THE

PATHOLOGY AND TREATMENT

OF

VENEREAL DISEASES.

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WITH ONE HUNDRED AND THIRTY-EIGHT WOOD-CUTS.

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PREFACE TO THE FOURTH EDITION.

Since the publication of the last edition of this work, the contributions to our knowledge of Venereal Diseases have been extremely numerous and important. They have included tissues of the human frame, as the brain and nervous system, which but a few years ago were supposed to be exempt from the ravages of syphilis, but which are now known to be the seat of its frequent manifestation. Additional light has been thrown upon many other affections and upon many questions of pathology, which were erroneously supposed to be exhausted. Increased interest has been awakened in this department in almost every civilized country. Learned bodies, as the Pathological Society of London, have devoted session after session for months to the consideration and discussion of the more obscure forms of syphilis. New workers have constantly been entering the field, and the mass of material now at our disposal is simply immense.

The time has gone by when a treatise upon any medical or surgical subject, giving solely the experience and views of the author, will find more than a limited number of readers. Without undervaluing the experience of the author, both for its own sake and for the ability it gives him to weigh and sift the experience of others, the chief object of the reader is to ascertain the present state of our knowledge upon the subject of which he reads. To accomplish this there must be collected for him, in a clear and acceptable form, every important fact and theory from many widely distributed sources to which he has no access, or which he would not have the time, and, possibly, not the ability to use, if he had them at hand. But in the present

instance, as now in many departments of science, the material to be collected was so scattered in various volumes of Transactions, in monographs, and in medical journals, and so many specialties had sprung up within this one specialty, that the labor involved in issuing a fourth edition of this work was recognized as formidable, and even sufficient to afford some ground for the assertion made by one well versed in the subject, that: "In future it will be impossible to include Venereal Diseases in a single treatise; they can only be studied and known in separate monographs."

That, however, such a treatise on a level with our present knowledge was demanded by the Profession, and that, if well executed, it would not fail to meet with the same favorable reception which had been accorded to the three previous editions of this work, was never for a moment doubted by the author, whose chief embarrassment lay in the want of time and strength. Fortunately he was able to overcome this difficulty by the association with him of a gentleman, Dr. R. W. Taylor, of this city, who was already well known in the United States and abroad by his original contributions to our knowledge of Venereal Diseases, and who was admirably adapted, both by his own experience and by his extensive reading, to engage in a work which has occupied us conjointly for the last two years. Still further, Dr. E. G. Loring, Surgeon to the New York Eye Infirmary, who revised the Chapter on Diseases of the Eye in the last edition, kindly consented to do the same in this. We are also under great obligation to Dr. C. H. Knight for most valuable assistance rendered us in preparing the manuscript, and also for the very complete index appended to the work.

As a result of these labors, the reader will find rather a new work than an old one revised, more portly in its dimensions than the last edition by 131 pages, but, as a reduced size of type has been employed, the volume is estimated to contain about one-half more reading matter than its predecessor. There is not a chapter in the book which has not been revised and the attempt made to bring it up to our present knowledge. Entirely new chapters have been called for to include affections until recently unknown,

and the greater part of the work has been rewritten from our present standpoint. A new feature of this edition has been the introduction of chapters upon certain diseases, which, although not strictly venereal, are liable to be mistaken for such, and often come under the care of the venereal specialist; we refer particularly to affections of the scrotal organs and to some simple affections of the skin. The number of illustrations has been largely increased. It will be seen that metric weights, as well as the ordinary troy measures, have been given in all prescriptions; and the attempt has been made, though confessedly with many errors and omissions, to follow the "Abbreviations of the Titles of Periodicals," adopted by Dr. Billings in the Library of the Surgeon-General's Office.

FREEMAN J. BUMSTEAD.

New York, Oct. 12, 1879.

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ERRATA.

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" 763, 13th line from bottom, *omit* "areata" after "alopecia."
" 764, 11th and 16th lines from top, *for* "Weisflag," *read* "Weisflog."
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VENEREAL DISEASES.

INTRODUCTION.

Venereal Diseases, so called from their most frequently originating in the pleasures of Venus, are the following:—

I. Gonorrhœa.
II. The Chancroid.
III. Syphilis.

Other affections may indeed be contracted in sexual intercourse, but those above mentioned, which depend more exclusively upon this mode of origin, and which are commonly recognized as *The Venereal Diseases*, will form the subject of the present work.

The distinct nature of these three diseases, and especially of the latter two, has not always been admitted, and still finds opponents. Many volumes have been written and much bitter controversy indulged in by the advocates of either side.

In the earlier editions of this work, this subject received considerable space and attention. Indeed, ours was the first *comprehensive treatise* upon Venereal diseases, published in any language, in which the distinct nature of the Chancroid and Syphilis, so ably advocated by Bassereau, was made the basis of the work; and we have reason to believe that to the satisfactory manner in which this new theory explained many facts before obscure, was to be attributed the favorable reception of our earlier efforts.

In the present edition we do not intend to enlarge upon this question; we shall on the contrary curtail or omit much that we have said before. We must reserve our space for the many practical points which have been accumulating during the last ten or fifteen years, and which are now engrossing the thoughts of those interested in Venereal. We claim that the distinct nature of the Chancroid and Syphilis is a question already settled in the affirmative, as recognized *absolutely* by the great majority of the profession, and as recognized *practically* by all with a few rare exceptions. Dr. Frederick Zinsser,[1] in an admirable review of this subject, makes the

[1] The Doctrines of Unicism and Dualism of the Syphilitic Contagion, Am. J. Syph. and Derm., N. Y., vol. i, 1870, p. 238.

following true remark: *So simply and naturally the double contagion explains the different forms* (of venereal disease), *that even after the fall of dualism, should that event occur, clinically the differentiation would be perpetuated.*

Wishing to fill our book with living issues, we shall, for the most part, leave dead ones buried, contenting ourselves with a brief history of their lives for the benefit of our junior readers. There is only one point upon which we shall somewhat enlarge on account of its comparative novelty. We shall endeavor to establish the fact that not only is the chancroid distinct from syphilis, but that it possesses no specific *virus* of its own, and that it may arise independently of contagion, from the inoculation of the products of simple inflammation. We would thus make it a strict *congener* of gonorrhœa.

History of Venereal Diseases.

Gonorrhœa.—Gonorrhœa has existed among all nations, and from the earliest times of which we have any record. It is clearly referred to by Moses in the 15th chapter of Leviticus, where he lays down rules for the government of those who are affected with "a running issue out of the flesh."

Among the Greeks and Romans, gonorrhœa appears to have been less common than among the Hebrews; still, unquestionable traces of it are found. Hippocrates describes five kinds of leucorrhœa, in addition to discharges dependent upon inflammation of the womb, which are mentioned separately. Herodotus states that "the Scythians made an irruption into Palestine and pillaged the temple of Venus Urania. The angry Goddess sent upon them and their posterity the woman's disease, which is characterized by a running from the penis. Those attacked by it are looked upon as accursed."[1] Celsus[2] was also acquainted with balanitis and gonorrhœa; the latter dependent, as he supposed, upon an ulcer within the urethra; and Cicero says that "incontinence gives rise to dysuria, in the same manner that high living causes diarrhœa."

At subsequent periods, this disease, and, in many instances, its complications of swelled testicle and cystitis, were described with more or less detail by Mesue[3] in 904; by Haly Abbas,[4] one of the Persian magi, who followed the doctrines of Zoroaster and wrote in 980; by Rhazes,[5] a learned Arabian physician, born in Chorosana in 852; by Albucasis,[6] another Arabian of the eleventh century; by Constantine of Carthage;[7] by Michael Scott[8] in 1214; by Gariopontus of Salerno; by Rogerius, John Gaddesden[9]

[1] Clio, lib. i.
[2] De Medicinâ, book vi, chap. 18.
[3] Summ. iii, part 4, sect. i.
[4] De Virgæ Passionibus, Causis eorum et Signis, book ix, chap. 28.
[5] Rhazes, book x, chap. 3.
[6] Theoric. nec non Practic., tract. xxi, fol. 92 et 93.
[7] Constantinus Africanus: De Morborum Cognitione et Curatione, lib. v.
[8] Michael Scott: De Procreat. Hom. Physion., cap. vi.
[9] John Gaddesden: Rosa Anglica, Practica Medicinæ, a Capite ad Pedes, lib. ii, c. xvii, fol. 107.

of England (commencement of fourteeth century); John de Concoregio,[1] John Arculanus, Guy de Chauliac,[2] Valescus de Tarento, John Ardern,[3] settled at London in 1371; and by many others. Since the close of the fifteenth century, when the study of venereal diseases received new impulse from the irruption of syphilis into Europe, it is hardly necessary to state that every medical writer has been familiar with the existence of gonorrhœa.

The Chancroid.—A contagious ulcer of the genital organs, presenting all the symptoms of, and undoubtedly identical with the ulcer now known as the chancroid, has also existed at all ages whose records have been preserved. Ulcers of the genital organs and suppurating buboes are described by nearly all the Greek, Latin, and Arabian writers on medicine. Hippocrates gives very minute directions for the treatment of abscesses in the groin, dependent upon ulcerations of the womb and of the genitals. Celsus is still more explicit, and clearly describes the simple, phagedenic, serpiginous, and gangrenous venereal ulcers, which are recognized at the present day. He also alludes to the danger of destruction of the prepuce when the ulcer is complicated with phimosis, and, under such circumstances, advises circumcision. Many other names might be quoted, but it is unnecessary to adduce farther evidence, since it is generally admitted that ulcers of the genital organs dependent upon contagion in sexual intercourse, have been known from a very remote antiquity. The only point in dispute relates to their nature.

It is maintained by some authors, and especially by Cazenave, that these were instances of primary syphilis, and not chancroids, as here assumed; and they have been supposed to furnish evidence of the existence of syphilis in Europe prior to the close of the fifteenth century. This idea is inadmissible for several reasons. One argument against it is the frequency of suppurating buboes with which these ulcers are said to have been attended, since in the great majority of true chancres the inguinal ganglia which become indurated remain entirely passive; while the chancroid, on the contrary, is frequently accompanied by an inflammatory bubo terminating in suppuration. This consideration, however, will have no weight with those who do not allow, in cases of venereal sores, any prognostic value to suppuration of the inguinal ganglia; but we can well afford to waive it and base our argument upon the fact that there is no clear record in history of the existence of the general symptoms of syphilis prior to the year 1494; that the ulcer of the genitals known to the ancients was always a local affection, and never followed by manifestations at a distance from the point of contagion; that repeated outbreaks of the disease when once apparently

[1] Practica nova Medicinæ: Lucidnr, tract. iv, fol. 66.

[2] Cyrurgia Guidonis de Chauliaco, tract. vi, doct. ii.

[3] Becket: Philosoph. Trans., vol. xxx, p. 839.

Most of the above texts have been derived from a learned work written in the last century by Gruner, and entitled: Aphrodisiacus sive de Lue Venereâ in duas Partes divisus, quarum altera continet ejus Vestigia in Veterum Auctorum Monumentis obvia, altera quos Aloysius Luisinus temere omisit Scriptores, Jena, 1789.

cured did not occur; that hereditary syphilis was unknown;[1] and finally, that the physicians who lived at the close of the fifteenth century, and who were perfectly familiar with the ulcers in question, were struck with horror and amazement at the appearance at this time of a disease which is now known to have been syphilis; confessed that they had never seen its like before, and that they were ignorant of its nature and treatment; and in their treatises upon venereal for nearly thirty years afterwards, described this and the former disease in separate and distinct chapters, thus showing that they did not entertain the least idea of their identity.

Subsequent to the latter part of the fifteenth century, we must follow the history of the chancroid in connection with that of

Syphilis.—According to the most reliable contemporary authors, syphilis was first known to European nations from its appearance in Italy in the latter part of the year 1494, about the time that Charles VIII., King of France, at the head of a large army, entered that country for the purpose of taking possession of the kingdom of Naples, to which he laid claim by right of inheritance. In this expedition, which was at first favored by the Neapolitans themselves, Charles left Rome on his way to Naples Jan. 28, and was received in the latter city Feb. 21, 1495.[2] The Neapolitans soon became restive under the yoke of their new master, and, assisted by the forces of Ferdinand of Aragon, under the leadership of Gonsalvo of Cordova, the great captain, endeavored to expel the French from Italy.

Now, although the new disease may have had no necessary connection with the events just mentioned, yet the latter doubtless favored the extension and exacerbation of the former through the license and debauch attending large bodies of troops, and subsequently led to mutual recrimination between the natives and the invaders respecting the origin of the malady; the French calling it "Mal de Naples," because it was to them unknown before the Neapolitan expedition, and the Italians ascribing its origin to the French, and calling it the "French disease."

It is often asserted that the subsequent extension of syphilis was due to its conveyance to their homes after the close of the war by the troops which had been collected upon Italian soil. This could not, however, have been the sole, nor even the chief mode of its transmission; since the French, on their return from Naples, fought the battle of Fornovo, July 6, 1495,[3] and a decree of Emperor Maximilian I., "Contra Blasphemos," promulgated at the Diet of Worms, August 7, of the same year, includes among the evils sent as a punishment against the prevailing vice of blasphemy, "præsertim novus ille et gravissimus hominum morbus, nostris diebus exortus, quem vulgo Malum Francicum vocant, post hominum memoriam inauditus, sæve grassatur,"[4] thus showing that syphilis had already

[1] Syphilis in infants at the breast is first mentioned by Gaspard Torello (1498).
[2] Guicciardini, lib. i, cap. iv.
[3] Guicciardini, lib. ii, cap. iv.
[4] Goldast. Const. Imp. ii, 110.

spread so widely in Germany as to attract general attention about the time that the French left Italy.

The testimony of other authors also concurs in showing that syphilis rapidly extended in the course of a few years over the greater part of Europe, and pervaded every rank of society. As stated by John Lemaire, a poet of that period:—

Il n'espargnoit ne couronne ne crosse.

A large amount of evidence is adduced by Bassereau[1] and Chabalier[2] in support of the fact already mentioned that syphilis was entirely unknown in Europe prior to 1494. Its connection with sexual intercourse was not at first recognized, and many attributed it to the evil influences of the stars; and although a few endeavored to assimilate it to certain diseases of ancient times, as, for instance, to the "asaphati" of the Persians, the mentagra which prevailed at Rome under Tiberius, to psoriasis, elephantiasis, and lepra, yet the greater portion of the writers of that period declared that it was entirely new in the world's history, and all confessed that, so far as their own experience went, they had never seen anything like it.

The contagious ulcers of the genitals which were known prior to the latter part of the fifteenth century, were called "caries," "caroli," and "taroli," and the first of these terms was afterwards applied to the new disease, which, however, was distinguished as the "caries gallica." Moreover, in the works of Marcellus Cumanus, Alexander Benedictus, Leonicenus, Gaspar Torella, John de Vigo, and other authors who wrote within thirty years after the appearance of syphilis, these two affections were described in separate chapters with many of the distinguishing features that are recognized at the present day. Thus John de Vigo mentions the induration of those ulcers which are followed by constitutional symptoms: "Cum calositate eas circumdante;" and none of the writers of this early period, when speaking of the French disease, make any allusion to suppurating buboes, which are described apart and referred to the "caries non gallica" known in ancient times. An exceedingly accurate description is also given of the cutaneous eruptions, the nocturnal pains, the bony tumors, and other general symptoms of syphilis; and notice is taken of the fact that a cure is in most cases only temporary, and that the disease often returns. Moreover, the early writers on syphilis believed in the contagiousness of general symptoms, and even of the blood of infected persons, which has recently been demonstrated by actual experiment.

Origin of Syphilis unknown.—None of the theories which have been advanced to account for the appearance of syphilis in Europe near the close of the fifteenth century, rest upon sufficient data to entitle them to absolute credence. We cannot suppose that it was of the nature of an

[1] Affections de la peau symptomatiques de la syphilis, Paris, 1852.

[2] Preuves historiques de la pluralité des affections dites vénériennes, Thèse de Paris, 1860 (No. 52).

epidemic and due to atmospheric influences, since it is expressly stated by those who witnessed its advent that it did not suddenly affect large numbers of persons of all ages, but spread from one to another, chiefly attacking the middle-aged (the very class most exposed in sexual intercourse), and sparing old men and infants, and the inhabitants of cloisters, and that it advanced from Italy as a centre, and occupied several years in extending to the more remote countries of Europe. Moreover our present knowledge of the disease enables us to state with confidence that it never appears except as the result of contagion.

Supposed American Origin.—The theory which has met with the most favor, refers the origin of syphilis to America, whence Columbus returning from his first voyage, landed at Barcelona, in Spain, in 1493, only a year before the appearance of the disease in Italy. According to Chabalier, it was stated by John Baptist Fulgosus, Doge of Venice, as early as 1509, that a new disease, communicated only by coitus, and first affecting the genital organs, had broken out in Spain, and had thence been transported to Italy, and also that it came into Spain from Africa: "Quæ pestis primo ex Hispania in Italiam allata, ad Hispanos ex Æthiopia, brevi totum terrarum orbem comprehendit." The idea that syphilis was brought to Europe from America by the sailors under Columbus was first advanced by Leonard Schmans, in 1518, Ulrich von Hutten in 1519, and Fracastori in 1521.

There can be no doubt that syphilis existed in the colony founded by Columbus during his second voyage, but whether indigenous to the West Indies, or brought there by the Spaniards, is unknown. Washington Irving, in his Life and Voyages of Columbus,[1] says, when speaking of the colony at Isabella: "Many of the Spainards suffered also under the torments of a disease hitherto unknown among them, the scourge, as was supposed, of their licentious intercourse with the Indian females; but the origin of which, whether American or European, has been a subject of great dispute."

Prof. Joseph Jones[2] has written an able and interesting article on syphilis among the Aborigines of this country, and endeavors to demonstrate its existence at that very early period by the skeletons found in the ancient burial places in Georgia, Tennessee, Kentucky, Louisiana, and Mississippi. The marks of syphilis in the bones exhumed have been traced by Dr. Jones from the valley of the Cumberland to the Gulf of Mexico.

The supposition had been advanced, that these bones presented merely "traces of periostitis," which were not due to the action of the syphilitic poison, because "it is uncommon to find shin-bones of adults belonging to races clad in skins and with the lower extremities exposed, in which there is not more or less roughness or hyperostosis along the tibial shafts." So far from these evidences of the action of syphilis being mere "traces of periostitis, and constituting mere roughness or hyperostoses along the

[1] Vol. i, book vi, chap. xi.
[2] N. Orl. M. and S. J., June, 1878.

tibial shafts," the bones are in many instances thoroughly diseased, enlarged, and thickened, with the medullary cavity completely obliterated by the effects of inflammatory action, and with the surfaces eroded in many places. These erosions resemble in all respects those caused by syphilis and attended by ulceration of the skin and soft parts during life. Furthermore, the disease was not confined to the "tibial shafts;" bones of the cranium, the fibula, the ulna, the radius, the clavicle, the sternum, and the bones of the face exhibited unmistakable traces of *periostitis, ostitis, caries, sclerosis, and exostosis.*

That these diseases were not due to mechanical injury or to exposure to cold, is evident from the fact that they were almost universally symmetrical. Thus, when one tibia was diseased, the other was similarly affected, both as to the position and nature of the disease. In like manner both fibulæ presented similar evidences of periostitis, ostitis, and exostosis; this was true also of the bones of the forearm (radius and ulna) and of the clavicle.

"The diseased bones which I collected," says Dr. Jones, "from the stone graves of Tennessee and Kentucky, are probably the most ancient syphilitic bones in the world." And he adds, "this discovery appears to be of great importance in the history of specific contagious diseases, in that it confirms the view held by some pathologists that syphilis originated in the Western hemisphere."

It must be confessed that the investigations of Dr. Jones go far to favor the idea that syphilis existed among the early aborigines of America, and was conveyed by the crew and soldiers of Columbus to Europe.

Again, according to Captain Dabry,[1] *Consul de France en Chine*, Chinese medical literature affords evidence of the existence of syphilis in that country and of its treatment by mercury, many centuries before the birth of Christ.

In concluding this subject of the origin of syphilis, we can only express our firm belief that this disease was unknown in Europe prior to the last decade of the fifteenth century, but we may add, in the words of Voltaire, "*la vérole est comme les beaux-arts, on ignore quel en a été l'inventeur.*"

Age of Confusion in Venereal.—The views that were entertained by those who witnessed the first appearance of syphilis in Europe, and which in many respects coincided to a remarkable degree with those which have been advanced in the middle of the nineteenth century, gradually lost their hold upon succeeding generations, and were followed by the utmost confusion of ideas respecting this subject. A most admirable history of this "age of confusion in venereal," as it has been called, is given by Bassereau, which should be read by every one who would understand the origin of those errors from which the medical mind has completely freed itself only within a very few years.

"A tendency on the part of a very few authors, as Vella (A. D. 1508),

[1] La médecine chez les chinois, Paris, 1863.

to confound together the various venereal diseases, became manifest in the early part of the sixteenth century, but the absolute confusion which ultimately reigned, was especially the work of those physicians, who had commenced the practice of their art subsequent to the year 1495, and who, therefore, were unable to compare the new disease with the venereal affections which had prevailed from time immemorial, before the close of the fifteenth century. In following the change which took place, we find that the first step was to make no distinction in their writings between the old and new ulcer, and to include in their descriptions of syphilis certain complications which belong almost exclusively to the ancient variety. Thus Nicholas Massa (1532), the author of a celebrated treatise on the French disease, includes among the unequivocal symptoms of this affection, suppurating buboes, which accompany almost exclusively the ulcer of the ancients.

"As the venereal ulcer of the ancients and its attendant suppurating bubo began to be included among the symptoms of syphilis, treatises on surgery ceased to contain those special chapters in which contagious ulcers of the genital organs and inguinal abscesses had heretofore been described. Discharges from the urethra were also included among the symptoms of syphilis, and still further modified the tableau. Finally, in the descriptions given of the French disease, not only were symptoms inserted which were completely foreign to syphilis, but the regular course of this affection was entirely forgotten.

"This confusion was rendered complete by Anthony Musa Brassavolus. This physician, who was a laborious student rather than a sagacious observer, seems to have made it an object of his treatise upon the 'French Disease,' published in 1551, to collect together all the errors of the writers upon syphilis of this period, and to add others of his own invention. Not only did he include all venereal affections under the head of syphilis, but, as described by him, this affection lost its characteristic physiognomy, and was a mere collection of symptoms succeeding each other without order or regularity. According to this author, buboes may appear before chancres; syphilis may commence indifferently as an exostosis, an eruption upon the skin, pains in the bones, or falling out of the hair and teeth. He goes so far as to admit eight primary symptoms, which he calls the simple forms of the disease, and which by their union in various ways may give rise to an infinite variety of combinations, which he terms the compound forms of syphilis, and limits to two hundred and thirty-four in number.

"The modifications of the doctrines professed by those who witnessed the first appearance of syphilis in Europe, could not fail to affect the treatment of venereal diseases. Before the year 1495, ulcers of the genital organs, the suppurating buboes dependent upon them, the various forms of vegetations and discharges from the urethra, were considered as purely local affections, and treated by means of local remedies. As soon as the French disease appeared, the insufficiency of all topical applications in the treatment of the new disease was manifest; but human ingenuity, never

more fertile in resources than under circumstances of great necessity, soon discovered in mercury a powerful modifier of the new complaint. For several years this remedy was employed in the form of frictions, and only in case the patient had broken out with an eruption following a sore upon the genital organs; but it soon became the custom to resort to mercurial inunction immediately after contagion and during the existence of the primary sore, with a view of preventing the appearance of general symptoms. This practice was first recommended by James Cataneus, who thought that the same remedy which cured the pustular eruption would also prevent it. 'Hæc enim onctio, absque dubio, tale destruit virus quod enim unam sanat ægritudinem, ab eâdem præservat.'

"This wise precept, to employ mercurial medication during the existence of the primary sore for the purpose of preventing a general eruption, soon gave rise to the most serious errors; for, about the time that it was given, physicians began to ignore the distinction between the two species of ulcers, and were consequently led to treat them all indiscriminately with mercury. This injurious, not to say barbarous practice, led to an exaggerated estimate of the powers of mercury, which, for three centuries, was given to a multitude of patients, who were supposed to be preserved through its influence from symptoms of which they stood in no danger.

"Hence we may explain the success of all those modes of treatment which charlatans have endeavored to substitute for mercury during the existence of supposed primary symptoms, as a prophylactic against secondary manifestations; since, if the same treatment, no matter what, be applied without distinction to patients with gonorrhœa, ulcerations, and buboes, there will always be a large proportion who will escape farther trouble, for the simple reason that their symptoms do not belong to the disease which first appeared in the fifteenth century, and are, therefore, incapable of infecting the general system."

The Modern School of Venereal.—The above-mentioned confusion of ideas relative to venereal diseases, with the consequent indiscriminate mode of treating them, continued unabated until towards the close of the last century, and did not wholly cease until after the first half of the present century had passed. Even as late as 1850 we find Vidal including under the name of syphilis catarrhal inflammation of the genital organs. As late at least as 1860, the Professor of Surgery in one of the chief universities of this country was teaching his students that gonorrhœa was liable to be followed by secondary symptoms, and should be treated with mercury!

The identity of gonorrhœa with syphilis was, however, denied even in the last century by Astruc,[1] Balfour,[2] and Benjamin Bell.[3] It was believed

[1] De morbi venereis, Paris, 1740.

[2] Dissert. de gonorrhœa virulenta, Edinburgh, 1767.

[3] Treatise on gon. virulenta, and lues venerea, Edinburgh, 1793.

in by Hunter, but met with further opponents in Swediaur,[1] Hernandez,[2] and especially Ricord, who by the use of the speculum in venereal diseases, and his discovery of the *chancre larré*, refuted the chief arguments which had been adduced in its favor, and established the non-identity of the two diseases beyond dispute forever. This was the first step taken towards the formation of "The Modern School of Venereal."

The idea that all venereal sores are due to a single virus, the virus of syphilis, had been the prevailing one for nearly three centuries prior to the year 1852. At the same time, it had not escaped the notice of many observers that the results of contagion were by no means identical; that, in some cases, the persons infected showed no symptoms after the healing of their ulcers, while others developed a train of symptoms lasting through years, and even transmissible to their children.

In the year 1852, Bassereau claimed a distinct cause or origin for each of these two classes of cases. He founded his claim, first, on the history of venereal sores, which we have already referred to, and which shows that although contagious ulcers of the genital organs, communicated in sexual intercourse, had been well known to the ancients, yet that the constitutional disease which we call syphilis made its first appearance in Europe in the latter part of the fifteenth century.

Bassereau's second argument was based upon the "confrontation" of persons affected with venereal diseases, and he and others were able to prove, in several hundred cases, that when the disease was local in the giver it was also local in the recipient, and that when it was constitutional in the giver it was always constitutional in the recipient; in other words, that the broad line of distinction separating a local disease on the one hand from a constitutional disease on the other, was constant in successive generations without limit.

It will be observed that this proof does not involve any differences real or supposed in venereal ulcers themselves; it may be said to rise above such consideration in that it ascends to the source and origin of such sores; and we do not hesitate to say that much of the confusion and contradiction of opinion upon this subject has been due to the fact that observers have confined themselves to investigating certain symptoms of venereal ulcerations, which, though generally constant, may yet be poorly marked or even wanting, and which often require practised eyes and fingers for their recognition.

We maintain that this clinical proof adduced by Bassereau has never been shaken, for, although local ulcers have been produced by the inoculation of matter from syphilitic sores, yet this is susceptible of, and indeed requires, as we shall see hereafter, another explanation than an identity of poisons, and, on the other hand, *there has never been a single authentic case in which syphilis has been produced by the inoculation of chancroidal matter from a person who has had only a chancroid and not syphilis.*

[1] Traité complet des maladies vénériennes, Paris, 1801.

[2] Essai analytique sur la non-identité des virus gonorrhéique et syphilitique, Toulon, 1812.

Bassereau does not appear to have speculated on the cause of the difference in venereal ulcers. We do not find in his work the words "Unity or Duality of Syphilis," nor any expression of opinion as to the existence of a specific virus for the local sore. He simply says that he is obliged to recognize a different cause (*une cause différente*) for the local and constitutional diseases.

A school of dualists, however, soon sprang up, with Rollet, of Lyons, at its head, who departed from the simple faith of their founder in attaching undue importance to the characteristics of the sores themselves, and who claimed for the local sore a distinct, special virus of its own.

One of the tenets of this school was that the secretion of syphilitic lesions could not be inoculated with success either upon the person bearing them or upon any other person affected with syphilis, and this tenet, in the theory of dualism, was looked upon as vital.

It was not long, however, before it was successfully attacked and overthrown. Clerc, of Paris, Melchior Robert, of Marseilles, and others, succeeded in inoculating the secretion of syphilitic sores upon the bearers, with the result of producing ulcers, without incubation, bearing all the characteristics of the chancroid, and inoculable in successive generations. Mr. Henry Lee, of London, and Köbner and Pick, in Germany, also found that a true chancre would become auto-inoculable, if it was irritated by the application to its surface of powdered savine, or by having a seton passed through its base, so as to render its secretion decidedly purulent. Again, Boeck and Bidenkap, in Christiania, in their later attempts at syphilization, took matter exclusively from true chancres, and obtained the same result as when they had inoculated chancroidal pus. In five cases reported by Bidenkap and Gjör, of Christiania, matter was taken from ulcers obtained in the above manner, and inoculated by patients free from syphilis upon themselves, and in only one instance did any general symptoms ascribable to syphilis follow, and these were of a doubtful character.

These experiments *apparently* proved the identity of the syphilitic poison with that of the local sore. By their means, it was supposed that the doctrine of duality was demolished, and the advocates of unity were triumphant. Whether this conclusion was not too hasty, we shall presently take occasion to inquire. But these experiments *actually did* prove the absence of any distinct *specific* virus in the chancroid, incapable of generation *de novo;* for here were chancroids artificially produced independently of any descent from chancroids.

To defend themselves, the dualistic school took refuge in the "mixed chancre," a sore combining both the syphilitic and chancroidal poisons, which, it was asserted, would satisfactorily explain all these cases and still leave the tenets of dualism, as at that time understood, intact. This explanation was for a while regarded as satisfactory, but it could no longer be upheld when such experiments had been multiplied indefinitely; when their number was so great that the chance of the commingling of two kinds of specific virus and their simultaneous inoculation was reduced to an absurdity; when an indurated syphilitic primary lesion could be taken

at random, and, after due irritation, its secretion could be successfully inoculated with the effect of producing pustules and ulcers bearing every characteristic of the chancroid; and when the same result could even be obtained at will by the inoculation of the secretion from a purely secondary lesion, as, for instance, a syphilitic mucous patch! If the chancroid was dependent upon a distinct specific virus, its presence in all these cases was simply impossible, and yet not a single shade of difference could be pointed out between the result produced and that from the most emblematic chancroid ever met with in practice. Dualism was indeed henceforth dead, if by "dualism" be meant that each of the two kinds of venereal sore has a *distinct, specific* virus of its own. In the face of the experiments referred to, we cannot believe it possible to defend in future any such doctrine of duality.

But the last word had not been spoken in favor of a distinct origin of the chancroid from that of syphilis, nor the last experiment made and recorded which would decide this question. Let us examine more carefully the experiments just referred to. What was the matter so successfully inoculated? The pure, unmixed virus of syphilis? By no means. It was a compound product, taken, to be sure, from a syphilitic lesion, but a lesion irritated commonly to suppuration by artificial means; containing possibly the germ of syphilis, but containing also, and in fact chiefly composed of, *pus*. Which of these two factors was responsible for the effect produced? The syphilitic virus? In that case this virus should have preserved its power of infecting the constitution, and matter taken from these ulcers, and inoculated upon healthy individuals, should invariably have produced syphilis, which has been shown not to be true. Moreover, if it could be proved that pus alone, free from all suspicion of syphilitic mixture, was capable of producing the same result, then *pus* was the guilty factor, and there was no such transformation as supposed by the unitists. Such proof we now have, as will be seen from the following cases:—

In 1865, Prof. Pick, at the suggestion of Prof. Zeissl, inoculated simple, non-venereal matter of inflammatory origin upon syphilitic subjects. Taking the secretion of pemphigus, acne, scabies, and lupus, he inoculated it upon persons affected with syphilis and produced pustules, not preceded by incubation, and the matter of which was further inoculable through several generations. Counter-inoculations upon the persons free from syphilis who were the bearers of these affections, were without effect. The same result was attained by Kraus and Reder with the pus of scabies, and by Henry Lee with pus from a non-syphilitic child. The late Mr. Morgan, of Dublin, also succeeded in producing pustules and ulcers, identical in appearance with the chancroid and capable of re-inoculation through a number of generations, by inoculating syphilitic women with their vaginal secretions.

It would thus appear that the skin of syphilitic individuals possesses a marked vulnerability, a peculiar aptitude to become inflamed when acted upon by irritants; but this is nothing more than is seen in other and in non-syphilitic subjects, whose vital powers are impaired by any cause

whatever. For instance, it is well known that among medical students engaged in the dissecting-room, it is those who are run down by hard study and overwork, who are most likely to become inoculated by fluids from the dead body. Again, the idea which was entertained by some that there must be a syphilitic soil for such inoculations to succeed upon, has since been disproved by other experiments.

The earliest of these experiments, so far as I am aware, have never been published, and were performed in the winter of 1867–8 by Dr. Edward Wigglesworth, Jr., of Boston, upon himself, while pursuing his studies at Vienna. He has kindly furnished me with the following history: After stating the grounds which led him to the conclusion—original, it appears, with himself—that "*pus pure and simple might be the cause of the chancroid*," Dr. W. says:—

"I would state that I was free from all disease either hereditary or acquired; that I had never had a sore of any kind or any local or constitutional lesion of the skin or mucous membranes, and that I was merely a little run down from overwork in the hospital. I took from an acne pustule upon myself, pus, which I inoculated upon myself in three places on the anterior radial aspect of my left forearm at the junction of the middle and upper thirds, first pricking open the apertures of hair follicles and then rubbing the pus into them. The result in the course of three or four days was three well-marked pustules. From each of these I inoculated one new spot upon the same arm nearer the wrist. The result was three new well-marked pustules. From each of the three second series I again inoculated fresh spots still nearer the wrist, and again the result was positive. The second series was hardly as well marked as the first, and the third series was slightly inferior in vigor to the second; still all were well marked, the nine sores being at the same time present upon my arm. On removal of the crusts, perceptible ulceration of the skin was found to exist. Zeissl, with whom I was studying at the time (1867–8), happened to be lecturing upon dualism, and requested me to show my arm to the class to prove the production of ulceration from properly inoculated, simple, healthy pus. There were no buboes in my case, nor did the ulcerations require other treatment than exclusion from the air by means of a simple dressing, and cleanliness. The scars remain to the present day. I thus convinced myself and others—

"I. That the products of inflammatory action, if properly introduced into the human integument, may cause local ulcers, closely resembling chancroids and re-inoculable in generations.

"II. That this pus need not come from a syphilitic person or be inoculated upon a syphilitic person. If taken from, or inoculated upon, a person debilitated by any disease as syphilis, the effect would doubtless be the same though probably greater in intensity."

Many years subsequent to these experiments of Dr. Wigglesworth, Kaposi[1] published the following statement: "My own experiments have

[1] Die Syphilis der Haut, etc., p. 47.

taught me that non-specific pus, such as that from acne and scabies-pustules, when inoculated upon the bearers as well as upon other non-syphilitic persons, will produce pustules whose pus proves to be continuously inoculable in generations; that from these pustules losses of substance occur, which heal with the formation of scar-tissue; and that as the number of pustules produced increases, the inoculability of the pus derived from them diminishes and finally ceases altogether."

It is not necessary to dwell upon the exact correspondence of the result of such inoculations and that obtained by the inoculation of the so-called chancroidal virus.

The following case, occurring in the practice of Dr. R. W. Taylor and vouched for by him in all its details, is an instance of a chancroid originating *de novo*.

"C. P. C., aged 26, became syphilitic in 1869, presenting primary and secondary lesions. In March, 1870, he had a papular syphilide on the body, and on the 10th of that month he came to me with gonorrhœa in its acute stage. On the sixteenth he came with an inflamed group of unruptured herpetic vesicles, in every respect typical. He feared these were chancres, but said he had not had connection since the first of the month. At this time the gonorrhœa was still active. On the twenty-second he returned, feeling certain that he had chancres. I then found four typical oval chancroids on the under portion of the prepuce over which the gonorrhœal pus had flowed, since he had failed to follow my advice to keep the vesicles properly protected. His gonorrhœa was then on the decline. On the twenty-sixth he complained of pain in the right groin, and I found several enlarged painful glands. In spite of thorough cauterization at the previous consultation, the chancroids were still active. A few days later while intoxicated, he had intercourse with his wife, and about March 31st he told me he feared that she had become infected. On the 5th of April, the wife came to me with five or six typical chancroids at the fourchette and on the inner aspect of the labia minora. At this time the husband's chancroids were in process of repair, but he had a typical chancroidal bubo. Owing to neglect on the part of the wife her ulcers became very extensive and were followed by abscess in the groin, neither of which healed for more than a month. Up to this time I have reason to believe that the wife had led an irreproachable life. She certainly had never had syphilis. But, learning of her husband's infidelity, she became reckless, and two years afterwards contracted from another man a hard chancre on the left labium majus, for which, as well as for the subsequent secondary symptoms, she was treated by myself.

"To review the case briefly, a syphilitic man contracts a gonorrhœa and subsequently develops herpes vesicles, which in a few days are converted into typical chancroidal ulcers. I inoculated some of the discharge from the ulcers upon the patient's abdomen, and within a week a characteristic chancroid was developed. The experiment was, however, unnecessary, since additional proof was furnished by the formation of several chancroids on his left thigh, in consequence of his careless and uncleanly habits.

Finally, intercourse with his wife resulted in her having chancroids and buboes."

The idea that the products of inflammation are the source from which the chancroid springs, and that the simultaneous inoculation of these products and of the germs of syphilis accounts for the varying degrees of ulceration and other phenomena met with in varieties of venereal sores, will strike many as novel, and it is easy to foresee the objections which will naturally arise. It will be asked: Can it be possible that the pus from acne, ecthyma, or scabies can give rise to a sore equal in duration and severity to that produced by matter from a typical chancroid? Comparative inoculations upon the same individual with these two agents may even be adduced to show that this is not the case. In replying to such objections, it must be frankly admitted that we do not as yet fully understand all the laws governing the inoculation of septic matter. We cannot, for instance, fully explain why one individual should be more susceptible than another, why different parts of the integument, as that of the chest, the arms, and the thighs, should develop ulcers so varying in their destructive tendency as is shown in the practice of syphilization; why the secretion from purulent urethritis and purulent conjunctivitis should be interchangeable, and yet have no effect upon the mucous membranes of the mouth, nose, or ear; why a chancroid of the prepuce should inoculate other points of that membrane, and yet commonly spare the glans penis; or why one upon the os uteri should allow the walls of the vagina in contact with it to escape; and so with other instances that might be brought forward.

That the effect produced is to a great extent proportionate to the ulcerative action of the source from which the matter is taken, is evident to any one who has performed auto-inoculation from indurated chancres. If the chancre consist of a simple erosion with a watery secretion, seated upon an indurated base, the first two or three, or even more, attempts at auto-inoculation will probably fail; but as the surface of the sore becomes irritated to suppuration by repeated pricks of the lancet, these attempts will succeed, first in producing minute pustules and ulcers, but subsequently, as the suppuration increases, others larger and better developed. Taking these facts into consideration, it need not be wondered at if comparative inoculations upon the same individual with matter from a simple skin affection and from a chancroid of the genitals, should show greater severity in the latter. But without entering further into this subject, we claim it to be sufficient to have shown that the inoculation of the products of inflammation will produce an effect identical *in kind*, even if not in degree, with that of matter from the most typical chancroid.

The conclusions at which we have arrived may be summed up as follows:—

I. *The chancroid is entirely distinct from syphilis.*

II. *The chancroid, however, does not depend upon a specific virus of its own, incapable of being generated de novo.*

III. *The chancroid, in most cases met with in practice, is derived from*

a chancroid, but it may arise, especially in persons debilitated by any cause, from inoculation of the products of inflammation, either simple or syphilitic, and subsequently perpetuate itself from one individual to another as a chancroid.

IV. *The simultaneous inoculation of the syphilitic virus and of the products of inflammation gives rise to the "mixed chancre," and explains the different degrees of ulceration which the initial lesion of syphilis is liable to assume.*

We hold that this view of the nature of the chancroid is most consistent with our present knowledge of pathology, and that it affords the only complete and satisfactory explanation of certain cases met with in practice and of the phenomena observed in artificial inoculations. It has been adopted by Bäumler, who, in his recent able work on syphilis, after quoting experimental inoculations like those above given, says: "The necessary conclusion is, that the *poison of the soft chancre may, under certain circumstances, be produced de novo without the intervention of the syphilitic virus*, while the syphilitic poison propagates itself only in one continuous series. Hence the chancroidal poison, or whatever in these experiments produced the pustules resembling chancroids, cannot even be compared with the syphilitic poison, to say nothing of regarding them as identical."

In the recent well-known debate upon syphilis before the Pathological Society of London, that accomplished surgeon, Mr. Hutchinson, came within one short step of the truth when he admitted the origin of the local venereal sore to be "the products of syphilitic inflammation, but not usually containing the germs of syphilis." If he had omitted the adjective, "syphilitic," before the word "inflammation," his expression would have been consistent with the facts at present in our possession, and he would have found it inconsistent with such facts to proclaim dualism as dead, since dualism is nothing more than a duality of poisons in the evolution of venereal sores.

If the view here advocated be the correct one, it suggests an interesting analogy with the history of our belief as regards the nature of gonorrhœa, an affection which in the last century was regarded as due to the syphilitic virus. Ricord finally adduced convincing proof that it had nothing to do with syphilis. It was afterwards supposed to depend upon a virus of its own, the gonorrheal virus. We now know that it may be caused by any simple irritant, but more especially by the pus from the urethral and other inflamed mucous membranes, whether originating or not in contagion. Such as the history of gonorrhœa has been, so, we predict, the history of the chancroid will be.

In the preceding remarks, we have only casually alluded to the evidence in favor of a duality of poisons to be found in the symptoms presented by venereal sores themselves, and by the lymphatic ganglia in anatomical relation with them. The value of this evidence must always depend upon the observer's knowledge, skill, and experience in venereal diseases. How often do we witness the grossest errors in the diagnosis of venereal ulcers

made by men who are deservedly eminent in general practice! Moreover, instances not unfrequently occur in which the symptoms are ill-defined, and in which the most experienced will wait for further developments before expressing an opinion. Hence, so long as the symptoms of the sores themselves were alone considered, the question of unity or duality remained undecided. And yet the evidence founded on these symptoms is not to be despised, for in the great majority of cases they are sufficient to enable us to distinguish the syphilitic from the local sore, and the obscurity of some cases is readily explicable on the ground of the simultaneous inoculation of the products of inflammation and the germs of syphilis, and the well-known immediate action of the one and the incubation of the other.

Division of the Present Work.

Following the natural order suggested by the above considerations, we propose to divide the present work into three parts: the First treating of Gonorrhœa and its Complications; the Second of the Local Contagious Ulcer of the Genitals, or Chancroid, and its Complications; and the Third of Syphilis.

PART I.

GONORRHŒA AND ITS COMPLICATIONS.

CHAPTER I.

URETHRAL GONORRHŒA IN THE MALE.

Preliminary Considerations.—By far the most frequent disease originating in sexual intercourse, is an affection of certain mucous membranes, a prominent symptom of which is an increased secretion and discharge from the diseased surface. At various times and places, this disease has received different names founded on the prevailing ideas of the nature of the secretion referred to. At an early period in the history of Venereal, the discharge was supposed to consist of the semen, and hence the disease was called gonorrhœa, from γονη, sperm, and ῥεω, to flow; a name which is still in use among American and English writers notwithstanding the incorrectness of the supposition in which it originated.[1] The French call the same affection "blenorrhagie," or a flow of mucus, a name which is also erroneous, since the discharge does not consist of mucus alone, but of a mixture of mucus and pus. In popular language it is termed "clap"[2] by the English, and "chaude-pisse" by the French.

The chief mucous membranes subject to gonorrhœa are those lining the genital organs in the two sexes, and the conjunctiva oculi. Gonorrhœa of the anus, mouth, and nose are, indeed, mentioned by authors, but the existence of all of them is more or less doubtful.

The symptoms and the treatment of gonorrhœa vary according as the disease affects the male or female, and according also to the portion of mucous membrane attacked; it will be convenient, therefore, to consider this affection under corresponding heads.

[1] Cockburne (The Symptoms, Nature, Cause, and Cure of Gonorrhœa, London, 1757) first established the fact that gonorrhœa is not a flow of semen.

[2] *Clip*, *clap*, *clippe*, to embrace, to fondle.

"*Clippe* we in covenant, and each of us *clippe* other."—*Piers Ploughman.*
"He kisseth her and *clippeth* her full oft."—Chaucer: *The Merchant's Tale.*
"Oh, let me *clip* ye in arms as round as when I woo'd!"—Shakspeare: *Coriolanus.*

"The lusty vine, not jealous of the ivy,
Because she clips the elm!"—Beaumont and Fletcher.

"Old French, *clapises*, public shops kept by prostitutes. *Hoblyn*;—*clapiers*, an old term for houses of ill fame."

Urethral Gonorrhœa in the Male.

Men are more liable to contract gonorrhœa than women; and of a given number of cases of this disease in the former, in a large proportion it is the urethra which is affected. Cases of urethral discharge in the male outnumber all other forms of gonorrhœa in the two sexes combined. The explanation of this fact will appear when we come to consider the causes and nature of gonorrhœa.

Symptoms.—The symptoms of urethral gonorrhœa in the male first appear, as a general rule, between the second and fifth day after exposure; though, in exceptional cases, as late as the seventh, tenth, or fourteenth day; but their occurrence after this time, as alleged by some authors, is, I believe, to be explained on the ground that the earliest manifestations of the disease have been overlooked. At first, the symptoms are very slight, consisting only of an uneasy and tickling sensation at the mouth of the canal, which, on examination, is found more florid than natural, and moistened with a small quantity of colorless and viscid fluid, which glues the lips of the meatus together. This moisture of the canal gradually increases in amount, until on pressure a drop may be made to appear at the orifice; at the same time it begins to lose its clear watery appearance, and assumes a milky hue. Examined under the microscope, it is found to consist of mucus with the addition of pus-globules; the number of the latter being proportioned to the depth of color of the discharge. Meanwhile, some smarting is felt by the patient in the anterior portion of the canal during the passage of the urine.

Such are the symptoms of the early stage of gonorrhœa. The exciting cause of the disease has been applied to that portion of the canal which lies near the orifice of the meatus and which was chiefly exposed to contagion, and the ensuing inflammation is gradually lighted up in this part, and has not yet extended beyond that portion of the urethra known as the fossa navicularis. This early stage of gonorrhœa is often called "the stage of incubation," a name which is objectionable because the inflammatory process is doubtless set up at the time of the application of the exciting cause. Time is required for it to produce its full effect, and the earliest symptoms are but slowly and gradually ushered in. A more appropriate name is the first or preparatory stage.

The first stage of gonorrhœa usually lasts from two to four days. The symptoms gradually increase in intensity, until, in about a week after exposure, the second or inflammatory stage may be said to commence. If we examine the penis during this stage, we find the mucous membrane covering the glans reddened, and the whole extremity of the organ swollen so that the prepuce fits more tightly than natural. In some cases the latter is puffed out by œdema in the cellular tissue, and phimosis may exist, rendering it impossible to uncover the glans. The inflammatory blush is especially marked in the neighborhood of the meatus, the lips of which are swollen so as to contract the calibre of the orifice. The urethra

is slightly more prominent than natural along the under surface of the penis, and is sensitive on pressure especially in the neighborhood of the fossa navicularis. The discharge has now become copious, so much so in some instances as to drop from the meatus as the patient stands before you. It is thick, of a yellowish cream color, and not unfrequently tinged with green. This greenish hue, as in the sputa of pneumonia, is due to the admixture of blood-corpuscles, which may be sufficiently numerous to produce the characteristic color of blood. The penis generally, and especially upon the under surface over the course of the canal, is painful and tender on pressure.

While passing his urine, the patient complains of intense pain which is now not confined to the anterior part of the canal, but is felt in all that portion of the organ anterior to the scrotum, or is even more deeply seated. The severity of the suffering during the act is in some instances very great. The pain is compared to the sensation of a hot iron introduced within the canal; and the popular name, *chaude-pisse*, given to the disease by the French, is fully justified. This pain is excited in part by the irritation produced upon an abnormally sensitive membrane by the salts contained in the urine, but chiefly, I am inclined to think, by the distention of the contracted and sensitive canal by the passage of the stream. Hence, during the act, the patient involuntarily relaxes the abdominal walls, holds his breath, and keeps the diaphragm elevated, in order to diminish the pressure upon the bladder and lessen the size and force of the stream of urine. In consequence also of the urethra being contracted and more or less obstructed by the discharge, the stream is forked or otherwise irregular.

Chordee.—Another source of suffering in this stage of gonorrhœa is the nocturnal erections, which are apt to come on after the patient is warm in bed. The genital organs are in a highly sensitive condition, and are readily excited by lascivious dreams, the contact of the bedclothes, or a distended bladder; or, independently of such exciting cause, they assume a state of erection which even in health is more apt to occur during sleep. When thus excited, it will often be found that the penis is bent in the form of an arc with its concavity downward. This condition is known as *chordee*. Its explanation is very simple. The urethra, the chief seat of the inflammation, runs along the under surface of the penis. Plastic lymph is effused around the canal, gluing the tissues together and rendering this portion of the penis less extensible than the remaining portion composed of the corpora cavernosa. Hence, in a state of erection, the corpus spongiosum surrounding the urethra, not being able to yield to the extension, acts like the string of a bow, and chordee is produced. The stretching of the parts thus adhering together excites pain, which is often very severe. The sufferer, awaking from sleep, instinctively grasps the penis in his hand, and bends it into a still smaller curve, so as to remove the strain from the under surface and thus ease the pain. I have been in the habit in my lectures of illustrating the mechanism of chordee by gluing

a piece of tape along the surface of an India-rubber condom, and then distending it with air or water.

The above explanation of the mechanism of chordee is the one usually received, though it is proper to state that it is rejected by Mr. Milton, who believes that chordee is due to spasm of the muscular fibres, which Kölliker and Mr. Hancock have shown to exist around the whole course of the urethra. Milton's explanation is opposed by the fact that bending the penis so as to increase the curve of the arc affords partial ease to the pain of chordee; and I am not convinced that the generally received opinion should thus be laid aside, though it is highly probable that spasmodic muscular action plays some part in the production of the frequent erections and chordee which take place in gonorrhœa.

Hemorrhage.—In the congested state of the vessels of the urethral mucous membrane which obtains in acute gonorrhœa, it is not surprising that blood should sometimes be found mixed with the discharge, imparting to it a reddish or rusty hue. This is the ordinary extent of the hemorrhage, although it may amount in a few rare cases to a decided flow of arterial blood, even when no special reason for its appearance, other than the gonorrhœa, is known.

It is, however, under sexual excitement that the hemorrhage is most likely to be free, and even alarming, especially to the patient and his friends. The occasion of it may be simply a violent erection. More commonly it is prolonged sexual excitement, induced by the presence, even in the absence of fondling, of the fair individual to whom the trouble was originally due. Any excess in exercise—walking, standing, etc., or any attempt at coitus which may be made if a man is under the effects of liquor, will evidently favor the same. Again, there is a practice in vogue among men of the town abroad, much more than in this country, of "breaking the cord," which consists in relieving themselves of the pain of chordee by laying the erected and bent penis upon a flat surface and straightening it by a blow. This dangerous practice is often followed by a copious hemorrhage, which may subsequently return on slight excitement, the vessels having once been ruptured. I say "dangerous," chiefly on account of the liability to hemorrhage following. It is said that it may also produce stricture, which is not unlikely. At any rate the practice is barbarous.

The amount of blood lost, under either of the above circumstances, varies of course in different cases. "A little blood goes a long way," so that the statements of patients should be received *cum grano salis;* but competent observers have estimated it, in rare instances, as one or two pints.

There are other discharges of blood, coming from the neck of the bladder, which take place in cases of gonorrhœal cystitis. These will be mentioned hereafter.

There are other important complications of the inflammatory stage of gonorrhœa, such as inflammation of the corpora cavernosa, folliculitis, periurethral abscess, lymphangitis, adenitis, etc. etc., which are worthy of

careful study, but which will be best treated of in subsequent chapters, to which the reader is referred.

The second stage of gonorrhœa, which we have now described, is variable in its duration in different subjects. As a general rule, it lasts from one to three weeks, being influenced by the constitution of the individual, his mode of life, and the number of his previous attacks. It is succeeded by the third stage or stage of decline. This final stage of gonorrhœa is characterized only by the disappearance of the more acute symptoms and a gradual return to a condition of health. The discharge runs through the same phases, in an inverse order, which it did at the outset of the attack. It gradually becomes less and less purulent, and finally is almost wholly mucous, before completely disappearing.

Perhaps the most valuable indication of the ushering in of this stage of gonorrhœa is the marked diminution or entire cessation of the pain in passing water. The painful erections and chordee may continue after the acute inflammation has subsided, since it takes time for the plastic matter effused around the urethra to be absorbed.

We have reason to believe that in the course of an attack of gonorrhœa, the disease gradually extends from the outer to the deeper portions of the canal, and it is in this latter situation that it is prone to lurk for an indefinite period. After the discharge has lasted for several weeks, we may evacuate the whole of the spongy portion by pressure from behind forward in front of the scrotum, and then, when no further discharge can be made to appear, we can still produce it by the exercise of similar pressure on the perinæum.

The duration of the final stage of gonorrhœa is, as a general rule, longer than either of the preceding. It may be cut short by treatment, but, if left to itself, commonly lasts for weeks or even months. Gonorrhœa is a disease which, independently of treatment, rarely terminates in less than three months.

Thus far I have said nothing of the reaction of this disease upon the general system. This varies greatly in different individuals and in different attacks in the same person. In some rare cases there is considerable febrile excitement during the inflammatory stage, marked by the usual symptoms of headache, dry skin, full pulse, furred tongue, etc. As a general rule, however, there is but little constitutional disturbance, and after the acute symptoms have passed, the invariable tendency of the disease is to depress the general health. This fact should be remembered in the treatment.

A first attack of gonorrhœa is usually more acute than subsequent ones; the latter often being subacute or chronic from the first. They are also more difficult to be influenced by remedies, and show a decided tendency to run into gleet.

Cases of gonorrhœa have been reported, in which it has been said there was no discharge whatever—all the other symptoms of gonorrhœa being present, and the disease following impure coitus. These have been called cases of dry gonorrhœa. I doubt whether there be a total absence of all

secretion in these cases throughout their whole course, but can readily conceive of an inflammation of the mucous membrane of the urethra, resembling that of erysipelas upon the skin, in which the secretion is for a time but slight, and incapable of detection except by a careful examination of the urine. As the inflammation subsides, however, I should expect to find distinct traces of a discharge. We have analogous symptoms occasionally in inflammations of the pituitary membrane of the nose. Two cases of this variety of gonorrhœa are reported by Dr. Beadle in the *New York Journal of Medicine and Surgery*, for October, 1840.

Causes and Nature of Gonorrhœa.—Every one is aware that urethral gonorrhœa in the male often proceeds from direct contagion, or, in other words, from intercourse with a woman affected with the same disease. But there is another mode of origin, admitted by nearly every writer, as of at least occasional occurrence, but with regard to the frequency of which some difference of opinion has been expressed. I refer to gonorrhœa originating in coitus just before, after, or during the menstrual period, or with a woman suffering from leucorrhœa, and, in a few instances, when nothing whatever abnormal can be discovered in the female genital organs, and the disease in the male can only be attributed to the irritant character of the vaginal or uterine secretions, or to excessive coitus often combined with the influence of alcoholic stimulants.

I have been convinced, by a somewhat extended observation, that gonorrhœa originating in this mode is of very frequent occurrence. Of one thing I am *absolutely certain*, that gonorrhœa in the male may proceed from intercourse with a woman with whom coitus has for months, or even years, been practised with safety, and this, too, without any change in the condition of her genital organs, perceptible upon the most minute examination with the speculum. I am constantly meeting with cases in which one or more men have cohabited with impunity with a woman both before and after the time when she has occasioned gonorrhœa in another person; or, less frequently, in which the same man, after visiting a woman for a long period with safety, is attacked with gonorrhœa without any disease appearing in her, and after recovery resumes his intercourse with her and experiences no farther trouble. The frequency of such cases leaves no doubt in my mind, that gonorrhœa is often due to accidental causes, and not to direct contagion.

In many of the instances referred to, the woman is suffering from a frequent combination of symptoms met with in practice, viz., general debility, engorgement of the cervix uteri, and more or less leucorrhœa; but her previous history, and the impunity with which her favors have been bestowed for a long period, preclude the idea that her discharge is the remains of a previous attack of gonorrhœa to which it owes its contagious property. Moreover, such an explanation fails to cover other instances, in which there is no appearance whatever of leucorrhœa, and the genital organs, so far as we can discover, are in a state of perfect health; although

intercourse about the time of the menstrual period has given rise to gonorrhœa in the male.

The greatest obstacle to the admission of gonorrhœa independent of contagion appears to be the rarity of urethritis in married men compared with the frequency of leucorrhœal discharges in their wives. As proved by unquestionable cases occurring in my own practice and in that of my medical friends, husbands do not always escape. That they are not more frequently affected is sufficiently explained by the immunity conferred against all simple irritants by constant and repeated exposure, whereby "acclimation"—to use a term adopted by the French—is acquired. The same fact is observed when neither the church nor the state has sanctioned marital relations; since it is not generally the habitual attendant upon a kept mistress affected with leucorrhœa who suffers, but some fresh comer who shares her favors for the first time.

My friend, Dr. B. Fordyce Barker, whose extensive experience with female diseases is well known, and who has thus had the opportunity of studying this subject from an opposite standpoint to my own, tells me that he has noticed a peculiar form of inflammation of the lining membrane of the uterus, in which the uterine discharge loses its alkaline reaction, becomes decidedly acid and acrid, and irritates and excoriates the mucous membrane of the vagina and the surface of the vulva. He adds, that, in *numerous* instances in married life, he has known this discharge to excite urethritis in the male between parties whose fidelity was unquestionable; and he has related to me a number in detail which I would gladly repeat, if space permitted.

Most cases of gonorrhœa from leucorrhœa or the menstrual fluid present no characteristic symptoms by which they can be distinguished from those originating in contagion. The contrary is frequently asserted, and it is said that the former class may be recognized by the mildness of the symptoms, the short duration of the disease, and the absence of contagious properties. I am familiar with the slight urethral discharge unattended by symptoms of acute inflammation, and disappearing spontaneously in a few days, which sometimes follows intercourse with women affected with leucorrhœa; but such instances are far less frequent than those in which the disease is equally as persistent and as exposed to complications as any case of gonorrhœa from contagion. Some of the most obstinate cases of urethritis I have ever met with have been of leucorrhœal origin, and have terminated in gleet of many months' duration. Diday has even set apart those cases of urethritis which originate in the menstrual fluid as constituting a distinct class, characterized by their greater persistency and obstinacy under treatment than cases of gonorrhœa from contagion.[1]

Those who maintain the non-contagious character of urethral discharges of leucorrhœal origin have failed to adduce the slightest proof in favor of their assumption, and it may safely be asserted that none of them would venture to make a practical application of their principles. The conta-

[1] Arch. gén. méd., Oct. 1861.

gious character of the leucorrhœal secretion is already proved by the existence of the disease in the male; why should not the same property be continued another, still another, and any number of removes from its origin? This supposition is sustained by analogy, since no fact is better established than that catarrhal conjunctivitis, or vulvitis in young girls, originating, for instance, from ascarides in the rectum, may be communicated from one person to another until all the members of a family, school, or asylum have become affected. At our public institutions for diseases of the eye such instances are very common, and the physicians of our children's asylums are well aware of the difficulty of eradicating mucopurulent conjunctivitis which has once sprung up among the inmates. At an orphan asylum under the charge of my friend, Dr. Leaming, this disease was introduced by a single child, brought from Randall's Island, and spread to twenty-two others before it could be arrested. Again, the leucorrhœa of pregnancy is sufficient to give rise to ophthalmia neonatorum: would any one, presuming upon its leucorrhœal origin, dare to apply a drop from the infant's eyes to his own? Several instances are recorded in which physicians have lost the sight of an eye with which the discharge of ophthalmia neonatorum has inadvertently been brought in contact. My friend, Prof. F. N. Otis, has taken pus from the eye of a *child* suffering from acute ophthalmia, and injected it into the urethra of an adult, with the effect of producing a gonorrhœa "which continued for four or five weeks, and was attended by the ordinary complications of œdema, chordee," etc.

The views which I have here advocated relative to the frequency of gonorrhœa independent of contagion, are by no means novel, and are entertained by many of our most eminent authorities, especially among the French, who possess unequal advantages for investigating the etiology of venereal diseases.[1]

Thus, to quote from Fournier: "Ricord says, 'women *frequently* give gonorrhœa without having it;' in my (Fournier's) opinion he should have said *most frequently*. For one case of gonorrhœa resulting from contagion, there are at least three in which contagion, strictly speaking, plays no part. From my own observations, I conclude that the man is oftener responsible for his gonorrhœa than the woman from whom he seems to get it; *he gives himself the clap oftener than he receives it.*"

The importance of this truth whenever a physician in the exercise of his profession incurs the fearful responsibility of passing judgment upon the virtue of a woman, and thus affecting her reputation and happiness (and often that of many others with whom she is connected) for life, cannot be

[1] Consult Ricord: Lettres sur la syphilis, 2d edition, p. 29. Diday: Nouvelles doctrines sur la syphilis, p. 515. Fournier: De la contagion syphilitique, p. 111. Sir Henry Thompson: Stricture of the Urethra, p. 120. Mr. Skey: London Medical Gazette, vol. xxiii (1838–39), p. 439. Berkeley Hill: Syphilis and Local Contagious Disorders, p. 376. Guilland: Des manifestations du rheumatisme sur l'urèthre et la vessie, 1876, p. 4. Otis: Clinical Lecture, Med. Record, N. Y., May 18, 1878.

overrated. In all such cases, the accused should receive the benefit of any doubt which may exist; and the physician who withholds it from her out of a morbid fear that he may be imposed upon, and thus runs the risk of convicting an innocent person, is unworthy of his calling. His province is to decide from the symptoms taken in connection with the known facts of the case, and unless these are sufficient to establish guilt beyond the shadow of a doubt, humanity demands at least a verdict of "not proven."

Other causes, in addition to those already mentioned, may give rise to urethral gonorrhœa in the male. Thus, unquestionable instances are reported in which a gouty or rheumatic diathesis without exposure in sexual intercourse has occasioned a discharge from the urethra. Dr. Guilland has collected a number of such published cases, with the addition of others of his own. In two of them, the patients had never had intercourse with women, so that the urethral discharge following an attack of rheumatism could not be looked upon as a mere coincidence. In other patients, one of them an interne in the Paris hospitals, and all of them of a rheumatic diathesis, too long a time had elapsed since the last act of coitus to ascribe the urethritis to contagion.

To finish with this subject of rheumatic gonorrhœa, I will here give Guilland's *résumé* of its characteristic features, italicizing those which he appears to regard as of the most importance: "Discharge *copious*, appearing suddenly and attended with little pain; disappears in most cases spontaneously after a comparatively short duration; general disturbance of the system frequent; *coexistence of rheumatic symptoms, or at least history of this diathesis. Above all, absence of any chance of contagion.*"

Ricord relates a remarkable case of tubercular deposit in different portions of the urethra of a strumous subject with symptomatic urethral discharge;[1] and a scrofulous diathesis is generally a strong predisposing, if not an active cause of inflammation of the urethra as well as other mucous canals.

Mr. Harrison reports the case of a medical practitioner who suffered from a puriform discharge, heat and pain along the course of the urethra, attended with frequent micturition, chordee, and sympathetic fever, after eating largely of asparagus.[2]

It is also claimed that arsenic, when producing a toxic effect either in consequence of the amount of the dose or the peculiar susceptibility of the patient, will act upon the urethral mucous membrane in a similar manner as it does upon the digestive tract and upon the skin, and cause urethritis. Two such cases are reported by M. Saint-Philippe.[3]

Among other causes of urethritis are free indulgence in fermented liquors, terebinthinate medicines, paraplegia inducing changes in the urine, the use of bougies, stricture, masturbation, prolonged excitement of the genitals, cancer of the womb, vegetations within the urethra, ascarides

[1] Bull. Acad. de méd., Par., vol. xv, p. 565.
[2] Lancet, London, Am. ed., Jan., 1860.
[3] Lond. M. Record, May 15, 1878, from the Gaz. méd. de Bordeaux.

in the rectum, dentition, epidemic influences, etc. The internal use of cantharides is peculiarly liable to excite gonorrhœa, which, in this case, commences in the deeper portion of the canal.

M. Latour, editor of the *Union médicale*, vouches for the truth of the following story: A physician, thirty years of age, had been continent for more than six weeks, when he passed an entire day in the presence of a woman whose virtue he vainly attempted to overcome, but who resisted all his approaches. From ten o'clock in the morning until seven in the evening, his genital organs were in a constant state of excitement. Three days afterwards he was seized with a very severe attack of gonorrhœa, which lasted for forty days.

A chancre within the urethra is attended with more or less thin and often bloody discharge, which will be more particularly described in a subsequent portion of this work.

Again, urethral discharges are sometimes due to changes in the mucous membrane lining the canal, induced by infection of the constitution with the syphilitic virus. In several instances I have observed a muco-purulent discharge coinciding with the first outbreak or a relapse of secondary symptoms, and so long after the last sexual act that it could not be attributed to the ordinary causes of gonorrhœa. Bassereau speaks of similar cases.[1] There is no more frequent seat of early general manifestations than the mucous membranes in general; and in the cases referred to changes probably take place in the urethral walls similar to the erythema, mucous patches, and superficial ulcerations which are found within the buccal and nasal cavities. These cases are very rare, and can only be distinguished from ordinary gonorrhœa by the previous history and coexisting symptoms of the patient. For instance, if there has been no exposure for a long period, and especially if secondary symptoms have recently made their appearance upon other mucous membranes, the urethral discharge is probably symptomatic of the constitutional disease. Since the secretions of secondary lesions are now known to be contagious, the discharge in these cases is doubtless so, also; it is not readily inoculated upon the person from whom it is derived nor upon any other affected with syphilis, but, if communicated to a healthy individual under the requisite conditions, it may give rise to a chancre.

Ricord's receipt for catching the clap may show how to avoid it: "Do you want to catch a clap? I will tell you how to do it. Select some woman of a pale lymphatic temperament—a blonde is better than a brunette—and the more 'whites' she has the better. Take her out to dine; order oysters first, and don't forget asparagus afterwards. Drink often and freely—white wines, champagne, coffee, liqueurs, they are all good. After dinner dance a while, and have your friend dance with you. Get well heated during the evening, and quench your thirst without stint with beer. At night play your part valiantly; two or three times are not too much, but more would be better. The next morning do not forget to take

[1] Affections syphilitiques de la peau, p. 356.

a prolonged hot bath; moreover, do not omit to take an injection. This programme having been conscientiously followed out, if you don't have a clap some good Deity must have saved you."

Fournier's statistics as to the class of women from whom gonorrhœa is most frequently derived are interesting:—

Public prostitutes	12
Clandestine prostitutes	44
Kept women, actresses	138
Shop girls	126
Domestics	41
Married women	26
	387

This table simply shows what daily observation corroborates, that there is not so much safety in what fast young men call "a good thing" as they believe; in other words, that more claps are caught in "nice little arrangements" than in brothels.

The inferences from what has now been said of the etiology of gonorrhœa relative to its nature, are so obvious that they require little more than mere mention. If in a large proportion of cases the disease can be traced to no other cause than leucorrhœa, the menstrual fluid, to excessive coitus, intercourse under circumstances of special excitement, inattention to cleanliness, the abuse of stimulants, etc., and if, when thus originating, it is undistinguishable, either by its symptoms, course, complications, or termination, from the same affection due to contagion, it is evident that it should be ranked among the ordinary catarrhal inflammations of mucous membranes, or, in other words, that it is a simple urethritis, the connection of which with sexual intercourse is a merely accidental, or at all events, not a necessary circumstance.

But—it may be asserted—the possibility of contagion proves the presence of a poison. Granted: but it does not follow that it is a *specific* poison, or one incapable of being produced by simple inflammation. Such a conclusion would be contrary to the facts adduced in the preceding pages, and, moreover, is not required by the analogy of inflammations of other mucous membranes; since, in muco-purulent conjunctivitis—*the true analogue of gonorrhœa*—we have precisely the same order of events, viz., inflammation originating in simple causes, and giving rise to a secretion which is contagious and capable of transmission through an indefinite series of individuals. The discharge from the two mucous surfaces just mentioned would even appear to be transferable, since that from the urethra applied to the eye gives rise to purulent ophthalmia, the secretion of which, if we may rely upon a few experiments by Thiry, of Brussels, will, when brought in contact with the lining membrane of the urethra, produce urethritis.

Based upon the fact that patches of granulations exist upon the urethral mucous membrane in most old cases of gonorrhœa, a theory has been

offered by M. Thiry[1] to the effect, that these excrescences are the essential element of contagion; without granulations, no contagion. This view is apparently indorsed by Désormeaux, but is untenable.

Lesions.—The pathological changes which take place in a case of gonorrhœa consist chiefly in hyperæmia of the urethral mucous membrane, with its attendant swelling and increased sensibility. The disease travels from the outer to the deeper parts of the canal, and, according to Désormeaux, has by the eighth day involved the anterior half, over which the mucous membrane is found to be reddened, roughened, and presenting the appearance of superficial ulcerations like those observed upon the glans in cases of balanitis. These changes remain the same at a more advanced stage, but involve the deeper parts of the passage, as the membranous and even prostatic portions. True ulcerations involving the whole thickness of the mucous membrane are not met with.

The follicles opening into the urethra are often attacked as well as the glands themselves, and are found filled with pus. In old cases, the mucous membrane becomes thickened, and of greater density. The subjacent tissues do not escape, and the areoli of the spongy tissue are filled up and effaced. With the lapse of time, the inflammation disappears from a great portion of the canal and limits itself to certain points, of which the most frequent is the bulbo-membranous region. These present a granular surface or even fungous elevations, and in rare instances, sessile or pediculated vegetations. The mucous membrane may be several times its normal thickness, firm, hard, and horny. Bands are sometimes found, stretching from one side to the other. The orifices of the glands may be obliterated or, in other cases, markedly dilated. To these changes should be added those which take place in the neighborhood of any stricture that may have formed, and which will be considered hereafter.

Since granulations of the mucous membrane are one of the chief things sought for in examinations with the endoscope, and since so much stress has been laid upon their presence, a fuller account of them is desirable.

The following is from Désormeaux,[2] being the result of his endoscopic examinations: "We have seen that gonorrhœa, when passing into the chronic stage, limits itself to the bulbo-membranous portion of the urethra, and that the mucous membrane of this part, at first simply deprived of its lustre, soon becomes uneven. These inequalities increase, multiply, and finally form rounded hemispherical projections (granulations). Then the diseased portion presents a surface of a deep red color, uneven, scattered over with round granulations, which are sometimes a little removed from each other and at other times closely opposed. The mucous membrane in the affected portion looks like a mulberry, both in its color and its granular surface.

"The granulations vary in size from that of a mustard seed to a millet

[1] M. Thiry's views have been published in a series of lectures in the Presse méd. belge, Brux., and are also advocated by Guyomar, Thèse de Paris, 1858 (No. 282).

[2] De l'endoscope, etc., 1865, p. 40.

or even hemp seed. The smallest appear to be of newest formation. This lesion is a perfect resemblance of the granulations found on the uterine neck and on the ocular conjunctiva. The granulations are almost always of a more or less deep red, and often of a dregs-of-wine color; but in some cases I have found in the midst of them other granulations, less numerous, small, and of a grayish color.

"These granulations may occupy a greater or less extent of the canal, most frequently about an inch to an inch and a half. Sometimes they involve the whole of the posterior portion, from the end of the spongy urethra to the vesical neck. An almost constant character is that the lesion is unique; it does not spread; there is no interruption between its two extremities; we do not find isolated patches, separated by portions of sound membrane. There is only one patch, before and behind which there is some inflammatory redness gradually shading off into sound tissue."

Désormeaux, Tarnowski, and others also describe herpetic patches in the canal, which are to be distinguished from the foregoing. "These patches of herpes correspond exactly to those observed on the skin, on the lips, and on the neck of the uterus. They are generally multiple and are found at different points of the canal. They have the same fugacious and mobile character as the ulcerations of the same nature met with in the mouth. A patch found to-day may be absent to-morrow, when others will be found in other places. They again differ from granulations in that they occupy generally a much less extent. Finally, their aspect is quite different; their surface is not granular, it is often merely deprived of its ordinary lustre (*dépolie*) like the aphthæ on the internal surface of the cheeks, or like the patches denuded of epithelium that are frequently met with on the buccal mucous membrane of smokers.

"We meet with still another form of herpetic urethritis, apparently of a deeper character. The ulcerations which it presents are less variable in their seat; they are uneven in their outline, and, were it not for accessory circumstances, one would be tempted, on superficial examination, to regard them as gonorrhœal ulcerations in the reparative stage; but, with a little attention, we find, that instead of projections, the inequalities of the surface are due to depressions. Hence, while a granular surface may be compared to that of a mulberry, the former resembles the depressions on the skin of an orange or the head of a thimble.

"Granular urethritis pursues an essentially chronic course and leads fatally to stricture. Herpetic urethritis is more under the influence of changes in the season, which control the evolution of rheumatic affections. The persistence of granulations on the one hand and the liability to herpetic eruptions on the other will explain why so many men have repeated attacks of gonorrhœa upon the slightest exposure."

Treatment.—The treatment of gonorrhœa must be adapted to the general condition of the patient, and especially to the stage of his disease. In the great majority of cases met with in practice, acute inflammatory symptoms have already set in at the time the patient first applies to the

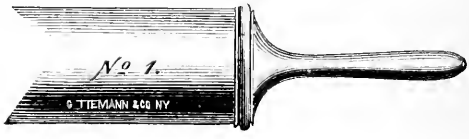
surgeon; but in those exceptional cases which are seen at an early period, and *in those only*, we may often succeed in cutting short the disease by means of the treatment termed abortive.

Abortive Treatment of the First Stage.—During the first few days after exposure, varying in number from one to five in different cases, before the symptoms have become acute, when the discharge is but slight and chiefly mucous, and while as yet there is no severe scalding in passing water, we may resort to caustic injections with a view of exciting artificial inflammation which will tend to subside in a few days, and supplanting the existing morbid action which is liable to continue for an indefinite period and is exposed to various complications. This is known as the "substitutive," or more commonly as the "abortive treatment" of gonorrhœa. This method has been inordinately praised and as violently attacked; its true merit is probably to be found between these two extremes. It is certainly liable to be greatly abused, and, if so, is both unsuccessful and capable of producing the most unpleasant consequences; but when limited to the early stage of gonorrhœa and used with proper caution, it is a highly valuable method of treatment, unattended with danger, and undeserving the censure sometimes cast upon it.

In employing the abortive treatment, there are several points which it is important to recollect: 1. The disease, in the stage to which this treatment is applicable, is limited to the anterior portion of the urethra, known as the fossa navicularis, or extends but a short distance beyond it; it is not necessary, therefore, that the injection should reach the deeper portions of the canal. 2. For the treatment to be successful, the whole diseased surface should receive a thorough application of the injection, for if any portion remain untouched, it will secrete matter that will again light up the disease. 3. When once a sufficient degree of artificial inflammation is excited, the caustic has accomplished all that can be expected of it, and should be suspended.

Since a solution of nitrate of silver, which is commonly used in the abortive treatment, is readily decomposed by contact with metallic substances, metal syringes should be avoided. Glass syringes, if well made, answer every purpose; but as found in the shops, they are apt to be unequal in calibre in different parts of the cylinder, the wadding of the piston contracts in drying, and a portion of the fluid fails to be thrown out, as is seen by its overflow when the syringe is filled a second time. For these reasons, I never advise a patient to purchase an ordinary glass

Fig. 1.



syringe, knowing that it will probably give him much annoyance, and perhaps prevent his deriving benefit from treatment. We have an excel-

lent substitute in the hard-rubber syringes which can be obtained at the druggists.

"No. 1" (Fig. 1) is the one generally sold when no special form is directed by the surgeon, but its nozzle is objectionable; it is unnecessarily

Fig. 2.

long, its point is apt to irritate the internal wall of the canal, and it is not well adapted to fully distend the meatus.

"No. 1, A" (Fig. 2), is preferable. The abrupt shoulder near the point is well adapted to fill the meatus, and the short and rounded end cannot abrade the sensitive mucous membrane.

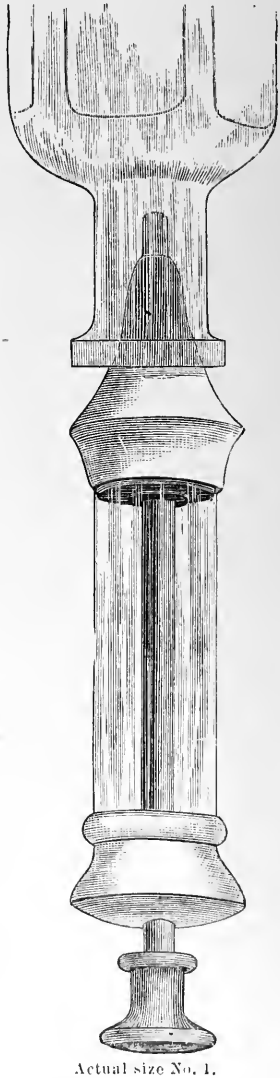
Fig. 3 represents another excellent form, and one which is recommended by Prof. Sig-

Fig. 3.

mund, of Vienna. I find a figure of the same in the work of Dr. H. A. Hacker, Die Blennorrhöen der Genitalien, Erlangen, 1850.

I know of no syringe, however, equally convenient to one recently introduced, and called by its inventor[1] "The Peerless Syringe," which, in addition to a good nozzle, has the special advantage that it can be filled from any bottle. It is made of glass, and provided with a soft rubber sleeve, by means of which it can be inserted like a cork in the mouth of the vial. This having been done, the vial is turned bottom up, and the syringe is filled by simply withdrawing the piston. A facetious patient has called it the "Commercial Traveller's Pocket Companion."

Fig. 4.



Actual size No. 1.

[1] R. Van der Emde, Apothecary, 323 Bowery, N. Y.

The "urethral syringe with extra long pipe" (Fig. 5) is, in fact, a syringe united to a catheter, and is adapted for injections of the deeper portions of the canal. The catheter portion may be bent to any curve desired by first oiling it and heating it over a spirit lamp; its form is then retained by dipping it in cold water.

Fig. 5.

The solution of nitrate of silver, in the abortive treatment of gonorrhœa, may be of considerable strength, when only one injection will be required; or, it may be weak, and in that case should be repeated at short intervals until the effect produced be deemed sufficient. I much prefer the latter course, especially with patients who apply to me for the first time, since it enables me to graduate the effect according to the susceptibility of the urethra, which varies in different persons. The following is the formula for the weak form of injection:—

℞. Argenti Nitratis gr. j–iss . . . 0·06—0·09
Aquæ destillatæ ℥vj . . . . 180·00
M.

With this, as with all injections in gonorrhœa, it is essential to success that the surgeon should administer the injections to his patients, or see, by actual observation, that they know how to use them. Verbal directions cannot be relied upon.

The patient should be made to pass his water immediately before injecting, or, better still, a quarter of an hour before. We wish to clear the urethra of matter, and to have the bladder empty so that the injection may have some time to act before it is washed away by another passage of the urine, and yet a short interval between the last act of micturition and the injection is advisable, in order that as much of the urine as possible may have drained from the canal and little be left to decompose the nitrate of silver. The prepuce should now be fully retracted, and the glans penis exposed. The latter should be wiped dry, so as to afford a firm hold to the thumb and forefinger of the left hand, applied laterally, *not from above downwards*, and firmly compressing it around the point of the syringe. Call the patient's attention to the fact that the opening of the urethra is a vertical slit; that compressing the glans from above downwards makes this opening gape while compression from side to side closes it; hence the importance of exercising the compression in the latter way while taking the injection. If the pressure be properly made, not a drop of the solution will be lost, as the piston of the syringe is slowly forced down by the forefinger

of the right hand holding the instrument, and the whole contents will be discharged into the canal. The syringe should now be withdrawn, and the fluid still retained for a few seconds by continuing the compression of the glans. When the injection is allowed to escape, it will be found to be of a milky-white color. This is due to the partial decomposition of the contained salt by the remains of the urine and the muco-pus in the canal. As this decomposition has prevented the application of the injection in its full strength to the urethral walls, a second syringeful should be thrown in, and retained for two or three minutes. During this time a finger of the disengaged hand should be run along the under surface of the penis *from behind forwards*, so as to distend the portion of the canal occupied by the injection, and insure the thorough application of the fluid to the whole mucous surface.

This description of the method of using the syringe is, in the main, applicable to all the injections which may be required in the course of a gonorrhœa: but we are now speaking of the abortive treatment, by means of weak injections of nitrate of silver. We will suppose that this first injection has been administered by the surgeon, who, at the same time, has explained the various steps of the operation to the patient. The directions with regard to diet, etc., that will presently be mentioned in speaking of the second stage, should now be given; the patient should be ordered to repeat the injection every three hours, and, for the present, it is best that he should be seen by the surgeon twice a day. It is also well at this time to prescribe an active purge.

The first effect of the caustic injections is manifested in a few hours; the discharge becomes copious and purulent, and considerable scalding is felt in passing water. In the course of twenty-four to forty-eight hours, however, the discharge grows thin and watery, and, very likely, is tinged with blood. It is now time to stop the injection and omit all medication for a few days, until we see how much good has been accomplished. If the treatment meets with success the discharge will gradually diminish, and finally disappear in from three to five days. Sometimes, however, after growing less, it again increases, showing a tendency to relapse. In this case, I usually advise weak injections of acetate of zinc, as recommended in the third stage of the disease. Some surgeons prefer to resume the caustic injections in the same manner as at first if, after a week has elapsed, any traces of the discharge remain.

The chief objection to this modification of the abortive treatment is, that it is necessary to leave the administration of most of the injections to the patient, who may be prevented by ignorance, or the requirements of his occupation, from using them as thoroughly or as often as is necessary. If we have reason to fear this, we may resort to a stronger solution, and inject it once for all, with our own hands, but I have found the effect decidedly less satisfactory. It was this method of employing the abortive treatment that was recommended by Debeney of France, and Carmichael of England, by whom this treatment was first introduced to the profession. The same method is also still employed and highly recommended by many

surgeons, and especially by M. Diday of Lyons. The strong injection should not contain less than ten grains (0.65) of the nitrate of silver to the ounce (30.00) of distilled water, and more than fifteen grains are objectionable, unless with patients who have been under treatment before, and in whom the urethra has been found to be quite insensible.

℞. Argenti Nitratis gr. x–xv . . 0|65—1|00
Aquæ destillatæ ℥j . . . . . 30|00
M.

The mode of using this injection is identical with that already described. Two small syringefuls should be thrown in; the first to clear the urethra of urine and muco-pus, the second to exercise a curative effect; and the surgeon should feel that the success of the treatment depends, in a great measure, on the thoroughness of its application. As an additional precaution against the fluid extending further back than is necessary, the patient may compress the penis anteriorly to the scrotum, while the surgeon is administering the injection; or the same result may be accomplished by making him sit astride the arm of a chair, and thus compressing the urethra in the perinæum.

There is still another mode of employing a strong solution of nitrate of silver, by means of an instrument introduced by Dr. F. Campbell Stewart, and called by his name. This instrument consists of a straight canula inclosing a sponge, which can be made to protrude from its extremity. This sponge is first soaked in a solution of nitrate of silver, and concealed within the canula. The instrument is then introduced for about two inches within the urethra, when the canula is to be partially withdrawn; the sponge is thus exposed to the contact of the urethral walls, in which position it is to be allowed to remain for a minute or two, and then withdrawn by slowly twisting it on its long axis. By the use of Dr. Stewart's instrument, the extent of the application can be limited at will, and it is perhaps owing to this fact that we can employ with safety a much stronger solution than when using a syringe. I have thus applied a solution of twenty, and even thirty grains to the ounce, without exciting an undue amount of inflammation, or other unpleasant symptoms. Care should be taken that the instrument be of sufficient size. Some of those found in the shops are too small, not exceeding a No. 7 bougie in diameter. I have had one manufactured for my own use of the size of No. 10.

I cannot leave this subject of the abortive treatment of gonorrhœa, without again expressly stating that I recommend it only in the first stage of the disease, and not after acute inflammatory symptoms have set in, or while the patient suffers from scalding in passing water. Taking the usual run of cases as met with in practice, probably not more than one out of twenty is seen at a sufficiently early period to admit of the abortive treatment. Its employment in the acute stage, as recommended by its inventors, is generally unsuccessful, and dangerous and even fatal results have been known to ensue. Prudent practitioners have limited the use of caustic injections to the early stage of gonorrhœa, except in some instances in the

decline of the disease; but, in the latter case, the mode of injecting must be modified, so that the fluid may reach the deeper portions of the canal.

Treatment of the Acute Stage.—The proper regulation of the diet, exercise, and mode of life of the patient, is of the first importance in every stage of gonorrhœa. In the treatment of the inflammatory stage, as well as in the abortive treatment of the first stage, if the patient can keep his bed for a few days, the battle is half won. The advantages of absolute repose and quiet should be placed prominently before him, and every inducement be offered to lead him to avail himself of them. Yet in practice, we find that very few will submit to this constraint. It is very well to say that every patient that puts himself under the care of a physician, should follow his advice implicitly in all things; but we must take the world as we find it, and the calls of business, or the necessity of secrecy, often render the insistence upon such stringent rules impossible. When life is in danger, men absorbed in business will stay at home, but not merely for an attack of gonorrhœa. This, indeed, should not prevent our doing our best to persuade them, but we shall succeed in but a small minority of cases.

Exercise of all kinds should be avoided as much as possible, walking, dancing, riding on horseback, and standing—in the street, at the desk, at a party—are all injurious. Riding is certainly less objectionable than walking, and yet a long ride, even in a rail-car, often aggravates a gonorrhœa or induces a relapse when it is apparently cured. At home, and at the store or office, the recumbent posture should be maintained as much as possible. It is highly important, also, that the genital organs should be well supported by a suspensory bandage. The kind of bandage is immaterial, provided it supports well and equably the scrotal organs and does not chafe. Many different kinds of suspensory bandages are on sale, but the best of all can be made by the patient at home. All that is required is an old handkerchief or a soft piece of muslin folded in the form of a fillet, which is to support the scrotum like a sling. A piece of tape is tied round the waist; the ends of the fillet in front are brought under and over it and held fast by clasp-pins. Then the only difficulty likely to occur is from the sling slipping off. This is obviated by stitching a short tape to its centre, passing the same beneath the perinæum and between the buttocks and tying it behind to the tape round the waist. While the more acute symptoms continue, the diet should be exclusively farinaceous; and meat, stimulants, asparagus, cheese, coffee, and acids be forbidden. The perusal of all books calculated to excite the passions, and the company of lewd women, even if no improprieties be committed, should be strictly interdicted. The last-mentioned caution is not generally given without good reason.

At the commencement of the treatment of a case of gonorrhœa in the acute stage, it is well to administer an active purge, as five grains of calomel combined with ten of jalap, a full dose of Epsom salts, or three or four compound cathartic pills of the U. S. P. Care should be taken to keep the head of the penis free from any collection of matter, lest balanitis be excited or the disease be aggravated by its presence. A pair of triangular-

shaped drawers, like ordinary swimming drawers, worn next the skin, affords the best protection to the patient's linen. Water, as hot as can be borne, is the most grateful local application that can be used. I have found that it generally affords great relief to the scalding in micturition and the local pain and uneasiness, and can fully indorse Mr. Milton's statement with regard to it. "The only direct application which I can safely say has never disappointed me, which is at once safe, simple, and useful, is that of very hot water to the penis. But to obtain the really good effects it offers, the water must be hot, not lukewarm. In fact, we seldom see so much good ensue as when it is carried to the extent of producing some excoriation and faintness; thus applied, and especially in the early stages of the disease, the weight felt about the testicles soon disappears, the pain on making water and using injections is soothed, and the prepuce and glans rapidly regain a more normal temperature and color."[1] The best method of employing it is to direct the patient to immerse his penis in a cup of hot water for a few minutes before and after using the injection.

After the operation of the cathartic, we may, in most cases, commence at once with copaiba or cubebs, rules for the exhibition of which will presently be given at length. If, however, the penis be still much swollen, and the scalding on passing water severe, we may defer the exhibition of the anti-blenorrhagics for a few days, and administer alkalies or diuretics, either alone or combined with sedatives, for the purpose of rendering the urine less irritating by diminishing its acidity, or diluting its contained salts by increasing its quantity. Again, both these classes of remedies may be given at the same time. From one to two drachms of the chlorate, acetate, or nitrate of potash, or two or three drachms of liquor potassæ, may be added to a pint of flaxseed tea; and the patient be directed to take this quantity in the course of twenty-four hours. The following is also an excellent formula:—

℞. Potassæ Bicarbonatis ℥j 30.00
Tincturæ Hyoscyami ℥j 30.00
Mucilaginis ℥vij 250.00
M.

A teaspoonful (15.00) every four hours.

Tincture of hyoscyamus and liquor potassæ are often given in the same prescription. Chemists say that this is a combination of incompatibles, and that the effect of the former is destroyed by a caustic alkali.[2] In practice, however, it is pretty generally admitted that this objection does not obtain. In this stage of the disease, Mr. Milton highly recommends the following:—

[1] Milton on Gonorrhœa, p. 21.

[2] See Paris's Pharmacologia, Ninth Edition, p. 512. This fact has been brought forward as new, and confirmed by actual experiment, by Dr. Garrod, Medico-Chirurgical Transactions, Second Series, vol. xxiii, London, 1858.

℞. Pulv. Potassæ Chloratis ʒij . 8|00
Aquæ bullientis ℥v . . . . 150|00
Misce et adde—
Liquoris Potassæ ʒiij . . . 12|00
Potassæ Acetatis ʒiij ad ʒv . 12|00—20|00
Misce et cola.

One ounce three times a day.

If the bowels be not freely open, Mr. Milton adds powdered rhubarb to each dose of this mixture, in sufficient quantity (gr. v ad ℈j) to produce two or three loose stools daily. The following is another formula recommended by Mr. Milton :—

℞. Potassæ Acetatis ʒj . . . . . 30|
Spirit. Ætheris Nitrici ʒiij . . . . . 12|
Aquæ Camphoræ ℥vj . . . . . 200|
M.

One ounce three times a day.

Fournier's favorite formula is —

℞. Sodæ Bicarb. gr. xlv–lxxv . . 3| 5|
Sacch. albi ʒx . . . . . 40|
Spiritus Limonis gtt. j–ij . . ? 0|06—0|12

Dissolve in a pint or a pint and a half of cold water, and this quantity to be taken daily between meals.

An elegant and convenient method of administering an alkali is by means of Dunton's or Wyeth's compressed pills of bicarbonate of potassa, of which two or more may be given after each meal.

Digitalis was recommended by Beranger-Ferand[1] in the early stages of gonorrhœa, as quieting painful erections and exercising a marked influence in the cure of the disease. Zeissl made a trial of it, giving from twelve to eighteen drops of the tincture four times a day, and, in several cases, found marked benefit. In other cases of *acute* gonorrhœa, it seemed to produce hyperæmia of the neck of the bladder, as shown by frequent desire to urinate, blood mixed with the last drops of urine, etc. He found that the more rapidly the pulse was reduced to forty-eight or fifty per minute, the better the effect on the discharge. In any trial of this drug, care should of course be taken that it is not carried to a dangerous extent. Jarnowski says the inf. digitalis is his favorite prescription when the discharge has become purulent and pain is felt in passing water and in erections.

If the penis be much swollen and florid, the meatus contracted by the distention of its walls, and the urethra very sensitive, the above general measures should constitute the only treatment, and no local remedies, with the exception of hot water, be resorted to, until the inflammation has somewhat subsided. In the majority of cases, however, especially when the patient has had gonorrhœa before, the local symptoms are not severe, even in the acute stage, and the point of a syringe can be gently introduced

[1] Etude sur l'action antiblennorrhagique de la digitale, Bull. gén. de thérap. lxxiii, 1867, p. 202.

within the canal without exciting much pain. When this is the case, an injection containing glycerine and strongly opiated, will be found to afford relief to the local pain and uneasiness, and hasten the subsidence of the inflammatory symptoms, and the diminution of the discharge. I can speak very decidedly in favor of this application and of its perfect safety; but the opium must not be added in the form of tincture, or the alcohol, which is an irritant, will counteract its effect; and the fluid is to be injected with gentleness, and not with such force as to painfully distend the canal. The following is the formula that I use:—

℞.	Extracti Opii ℈j	1|30
	Glycerinæ ʒj	38|00
	Aquæ ʒiij	90|00
M.		

Injection to be used after every passage of urine.

In many cases of a subacute form, half a grain or a grain of acetate or sulphate of zinc may be added to each ounce of the mixture, even at the outset, and there are but few cases in which it is not admissible in the course of a few days, whenever the inflammation, local pain, and scalding are found to be much improved. Half a drachm of Goulard's extract to four ounces of water, is also an excellent injection as the inflammatory symptoms begin to subside. If the case continue to progress favorably, the quantity of the astringent may be gradually increased, and that of the opiate diminished; and the treatment should be continued according to the rules laid down for the third stage, to be mentioned presently.

While pursuing the treatment of the acute stage of gonorrhœa, care should be taken that antiphlogistic measures be not too long persevered with. It should be remembered that the natural tendency of the disease is to lower the tone of the system, and a condition of debility in turn reacts on the disease and prolongs its duration. We often meet with patients who have treated themselves with low diet and daily purging for weeks, and yet who are no better of their gonorrhœa. An antiphlogistic course alone may relieve the more acute symptoms, but it will not cure the complaint; and so soon as the pain in passing water has diminished and the local inflammation in a measure subsided, the patient should no longer be confined to his room, and should have a more liberal diet; nor, under any circumstances, should his confinement and abstinence be prolonged, if after a reasonable time, they are found to produce no change for the better, or the pulse becomes feeble, the skin clammy, and the strength exhausted. Indeed, in some cases, in which the constitution is enfeebled by disease, debauch, or previous attacks of venereal, it is necessary to abstain from all measures calculated to lower the tone of the system, and resort to good living and even quinine, iron, and other tonics, from the very outset.

Treatment of the Stage of Decline.—A marked diminution of the scalding in making water, and of the painful sensations in the penis, is, I believe, a better index of the subsidence of the inflammatory action, than the character of the discharge, which, independently of treatment, often continues copious and purulent after the third stage has fairly commenced.

In giving directions as to the regimen of a patient in the third stage of gonorrhœa, some regard should be paid to his usual mode of life. As a general rule, all indulgence in spirituous or malt liquors should be strictly forbidden, and total abstinence be practised until the cure is complete, and for at least a fortnight afterward. You will meet with some patients, however, who have been free drinkers for years, and who will not well bear the total loss of their stimulus, without becoming so debilitated that their gonorrhœa is thereby prolonged and more difficult to cure. In these *exceptional* cases, it is better to allow a glass of claret, sherry, or even brandy and water, to be taken with the dinner. In any case, malt liquors and champagne should be avoided, since they are decidedly more injurious than other liquors which contain a larger amount of alcohol. The patient may now return to a more generous but simple diet, though salt meats, highly seasoned food, asparagus, and cheese should still be avoided. The bowels are not to be allowed to become constipated, and this should be prevented so far as possible by regulating the diet. One or two free stools a day are desirable. If the patient have been confined to the house during the acute stage, he may now be allowed to go out, but should be cautioned against walking or standing more than is necessary, and the genital organs should be well supported by a suspensory bandage. Patients often inquire whether the use of tobacco is injurious; I believe that it is, and that either smoking or chewing, especially in excess, weakens the genital organs and tends to keep up a urethral discharge. I have frequently been told by patients subject to spermatorrhœa, that smoking during the evening would invariably be followed by an emission during the night, and I am satisfied that many cases of gonorrhœa are prolonged by the excessive use of tobacco. I therefore recommend entire abstinence, or, at least, great moderation, both in smoking and chewing, to persons suffering with this disease.[1]

The chief remedies adapted to the third stage of gonorrhœa are injections, and copaiba and cubebs. By far the more important of these are injections, which constitute our chief reliance in the treatment of this affection, when it has arrived at this stage; and, in spite of all that has been written and said against them, I do not hesitate to say, that the surgeon who voluntarily renounces injections deprives himself of his best weapon in contending with gonorrhœa, and is comparatively impotent in his attempts to conquer it.

The objections that have been raised against this mode of treatment need not long detain us. They are chiefly the following: 1. It is asserted that the injected fluid carries before it the muco-pus within the urethra, and thus extends the disease to the deeper portions of the canal. Supposing this possible in any case, it cannot take place if the patient pass his water before injecting, as he should always be directed to do. 2. It is

[1] Dr. Shipley has published two cases of gonorrhœa in which the discharge repeatedly disappeared on leaving off smoking, and returned on resuming it. (*Boston Med. and Surg. Journal*, Nov. 22, 1860.)

said that injections may excite swelled testicle and other complications of gonorrhœa. This is only possible, when they are used of too great strength or with undue violence. 3. It is supposed by some persons that there is danger of the injection penetrating the bladder. I formerly supposed that this was impossible with a syringe merely penetrating a short distance within the meatus, but, although I have since been convinced of my error by the fact that patients of mine suffering from cystitis have been able to wash out the bladder with an ordinary Davidson's syringe, its point only introduced within the meatus, yet this result can only be attained by practice, and is not at all likely to occur in the ordinary mode of using urethral syringes. Moreover, no harm would ensue even if a portion of the fluid should enter this viscus, for it would be immediately neutralized by the urine. 4. The chief objection that has been alleged against injections is that they are a frequent cause of stricture of the urethra. This the opponents of injections have endeavored to prove, by showing that most persons with stricture preceded by gonorrhœa were treated for the latter disease by injections. This is clearly a mode of reasoning, *post hoc ergo propter hoc*, and by no means proves the ground assumed. I have heard of some one, who, to show its fallacy, instituted some inquiries among patients with stricture, as to whether they had taken flaxseed tea for their previous gonorrhœa, and who was able to prove, if such reasoning be reliable, that flaxseed tea is a very fruitful source of stricture.[1] As Ricord justly states, it is much more probable that strictures are due to the chronic inflammation, which, in cases of gonorrhœal origin, has usually preceded them for a long period, than to any influence exercised by injections. This well-known effect of chronic inflammation of a mucous membrane in producing an effusion of plastic material in the submucous cellular tissue, which by its contraction diminishes the calibre of the canal, is a strong argument in favor of this view. The objections to the use of injections are, I believe, founded on their abuse, on false reasoning, or on prejudice, and will not stand the test of examination. When properly used, these are the most valuable means within our reach for the cure of gonorrhœa, and are employed in the practice of all surgeons, with very few exceptions, who have had the opportunity of testing their value.

Injections are particularly adapted to the treatment of the first stage by the abortive method and to the treatment of the third stage of gonorrhœa; although, as already stated, in very many cases they may be used with safety and benefit in a weak form, even in the second or acute stage.

These remarks in favor of injections do not of course imply that they are infallibly successful, nor that they can be used indiscriminately in all cases. Under certain circumstances, their effect is found to be injurious. If in the course of treatment the patient complain of a frequent desire to

[1] An amusing instance of misconstruing the English language is given by M. Jullien, who quotes the author of this work as here stating that "*strictures following gonorrhœa have no other origin than the immoderate use of tea!!*" (Jullien, Mal. vén. p. 55.)

pass his urine, and other symptoms indicating irritation or inflammation of the neck of the bladder or prostate, injections should be at once suspended. Continuous pain in the penis, or any considerable amount of tumefaction of its tissues also contra-indicates the use of irritant or astringent injections.

Moreover, it should not be forgotten that injections will sometimes keep up a discharge through the irritation which they excite, however simple may be their composition. After the force of the disease has been subdued, they should therefore be used at gradually increasing intervals, or, from time to time, be altogether omitted, until the necessity of their continuance again becomes apparent.

The manner of using the syringe in the third stage is essentially the same as in the abortive treatment of the first stage. A larger syringe, however, should be employed, one, for instance, holding three or four drachms; since there is now no necessity of limiting the action of the injection posteriorly, and, on the contrary, it is desirable to extend it as far back as possible, in order that it may reach the whole diseased surface. For this purpose the finger may be run along the under surface of the urethra from before backwards, as well as in the opposite direction (from behind forwards), as previously recommended, in order to insure complete distention of the canal and exposure of its lacunæ. The patient should always pass his water before injecting, and throw in two syringefuls at each application.

A great variety of substances have been recommended as the active principles of injections. A choice, to a certain extent, is doubtless desirable, since the same injection does not always succeed equally well in all cases. For instance, one of my patients, whom I have repeatedly treated for gonorrhœa, is always made worse by an injection of sulphate of zinc, and is benefited by a weak solution of nitrate of silver. Peculiarities of this kind are occasionally met with, but I believe that much time is wasted by young practitioners in changing from one to another of the many varieties of injections proposed in books, under the supposition that some specific effect is to be obtained from the contained ingredients, whereas, in most cases, success depends upon the thoroughness of the application, and attention to the general health and any existing complications.

My own preferences for an astringent in the third stage of gonorrhœa are very strongly in favor of the acetate of zinc, which is also the favorite injection of Sigmund of Vienna, Mr. Milton, and many other eminent surgeons. I have already spoken of the addition of a small quantity of this salt to the sedative injections of the acute stage, after the more inflammatory symptoms have been subdued. The proportion of the acetate may be increased and that of the opiate diminished, as the case progresses, and the latter finally be omitted altogether. The strength of the injection should be such that it may excite a slight uneasy sensation in the urethra for five or ten minutes, but it must not be strong enough to cause severe or long-continued pain. As the case approaches a cure, the injection will cease to excite any unpleasant feeling whatever, and its strength need not

be further increased. In most cases, we need not at any period exceed the proportion of the acetate in the following formula:—

℞.	Zinci Acetatis gr. xij	80
	Aquæ ℥iv 120	
M.		

Glycerine may be substituted for half an ounce or an ounce of the water. As to the frequency with which the injection is to be used, I usually direct the patient to inject after each passage of his urine, with the expectation that he will take four or five injections in the course of the twenty-four hours.

If the discharge do not materially diminish under the use of these injections, either alone or combined with the internal administration of copaiba or cubebs, I usually resort to a solution of nitrate of silver, of the strength of from two to five grains to the ounce of water, and inject it myself for the patient, daily, or every two or three days, while at the same time he is directed to continue his injection of sulphate of zinc. The effect of an irritant like nitrate of silver should be closely watched, and its administration should not, therefore, be left to the patient himself.

The sulphate of zinc is nearly, though not quite, as valuable a remedy as the acetate, and the remarks above made in favor of the latter are in a measure applicable to the former. Indeed, if I were asked to name the simplest treatment of gonorrhœa, and the one best adapted to the largest number of cases, I should reply: a weak injection of the sulphate or acetate of zinc, containing from one to three grains to the ounce of water. Many men about town constantly carry in their pockets a prescription of this kind (generally with the addition of a little morphine or a few grains of powdered opium), with which they sometimes succeed in arresting their frequent attacks of gonorrhœa, without resorting to the nauseous anti-blennorrhagics, or finding it necessary to consult a surgeon.

The sulphate of zinc was a favorite with Dr. Graves, who was in the habit of combining it with the impure carbonate of zinc, as in the following formula:—

℞.	Zinci Sulphatis gr. iij	0·20
	Calaminæ gr. x	0·65
	Mucilaginis ℥ij	10·00
	Aquæ ℥vj . . . . . 180·00	
M.		

With regard to the addition of calamine, Dr. Graves says: "How the lapis calaminaris acts, unless on a mechanical principle, it is difficult to explain; but of its utility I am certain, having long used this combination, as recommended in Thomas's Practice of Physic."[1]

The chloride of zinc is a powerful caustic and irritant which fulfils, although in a much less perfect manner, the same indications as nitrate of silver, and may, therefore, be used under similar circumstances.

The sulpho-carbolate of zinc has been employed in about the same

[1] Clinical Lectures, London Med. Gaz., new series, vol. i., 1838–9, p. 438.

strength as the sulphate, but possesses no advantage over the latter, so far as I know.

Of the numerous other formulæ for injections sometimes employed in the treatment of gonorrhœa, the following are among the best :—

℞. Cupri Sulphatis gr. xij . . 0|80
Aquæ ℥iv–vj . . . . . 125|00—185|00
M.

℞. Liq. Plumbi Subacetatis ℥ss–j 16|00— 32|00
Aquæ ℥iv–vj . . . . . 125|00—185|00
M.

℞. Aluminis gr. xij–xxx . . . 0|80— 2|00
Aquæ ℥iv . . . . . 125|
M.

Mr. Milton says of alum : "The absence of pain which follows its use, and its feeble curative power, have led me to assign to it only a secondary rank. I am, indeed, extremely doubtful, if it possesses any superiority over very mild injections of nitrate of silver or sulphate of zinc, and would, therefore, confine its exhibition to those cases accompanied by severe pain, where it may, during a day or two, serve as a pioneer to the others."

In the following we have a combination of alum and sulphate of zinc :—

℞. Liq. Aluminis Comp. ℥j . . . . . 30|00
Aquæ ℥iij . . . . . 90|00
M.

The two following are excellent formulæ, much employed by Ricord :—

℞. Zinci Sulphatis,
Plumbi Acetatis, āā gr. xxx . . . 2|00
Aquæ Rosæ ℥vj . . . . . 180|00
M.

℞. Zinci Sulphatis gr. xv . . . . . 1|00
Plumbi Acetatis gr. xxx . . . . 2|00
Tincturæ Catechu,
Vini Opii, āā ℥j . . . . . 4|00
Aquæ Rosæ ℥vj . . . . . 180|00
M.

The "Injection Bru," a French proprietary article, which is much used by "men about town," is said by Hager to be made according to this last formula. The two, however, do not correspond in their color or in the amount of sediment in the bottle. That the injection Bru contains both sulphate of zinc and acetate of lead is evident on chemical analysis. I have suspected that krameria was the vegetable astringent in the mixture, which may be closely imitated by using the following formula :—

℞. Zinci Sulph. gr. xv 1
Plumbi Acetat. gr. xxx 2
Ext. Krameriæ fl.,
Tr. Opii, āā ℥iij 12
Aquam ad ℥vj 180
M.

Vegetable astringents may be employed either alone or in combination with the salts of the metals, but are in general inferior to the latter.

℞. Vini Rubri ℥vj . . . . . 180|00
Acidi Tannici gr. xviij . . . . . 1|20
M.

℞. Zinci Sulphatis,
Acidi Tannici, āā gr. xij . . . . . 0|80
Aquæ ℥iv . . . . . 120|00
M.

Tannate of zinc is formed by decomposition of the sulphate.

℞. Potassæ Permanganatis gr. xxxvj . 2|35
Aquæ ℥vj . . . . . 180|00
M.

(Dr. John G. Rich, of Canada.)

The formula for the "Matico (?) injection," as commonly sold by that name, is as follows:—

℞. Zinci Acetatis gr. vj . . . . . 0|40
Morphiæ Acetatis gr. j . . . . . 0|06
Acidi Tannici gr. iij . . . . . 0|20
Aq. Flor. Aurantii ℥j . . . . . 4|00
Aquæ, q. s. ad ℥j . . . . . 30|00
M.

Injections of tincture of aloes are recommended by Gamberini,[1] of Bologna, who states that they excite only a momentary smarting sensation, and are very efficacious.

℞. Tinct. Aloës ℥ss . . . . . 15|00
Aquæ ℥iv . . . . . 120|00
M.

The subnitrate of bismuth is an excellent injection. It acts as a local sedative, and, deposited upon the walls of the urethra, serves to protect the diseased surfaces from contact. Of 52 patients treated exclusively with injections of subnitrate of bismuth, 36 recovered after an average treatment of twenty-two days.[2] I have found only one difficulty attending its use, viz., that it clogged up the urethra, and by its mechanical presence excited an uneasy sensation, which was only relieved by the passage of the urine. As it is not soluble in water, it should be suspended by means of common mucilage, or better still (on account of the liability of the former to become rancid) mucilage of sassafras or quince seeds, or glycerine, and the bottle be shaken before using.

℞. Bismuthi Subnitratis ℥j . . . . 4|00
Mucilaginis Cydonii ℥ss . . . . . 20|00
Aquæ ℥vss . . . . . 165|00
M.

Injections of clay-earth, as recommended by Hewson[3] and Godon,[4] must act chiefly in the same way as bismuth, by separating the urethral walls,

[1] Rev. de thérap. méd.-chir., Paris, jan. 1, 1860, p. 13.
[2] Victor de Meric: Report to the Medical Society of London, April 30, 1860.
[3] Repts. Penn. Hosp., vol. ii, 1869.
[4] Am. J. Syph. & Derm., N. Y., 1874, p. 337.

and are open to the same objection, that of clogging the canal, unless sufficiently diluted.

Dr. Irwin (U. S. Army) relies upon an injection of chlorate of potassa (℥j ad aquæ ℥viij), repeated every hour for the first twelve hours, and gradually decreasing the frequency until the second or third day, when he states, "the disease will be generally found to have ceased." (?)

Mr. G. Borlase Childs employs an injection of the liquor hydrargyri nitratis (♏ss ad aquæ ℥j), repeated three times a day.

Western eclectics, so called, often use hydrastin, either alone or combined with leptandrin.

℞. Hydrastin gr. x . . . . . 0|60
Leptandrin gr. iv . . . . . 0|25
Aquæ ℥iv . . . . . 120|00
M.

Prof. Bartholow, in his excellent "Treatise on Materia Medica", says he has seen no injection so frequently successful in gonorrhœa as—

℞. Hydrastiæ ℥j . . . . . 4|00
Mucilag. Acaciæ ℥iv . . . . . 150|00
M.

"Or the fluid extract, diluted to one-half or three-fourths with water, may be used for the same purpose." I often prescribe a solution of the muriate of hydrastin, about one-half grain (0.03) to the ounce (30.00), with very good result.

Soluble bougies, so called "Reynal's medicated bougies," containing various astringents combined or not with sedatives, and intended to be introduced into the urethra and allowed to remain there till they dissolve, though ingenious, have not proved of any special value.

Finally, in many cases of gonorrhœa, simple iced-water, injected after each passage of the urine, is very serviceable in allaying pain and irritation, and not inefficacious for the cure of the discharge.

Copaiba and Cubebs.—Certain drugs which appear to possess a peculiar power in arresting inflammation of the urethral mucous membrane, are called anti-blennorrhagics. The chief of them are copaiba and cubebs. Some interesting investigations made by Ricord to determine the mode of action of these agents, are given in Ricord and Hunter on Venereal. It had already been observed in practice that copaiba and cubebs had but little curative effect upon gonorrhœa of any portion of the male or female genital organs, except the urethra; and it was hence suspected that they acted chiefly by their presence in the urine, and not through the general circulation; but this fact had not been demonstrated. A man with gonorrhœa chanced to enter Ricord's ward at the *Hôpital du Midi*, who had a fistulous opening communicating with the urethra a short distance in front of the scrotum, produced by a ligature which had been applied around his penis when a child. He could at will, by separating or approximating the two edges of the fistula, either make his urine emerge from the artificial orifice, or cause it to traverse the whole extent of the urethra. Both portions of the canal were affected with gonorrhœa.

Ricord administered copaiba to this patient, and directed him to pass his water entirely through the fistula. In the course of a few days, the disease was cured in the posterior portion of the canal, behind the artificial opening through which the urine had passed, while it remained unchanged in the anterior portion. He was now directed to make his water pass through the whole length of the canal, and in a few days more the anterior portion was also cured. By a singular coincidence, two other cases of a similar character, soon after presented themselves in Ricord's wards, in one of which copaiba, and in the other cubebs, was given in the same manner, and the result in each was the same as in the case just described. From these experiments, Ricord concludes that copaiba and cubebs have but little influence upon gonorrhœa, unless directly applied through the urine to the diseased surface, and hence we cannot expect decided benefit from their administration in any form of gonorrhœa, except that of the urethra in the two sexes. In gonorrhœa of the vagina or vulva, or in balanitis, they are comparatively useless.

The presence of these drugs in the urine is still further evinced by the odor which they impart to this fluid, and which is often sufficient to pervade the bed-chamber occupied by the patient.

It must not, however, be inferred that copaiba and cubebs have no effect except by way of the kidneys. They are often used with benefit in other diseases than those of the urinary organs, and cannot therefore be entirely destitute of action through the general circulation. Moreover, they sometimes act as revulsives by producing copious evacuations from the bowels, and the urethral discharge is diminished as after the administration of a purge; their chief action, however, is in the manner described, by their presence in the urine.

Such being the case, it might naturally be supposed that an emulsion of copaiba injected into the urethra would have the same effect, and that thus the internal administration of so nauseous a drug might be avoided. The experiment has been tried in numerous instances, but the result has always been unsatisfactory. As stated by Ricord, both copaiba and cubebs, in passing through the digestive organs or kidneys, undergo some modification of an unknown character, upon which their curative power depends, and which cannot be imitated by art.

Dr. Hardy, of Paris, is said to have effected a cure in several cases of vaginal gonorrhœa by giving the patients copaiba, and directing them to inject their urine into the vagina after each act of micturition. This course, however, is more interesting as an experiment than worthy of imitation in practice.

M. Roquette, of Nantes, states that he has cured two patients who happened to be rooming together, by giving copaiba to one of them and directing the other to inject his friend's urine.[1] Testimony on this point, however, is not uniform. In the Gaz. méd. de Lyon,[2] Diday says: "We

[1] Accidents déterminés par le copahu, Union méd., Paris, dec. 19, 1854.

[2] June 16, 1863.

seize the present occasion to confess, that injections, and even the retention within the urethra, of urine containing copaiba—a mode of treatment proposed by ourselves in 1843—has not had in our hands the same success as reported by other authors, or as theoretical considerations would lead us to expect."

Zeissl has experimented with inhalations of the ethereal oil of copaiba and other anti-blennorrhagics, in a few cases, and states their action to have been favorable but slow.

It was formerly supposed that copaiba could be used with safety only in gleet, and even then in very small doses, and that it was inadmissible in gonorrhœa, especially in the acute stage, having a tendency, as was thought to excite inflammation of the neck of the bladder and swelled testicle. In the latter part of the last century, however, it was discovered that the natives of South America were in the habit of administering copaiba in large doses in all stages of gonorrhœa, and this, too, with very great success. This led to a bolder method of administering it, and it was soon ascertained that its curative effect is much greater in the acute than in the chronic form of urethritis, and that it is rarely, if ever, productive of those complications which were once attributed to it.[1] In short, it would appear that copaiba can be administered with safety and to much greater advantage in the acute stage of gonorrhœa, or at an early period of the stage of decline than afterward, and the same is true of cubebs. Still, when a case of this disease presents itself with marked inflammatory symptoms, it is usual to wait for a day or two until these have been somewhat subdued by the means already mentioned before commencing with copaiba or cubebs, and I do not think that any time is thus lost; and, in all cases, the effect of the remedy is promoted by the previous exhibition of a cathartic. The diuretics and alkalies, spoken of in connection with the acute stage, may be combined with these drugs, as in some of the formulæ to be mentioned presently, or they may be given separately.

The dose of copaiba is from twenty minims to one or even two drachms, repeated three times a day. It may be given in its pure form upon coffee, wine, or milk, but it is so disagreeable to the palate, and so likely to excite nausea, eructations, and even vomiting, that few persons can thus tolerate it. To render it more acceptable to the taste and stomach, it is generally given in combination; and other ingredients are often added for the purpose of assisting its action upon the urethra. The "Lafayette mixture" in common use may be made more acceptable to the palate by the addition of extract of liquorice, as follows:—

[1] For an interesting history of the remarkable change in medical opinion with regard to the administration of copaiba, see Trousseau, Traité de thérapeutique, vol. ii, p. 592.

℞. Copaibæ ℥j . . . . . 30|00
Liquoris Potassæ ℥ij . . . . . 8|00
Ext. Glycyrrhizæ ℥ss . . . . . 15|00
Spiritus Ætheris Nitrici ℥j . . . 25|00
Syrupi Acaciæ ℥vj . . . . . 225|00
Olei Gaultheriæ gtt. xvj . . . . 1|20

Mix the copaiba and the liquor potassæ, and the extract of liquorice and sweet spirits of nitre separately, and then add the other ingredients.

Dose.—A tablespoonful (15.00) after each meal.

The following are also useful formulæ—

℞. Olei Copaibæ,
" Cubebæ, āā ℥j . . . . . 4|00
Aluminis ℥ij . . . . . 8|00
Sacchari albi ℥iv . . . . . 16|00
Mucilaginis ℨiij . . . . . 13|00
Aquæ ℨij . . . . . 60|00
M.

Dose.—A teaspoonful (5.00) three times a day.

℞. Copaibæ,
Liquoris Potassæ, āā ℥iij . . . . 12|00
Mucilaginis Acaciæ ℨj . . . . . 38|00
Aquæ Menthæ Viridis q. s. ad ℨvj . 200|00
M. (Milton.)

Dose.—One ounce (30.00) three times a day.

℞. Copaibæ ℥x . . . . . 40|00
Tincturæ Cantharidis,
Tincturæ Ferri Chloridi, āā ℥ij . . 8|00
M.

Dose.—From half a teaspoonful (2.50) to a teaspoonful (5.00).

℞. Syrupi Acaciæ ℨv . . . . . 190|00
Vini Opii ℨj . . . . . 30|00
Olei Juniperi,
Olei Cubebæ, āā ℥ij . . . . . 8|00
Copaibæ ℥iij . . . . . 12|00
Spiritus Gaultheriæ ℨj . . . . . 30|00
M.

Dose.—A teaspoonful (5.00) three to four times a day. (Dr. Hollywood, of Detroit.)

But in whatever way combined, many stomachs will not tolerate copaiba in a liquid form; in which case we may prescribe the solidified mass, formed by the addition of magnesia, and known in the *U. S. Dispensatory* as Pilulæ Copaibæ. It requires some little tact to prepare this mass; or, rather, difficulty is met with, unless the proper kind of copaiba be used. Two kinds of the balsam are found in commerce, one of which, the best, is solidifiable with magnesia, and the other not. The solidified mass should be divided into pills, each of which may contain five grains; and it is desirable to coat them with sugar, both for the purpose of preventing their adhering together, and to render them more acceptable to the palate. This is to be accomplished in the following manner: Put the pills into a vessel with sufficient water to moisten them; then turn them out upon a pan and sprinkle over them finely powdered sugar, at the same time rolling them about by shaking the pan, so that they may be entirely and equally coated. This process may be repeated after they are dry, as many times as is necessary to give them a thick coating of sugar. The dose is from four to eight

pills three times a day. Thus prepared, they leave no taste in the mouth, and, being slowly dissolved in the stomach, are much less likely to excite nausea than the liquid.

We have another anti-blennorrhagic, but little if at all inferior to copaiba, in the powdered berries of the Piper Cubeba. Cubebs possess the advantage over copaiba of being far less disagreeable to the taste, and less likely to excite nausea, eructations, vomiting, and diarrhœa; and, on this account, are often to be preferred in the treatment of gonorrhœa. They cannot be relied upon, however, unless freshly powdered, and preserved in a glass vessel, since the essential oil which they contain is rapidly absorbed by any porous material. Cubebs are conveniently taken, mixed in sweetened water, in the proportion of one to two drachms of the powder to half a glassful of the liquid; and this dose should be repeated three or four times a day.

Cubebs are often advantageously combined with iron, especially for persons of weak habit, thus:—

℞.	Pulveris Cubebæ ℥ij	8 00
	Ferri Carbonatis ℥ss	2 00
M.		

To be taken three times a day.

Cubebs and copaiba may be combined together in the same prescription.

℞.	Copaibæ ℨij	60 00
	Pulveris Cubebæ ℨj	30 00
	Aluminis ℥iss	6 00
	Magnesiæ q. s. ut fiat massa.	

To be divided into pills containing five grains each (0.32), of which from four to eight are to be taken three times a day.

℞.	Pulveris Cubebæ ℨiij	90 00
	Copaibæ ℨiss	45 00
	Aluminis ℥ij	8 00
	Sacchari albi ℨj	30 00
	Magnesiæ ℥iss	6 00
	Olei Cubebæ,	
	Olei Gaultheriæ, āā ℥j	4 00
M.		

This mixture is known as "the Black Paste," and the patient may be directed to take a piece the size of a walnut, after each meal. The following prescription is particularly adapted to delicate stomachs:—

℞.	Copaibæ ℨij	60 00
	Magnesiæ ℥j	4 00
	Olei Menthæ Piperitæ gtt. xx . . .	1 30
	Pulveris Cubebæ,	
	Bismuthi Subnitratis, āā ℨij	60 00
M.		

To be divided into pills of five grains each (0.32), and coated with sugar.

℞.	Copaibæ ℨj	30 00
	Magnesiæ ℥ss	2 00
	Pulveris Cubebæ ℨiss	45 00
	Ammoniæ Carbonatis ℥ij	8 00
	Ferri Sulphatis ℈j	1 30
M.		(Méot.)

To be divided into pills of five grains each (0.32); dose, three, three times a day.

Copaiba and cubebs may also be obtained enveloped in capsules of gelatine, and this is a popular form of administration. The capsules obviate the disagreeable taste of these drugs, but they do not always prevent nausea and eructations, when their contents are suddenly discharged into the stomach, by the solution of the envelope. In such cases, we may employ the French *dragées* which have been introduced within the last few years, and of which there are several varieties; some containing copaiba alone, some copaiba and tar, others cubebs, and others still both these drugs combined with iron; I have found them all to be very reliable. The dose is from four to six, three times a day.

Cullerier expresses the opinion, which is endorsed by Fournier, that it is sometimes advantageous to alternate doses of cubebs and copaiba. "Give, for instance, six capsules of copaiba in the morning, six of cubebs during the day, and six of copaiba at night; the next day, commence with the cubebs, and so on. This method of administering these drugs, simple as it may appear, is of great service, and I would recommend it whenever a case of clap does not yield to copaiba and cubebs given separately" (Cullerier).

The "Matico Capsules," manufactured in New York, contain copaiba, oil of cubebs, the ethereal extract of cubebs, gallic acid, and morphine. In these, as in the "matico injection," the "matico" is represented only by gallic or tannic acid in small proportions, the active ingredients being those well known!

Injections of an emulsion of copaiba into the rectum, when the drug is not borne by the stomach, have been recommended, especially by Velpeau. I have never tried this method of administering copaiba, and should have but little faith in its efficacy. It is acknowledged that a much larger quantity must be used than when it is given by the mouth. A simple injection should first be employed to clear the rectum of fecal matter, when the following mixture is to be thrown in:—

℞.	Copaibæ ℥v	20|00
	Ovi Vitelli No. j.	
	Extracti Opii gr. j	0|06
	Aquæ ℥viss	195|00
M.		

The nausea, eructations, and diarrhœa, which are often excited by copaiba, have already been referred to, and sometimes render it impossible to administer this remedy in any form to a delicate stomach. The diarrhœa may often be controlled by the combination of alum or an opiate, but more frequently requires the drug to be suspended, and afterward resumed in smaller doses.

Copaiba sometimes, also, gives rise to a cutaneous eruption, belonging to the class of exanthemata, as roseola, erythema, or urticaria. Such eruptions should be carefully distinguished from those of secondary syphilis, as may readily be done by the absence of coexisting syphilitic symptoms, by the itching that usually, but not always, attends them, and by their disappearance in a few days after the copaiba is suspended. The adminis-

tration of copaiba should not, as a rule, be continued, if it produce this effect, although Diday says that the eruption will disappear spontaneously all the same whether we go on with the copaiba or not.

Another unpleasant symptom not unfrequently occasioned by copaiba, is pain in the region of the kidneys, dependent upon congestion of those organs. A few years ago, a patient was under my care for gonorrhœa, who had previously had several attacks of hæmaturia. Contrary to my advice, he took copaiba, which induced a return of the blood in his urine, and I afterwards learned that the administration of this drug had already produced a similar effect in a former attack of gonorrhœa. This and other similar instances may readily be explained on the probability that copaiba and cubebs produce a certain amount of hyperæmia of the kidneys. But a far more serious charge has been brought against these drugs, viz.: that of producing morbus Brightii. Now there is no evidence whatever that this charge is well founded. Zeissl states that in his large experience, he has found no proof of the same, and this is our own testimony and that of others well informed. The error has probably arisen from the fact that the urine of persons taking copaiba will, on the addition of nitric acid, deposit a sediment which has been mistaken for albumen. That it is not albumen is shown by its disappearance on boiling, or on addition of alcohol, potash or carbonate of ammonia. It is merely due to the copaibic acid contained in the urine.

Cubebs may occasion, though much more rarely, any of the unpleasant symptoms just mentioned as likely to occur from copaiba. Both of these drugs, in large doses, will, in rare instances, excite severe headache, giddiness, and even more serious symptoms connected with the nervous centres. Ricord mentions a case of temporary hemiplegia, and another of violent convulsions, produced by copaiba; in both instances, these serious symptoms were followed by the outbreak of a cutaneous eruption, also dependent on the drug.

The anti-blennorrhagics now mentioned, are of undoubted efficacy in the treatment of many cases of gonorrhœa, but in others they utterly fail; nor have we any means of distinguishing these two classes of cases beforehand. As a general rule, if they are likely to prove successful, their good effect will be apparent in a fortnight or three weeks from their commencement, and if, by this time, the disease continue unabated, they should be omitted, and other means employed to effect a cure. When long continued, they produce disorder of the digestive functions, impair the appetite, and induce general malaise and debility; a condition of the system highly calculated to prolong the duration of gonorrhœa. Though often of marked benefit, they are by no means indispensable in the treatment of every case of gonorrhœa.

Preparations of the Gelsemium sempervirens are much employed at the South, given internally, in the treatment of gonorrhœa, but in my hands have not proved of much benefit. This plant acts primarily on the nervous centres, and in full doses produces staggering in the gait, dimness of sight, and double vision. In one of my patients who was taking it, the

double vision was due to paralysis of the motor oculi of each eye, which passed off soon after the drug was suspended. The most convenient form for administration is the fluid extract, the dose of which is about fifteen drops three times a day, gradually increased until dimness of vision or staggering in the gait is perceived.

The following formula is recommended by Prof. Wm. P. Seymour, of Troy :—

R.	Ext. Gelsemii fl. ℥ij	8|00
	Spiritûs Ætheris Nit. ℨij	55|00
	Tinct. Cubebæ ℨj	30|00
	Spt. Lavandulæ Comp. ℨss	15|00
	Aquæ q. s. ad ℨiv	120|00
M.	℥j (4.00) every six or eight hours.	

The oil of yellow sandal wood is a very valuable internal remedy for gonorrhœa, which was first introduced to the notice of the profession in 1865, by Dr. Thomas B. Henderson, of Glasgow.[1] I have found it quite as efficacious as copaiba, if not more so, and it is far more acceptable to the stomach. The dose is from fifteen to thirty minims, three times a day, taken on lumps of cut sugar, in water, or in a mixture with alcohol and cinnamon—

R.	Olei Santali Flavi ℨj	32|00
	Spiritûs recti ℨiij	90|00
	Olei Cinnamomi ♏xxiv	1|60
M. et Sig.—From one to two teaspoonfuls (5.00–10.00) three times a day.		

This oil is now put up in capsules; from twelve to twenty are to be taken daily.

I have known of a number of cures of gonorrhœa with the oil alone. Sometimes, like copaiba, it produces pain in the kidneys, and must be suspended.[2]

I have tried the oil of erigeron as recommended by Dr. J. T. Prettyman, but without favorable result.[3]

Gurjun Balsam has recently been prescribed with success at some of the hospitals of Paris.[4] It is said to act more rapidly than copaiba, and to have no disagreeable effect on the breath.

The following is Vidal's formula, as used at the Hôpital St. Louis :—

Gurjun Balsam 4 grammes (1 drachm);
Gum 4 grammes (1 drachm);
Infusion of Star Anise 40 grammes (10 drachms).
To be divided into two doses, and taken directly before meals.

I can speak very favorably of *Cannabis sativa* as an internal remedy for gonorrhœa after the more acute symptoms have subsided. It is to be given in the form of the mother-tincture (one part of the fresh plant to

[1] Glasgow Medical Journal, 1865.

[2] See articles by M. Panas, Union méd., Paris, Sept. 23, 1865; and by Dr. H. H. A. Beach, Bost. Med. and Surg. Journ., Nov. 5, 1868.

[3] Am. Journ. Med. Sci., July, 1866.

[4] Bull. gén. de thérap., Paris, Feb. 28, 1878.

two parts of alcohol, by weight), in doses of ten to fifteen drops, in water, three or four times a day.

During the administration of copaiba, cubebs, or any other drugs which act by their presence in the urine, the patient should drink but little fluid, so that the urine may be undiluted and as fully charged as possible with the remedy.

Expectant Treatment.—In a work like the present, which is intended to give the views of other authors as well as our own, it would be unjust to the reader to omit saying that the treatment above recommended is in several respects at variance with that advised by some authorities of the highest eminence. I refer to the present teachings of the French school, and especially to those of Fournier and Diday.

The treatment adopted by these surgeons is, to a great extent, an *expectant* treatment, and may be stated as follows: In the first place they do not believe in the efficacy of copaiba and cubebs, nor in urethral injections during the acute stage of the disease, or even while any decidedly puriform discharge remains. They believe that these means may repress the discharge for the time being, but that the latter will return in full force as soon as the former are stopped; moreover that their use at this time so habituates the stomach and urethra to them, that they can be used to much less advantage at a later period, when their action would otherwise be speedily effectual. Hence, Diday lays down the following rule: "Tell every patient who comes to you at a time when the acute stage of clap is established, that he must wait a month or six weeks before it is possible to give him specific remedies with advantage."[1]

Meanwhile, while waiting for the clap to become "ripe" enough, as Diday expresses it (to be plucked?), these surgeons prescribe attention to hygiene, "a full bath every third day," "several local baths of cold water daily," "avoidance of beer, white wines, and Vermouth;" "pure wine, coffee, liqueurs, pork, and spiced dishes only in moderation," together with "a glass of water, four or five times a day, either sweetened with syrup or orgeat, or with a pinch of the following powder:—

℞. Sacch. albi,
Pulv. Acaciæ, āā ʒij 60
" Glycyrrhizæ,
" Potass. Nitrat. āā ʒiss 6
M."

If in spite of this treatment the inflammation should increase, without, however, attaining its maximum intensity, "Order five or six glasses a day of a ptisan of couch-grass (*chiendent*), and strawberry root (*racine de fraisier*), sweetened with syrup of liquorice. Every second day, before going to bed, take a bath and remain in it for an hour and a half. Two or three times a day, bathe the penis with a warm infusion of marshmallow. Sprinkle the inside of the suspensory bandage worn with powdered camphor," etc. etc. etc.

[1] Thérapeutique des mal. vén., 1876, p. 12.

When the inflammation has reached its height, "apply eight leeches to the perinæum. Remain in bed or at any rate in your room. When walking keep the penis elevated. Drink two or three pints daily of flax-seed tea, or a ptisan of the white water-lily. Take a full bath every day, lasting from two to three hours. Frequent local baths of an infusion of marshmallow. Pass water with the penis immersed in warm water. Avoid every occasion, physical and moral, for erections. *Keep your bowels open.*

"A clap must not be considered ripe, simply because such time has passed as is regarded as the ordinary term by the patient, influenced by theoretical considerations, prejudices or his own convenience. Each clap has its own course; and although we may usually reckon on five or six weeks for it to attain maturity, this period is sometimes shorter, and very often longer; frequently it amounts to two months and a half or three months, and in one case under my care it was eleven months! How shall we ascertain that a clap is ripe? It is ripe when there is little or no pain in passing water and in erections, when the meatus is no longer red nor tumefied; when the discharge has much diminished, and, instead of being yellow or green, is white and somewhat sticky. This last feature is characteristic, and, since it cannot appear without the other signs of maturity existing, it, of itself, is a résumé of all the signs, in a diagnostic point of view; so much so that, in any case of clap, if the discharge, collected a sufficiently long time after an erection and held between two fingers, *will stretch between them as they are separated to the extent of four-tenths of an inch* (metre 0.01), *we are authorized to pronounce that clap ripe*" (Diday, loc. cit.).

The clap having been found or supposed to be "ripe," copaiba and cubebs, aided or not by urethral injections, are to be used vigorously for a week or a fortnight. If, after the lapse of this time the patient is not well or his discharge nearly gone, "stop the treatment at once, its continuance would be a mistake; the reason it did not succeed was that it was premature; make up your mind then to wait; return for a time to demulcent drinks; then try again suppressive medication, as soon as it shall appear to be indicated" (Fournier). Copaiba and cubebs would appear to be more relied upon by these surgeons and others of the French school than urethral injections. The statements of patients are always to be taken *cum grano salis;* hence I cannot fully rely upon the word of a recent patient returning from Paris who said an eminent French surgeon told him that urethral injections were nearly obsolete in France.

As said in commencing, the above treatment recommended by Fournier and Diday is in the main *expectant.* Aside from rest and hygiene, the means recommended while waiting for the claps to become "ripe" can have little if any effect. I will not say but their course is the best. The cases, which everybody meets with, of a clap hanging on month after month under ordinary treatment, are enough to lead us to try anything which promises better success. But I have never been able to thoroughly test their treatment, simply because patients will not submit to such temporiz-

ing. I would not myself if I had the disease, nor would you, virtuous reader, if you should chance to "contract a clap from a water-closet" (or otherwise). At the same time, the experience of these surgeons may induce us to *inquire in many cases whether medication has not been carried too far.*

Obstacles to Success.—A mistake, generally committed by patients who treat themselves for gonorrhœa, and by some physicians, especially in the early years of their practice, is over-medication and a neglect of the general health. Nothing is more common than to meet with a patient, suffering with gonorrhœa of several months' standing, who has been kept on low diet, and been taking various preparations of copaiba and cubebs, using a variety of injections often exceedingly irritant in their composition or strength, and who is now run down, weak in body, and despairing in mind. His digestion is impaired, his appetite gone, and his clap as bad as ever. Let such a man lay aside his capsules, pills, powders, mixtures, and irritant injections; give him substantial food, and a tonic, as quinine or iron; and his disease will probably begin to improve at once, and subside entirely in the course of a few days or weeks. Under any circumstances, you will have removed one great obstacle to a cure, and if the discharge do not entirely disappear, it is probably kept up by some local complication, which can now be attacked with a prospect of success.

Independently of debility, the chief causes of the continuance of a gonorrhœal discharge are the existence of stricture and irritation of the neck of the bladder. It is desirable in every obstinate case to ascertain if the former be present by the passage of bulbous sounds, and if any obstruction be met with, appropriate treatment should at once be adopted; but even in the absence of stricture, the introduction of an instrument into the bladder two or three times a week has a most beneficial effect upon old cases of clap.[1]

It sometimes happens that a case of gonorrhœa has been going on well for a week or ten days under the use of the anti-blennorrhagics and injections—the discharge has almost entirely ceased, and the patient considers himself nearly well, when suddenly a relapse takes place; the discharge is once more thick and purulent; the scalding in making water returns; the injection, which has scarcely been felt for a number of days, excites considerable pain, and at the same time the patient has a frequent desire to pass his urine, and suffers from an uneasy sensation in the perineal region. The latter symptoms denote that the disease has extended to the deeper portion of the urethra, and that there is irritation or inflammation of the neck of the bladder. Under these circumstances, the case requires to be very carefully watched and judiciously treated. Unless great care be used, the inflammation may extend through the vas deferens to the scrotal organs, and swelled testicle ensue; or the prostate gland may become involved. If irritant injections now be used, they will prove inefficient and will aggravate the symptoms. It is best to suspend the use of injections

[1] See chapter on Gleet.

altogether, and to resort to the exhibition of alkalies and sedatives, as recommended in the inflammatory stage, until the subsidence of the symptoms shall enable us to resume direct treatment; the patient should also be particularly careful with regard to exercise. Canada turpentine, the product of the *Abies balsamea*, will also be found of essential service in these cases. It may be made into pills containing five grains each, of which from six to twelve should be taken daily. I have also been much pleased with the effect of tincture of ergot, administered in drachm doses three times a day.

Treatment of Special Symptoms.—It remains to speak of the treatment of certain special symptoms which may attend a case of gonorrhœa, and one of the most annoying of these is *chordee*. Various sedatives are employed for its relief, among which camphor holds the first rank. This may be given in the form of a pill, combined with extract of lettuce or opium, as in the following formulæ:—

℞. Lactucarii,
Pulveris Camphoræ, āā ℈ij . . . . 2|60
M. ft. pil. xx.
Dose.—Two at bedtime. (Ricord.)

℞. Pulveris Camphoræ ℈iss . . . . . 2|00
Pulveris Opii gr. x . . . . . |65
M. ft. pil. No. x.
Dose.—One or two. (Ricord.)

We have also used with good result the monobromide of camphor in doses of three grains (gramme 0.20), either made into a pill with the extract of hyoscyamus or dissolved in the tincture of the same.

Mr. Milton prefers camphor in a liquid form in large doses. He directs the patient to take one drachm of the tincture in water on going to bed, and every time he wakes up with chordee, to repeat the dose. He states that after the continuance of this treatment for two or three nights all tendency to chordee disappears.

Dr. Ed. R. Mayer[1] says "full doses of gelsemium at bedtime are the most certain preventive of chordee."

Lupuline is another remedy of undoubted power in allaying the excitability of the genital organs, and possesses the advantage over opium that it does not constipate the bowels. It may be given in doses of fifteen grains, triturated in a mortar with sugar. This quantity is to be taken before going to bed, and may be repeated one or more times in the night if required.

Of the above means of relieving chordee, I regard Mr. Milton's method of giving camphor, if it do not disagree with the stomach, and the administration of lupuline, as the best; yet none of the remedies mentioned can be relied upon with certainty of producing the desired effect, for they all fail in many instances. Much may be accomplished by directing the patient to avoid eating or drinking for some hours before going to bed, to

[1] "Specific Medication," a paper read before the Luzerne County Medical Soc., at Pittston, Pa., Sept. 13, 1876.

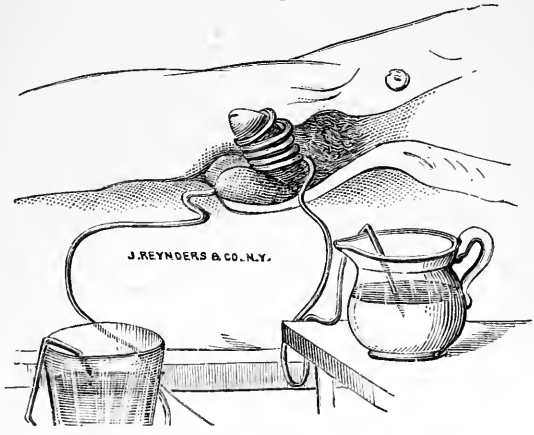
be careful to empty his bladder and rectum, and to sleep on a hard mattress, with but few bed-clothes over him. The position in bed is also of importance, since erections are much less likely to take place when lying upon the side than upon the back. Suppositories of the extracts of opium or hyoscyamus and belladonna introduced into the rectum may often be found of service.

Another means of relief which I have found highly successful is bathing the genital organs in very hot water directly before going to bed. The reaction after the application of heat has a sedative effect, and in this respect has exactly an opposite influence to that of the cold lotions which are sometimes advised.

Many French surgeons recommend leeches to the perinæum. I have never tried them, believing the remedy worse than the disease.

Treatment of Hemorrhage.—A slight hemorrhage from the urethra in gonorrhœa is often a blessing rather than a curse, since it relieves the congested condition of the vessels. Even when so great, though still moderate in amount, as to require precautionary measures, it will usually be sufficient to put the patient into bed with his hips elevated, and apply ice or cloths dipped at short intervals in ice-cold water to the genitals. If at hand, the ingenious "cold-water coil" of Dr. Otis, represented in Fig. 6, may here be employed.

Fig. 6.



Otis's cold-water coil.

In severe cases we are obliged to resort to urethral injections of very cold water, or of water with the addition of some strong astringent as the perchloride or persulphate of iron. These means will rarely fail, but we may be led to try the effect of a full-sized sound, or a piece of a flexible catheter introduced into the canal and a compressive bandage around the penis. A compress firmly applied by a bandage to the perinæum or Otis's perineal tourniquet will take the place of this when the blood comes

from the deep urethra. Hæmostatics, especially ipecac or ergot given internally, will do no harm.

As an attack of gonorrhœa is passing off, it not unfrequently happens that the discharge assumes an intermittent character, entirely disappearing for a few days, and then, without apparent cause, reappearing for a day or two. This may occur several times in succession, and in some cases that I have witnessed, it has assumed great regularity. The surgeon should, of course, assure himself that the return of the symptoms is not due to imprudence, and, if satisfied of this, is generally safe in telling the patient that his disease will soon cease entirely to annoy him.

It is important to continue treatment for some days after all traces of the disease have passed away, since relapses are very readily induced. They are usually brought on by the patient's neglecting the rules with regard to exercise, diet, etc., already laid down, or by his indulging in sexual intercourse. He should be particularly cautioned on these points, and should be directed to continue his medication, both external and internal, in decreasing doses, for at least ten days after the lips of the meatus have ceased to be glued together in the morning. Until every symptom of gonorrhœa has disappeared for this length of time, the patient cannot consider himself as securely well, and should still be cautious in his habits for a fortnight longer.

After the entire cessation of the discharge, patients sometimes complain of abnormal sensations in the genital organs, which they describe under the names of "tickling," "crawling," and sometimes "lancinating," and which may be nearly constant or intermittent at intervals of several hours or several days. These sensations in most cases are not dependent upon inflammation or organic changes in the part, but are of a strictly neuralgic character. They are best relieved by the passage of a full-sized sound every few days; and they are much less felt when once the mind is set at rest with regard to any danger of a return of the gonorrhœa.

The reader may be interested to know what is the *average* duration of treatment required in the hands of the best surgeons for the cure of gonorrhœa, laying aside those cases which are seen in the first stage, and which are speedily cured by the abortive method. This may be estimated at four to six weeks. Greater success, on the average, is probably not attainable by any means with which we are at present acquainted.

Although I have been led in the preceding pages to criticize the expectant treatment as recommended by some French surgeons, yet I cannot close this chapter without a quotation from Fournier, which contains much sound common sense. He says: "We meet with cases of gonorrhœa which defy all treatment. Shall we in these cases persist and struggle on, piling one remedy and one injection upon another? I believe that this practice will more frequently aggravate the disease than cure it. In my opinion it is better to desist, to stop all medication, to encourage the patient and leave to time what art has not been able to accomplish. I am not afraid to say that there are many patients, who, after exhausting all the resources of therapeutics, get well through time alone. Moreover, in

most instances, the disease subsides into a mere inoffensive oozing from the canal. It is better to put up with a small evil than to expose one's self to a worse one by seeking a cure which remains uncertain. Now there can be no question but that medication continued for a long time, and incessant irritation of the urethra, may result in serious accidents and in grave complications. In the face of this danger springing from the treatment, the physician must know when to stop in time. Unable to cure in every case, he should at least not make the case worse."

CHAPTER II.

GLEET.

What is the difference between chronic gonorrhœa and that affection known as "blennorrhœa" or "gleet"? If half a dozen surgeons be asked this question, it is not probable that the answers of any two of them will exactly correspond, and this because a gleet is, in most cases, preceded by a gonorrhœa, the latter terminating in the former, without any broad line of demarcation between them. Yet if gleet be worthy of a separate name, it must possess some distinctive features, and these we will endeavor to describe.

Let us understand then by gleet a chronic discharge from the urethra, unattended by pain, or other symptoms of inflammation, and containing only a very small quantity of pus, of a milky or opaline color, so scanty as to be seen only when a very long time has elapsed since passing water, as in the morning on rising, when the lips of the meatus may be found glued together, and, possibly, a small drop of the fluid may be pressed from the canal. At other times the fluid is absent or is only detected by the presence of long shreds, looking like vermicelli, floating in the urine. This fluid deposited upon the linen, leaves a diffused grayish patch, slightly darker (possibly faintly yellow) at the centre. Another characteristic of gleet is that, unlike chronic gonorrhœa, it is not readily lighted up into an acute stage of inflammation by excesses in diet or coitus, although it is not entirely free from this risk.[1]

In addition to gleet, we might admit with Diday, still another chronic discharge from the urethra, which is characterized by its entire freedom from pus or muco-pus and which consists merely of a transparent, viscous fluid, that can be stretched to some distance between the fingers. Its appearance is not constant in the morning as is the discharge of gleet, nor does it depend upon the time passed since urinating. It shows itself from time to time, independently of erections, and especially on straining at stool, etc., and the lips of the meatus are more moist than they used to be (or than the patient supposes them to have been). In short, such cases should properly be included under the head of "prostatorrhœa," in which mental treatment is of quite as much importance as physical, not to say more so.

[1] When a patient has exposed himself in coitus and has observed an aggravation of an old discharge, the question often comes up, whether he has simply revived the acute stage in consequence of his imprudence or has contracted a fresh clap. The former is probably the case if the aggravation of the symptoms appeared the next morning after exposure; the latter, if the aggravation has been delayed a few days (Diday).

The recognition, however, of these three chronic urethral discharges, viz., chronic gonorrhœa, gleet, and chronic urethral moisture in excess, is of such importance that we will present their diagnostic symptoms in a tabulated form :—

Chronic Gonorrhœa.	Gleet.	Chronic Urethral Moisture.
Objective Symptoms.—If urine has not been passed for three or four hours, a whitish or yellow drop may be pressed from the urethra. Meatus slightly reddened.	*Objective Symptoms.*—Discharge, seen only in the morning, is of a milky or opaline white color, never decidedly yellow. Sometimes merely glues the lips of the meatus together or is observed only as filaments in the urine.	*Objective Symptoms*—Not constant in the morning nor after many hours' retention of urine. Consists simply of a drop of transparent fluid, appearing especially on straining, which can be stretched between the points of the fingers from an inch and a half to two inches.
Subjective Symptoms.—Slight pain in passing urine and in erections.	*Subjective Symptoms.*—Pain absent; possibly sensation of tickling or of "cold," occurring irregularly and of short duration.	*Subjective Symptoms.*—None.
Liabilities.—The discharge and pain aggravated temporarily by excess in diet, coitus or other imprudence. Danger of contagion great.	*Liabilities.*—Excess of any kind much less likely to aggravate symptoms. Danger of contagion slight.	*Liabilities.*—Not affected unless by extraordinary imprudence. No danger of contagion.

Thus it will appear that, although gleet has certain claims to be considered as an affection distinct from chronic gonorrhœa, yet the two have no broad line of distinction between them, and the latter may gradually merge into the former. Much in the way of treatment is also applicable to the two affections, and I have therefore deferred speaking of certain means adapted to chronic gonorrhœa until the present chapter.

Gleet generally follows without interval an attack of gonorrhœa, as a consequence of the neglect or unsuccessful treatment of the latter. In many cases, however, gonorrhœa runs through its successive stages and is apparently cured; then after an interval of several weeks or even months the patient returns with the report that he has recently noticed in the morning on rising that the lips of his meatus adhere together, and, on separating them, that the urethra contains a small amount of matter; he suffers no pain or inconvenience, but is still anxious about his discharge and desires to be free from it. In such instances, it is probable that the cure of the preceding urethritis was only apparent, and that a slight degree of inflammation was left in the deeper portions of the canal, not manifesting

itself externally until aggravated by some exciting cause, as coitus, alcoholic stimulants, fatigue, etc. Or, again, it is not improbable that there is a stricture of the urethra, which is the most frequent cause of the continuance of a gleety discharge following an acute attack of gonorrhœa. Other organic changes may exist within the canal and be productive of gleet, as a granular condition of the mucous membrane, vegetations similar to those met with upon the internal surface of the prepuce, and, in rare instances, polypoid growths.

Idiopathic gleet, or gleet not preceded by acute urethritis, may be dependent upon various affections of the prostate, and especially upon the hypertrophy of this gland so common in old men. It may also arise from disorder of the digestive function, and from disease of the bladder or kidneys, whereby the urine is rendered abnormally irritating.

Gleet is often maintained by a state of general debility, or by a strumous, rheumatic, or gouty diathesis. That general debility is a fruitful source of the persistence of gleet, is evident from the frequency of this disease in persons of broken-down constitutions, and from the beneficial influence of tonics and general hygienic measures in its treatment. Again, gleet is peculiarly frequent and obstinate in persons of a strumous diathesis who are subject to chronic inflammation of other mucous membranes, and under such circumstances it is benefited by the administration of anti-strumous remedies. The influence of rheumatism and gout in the production of discharges from the urethra has already been mentioned in connection with gonorrhœa.

Symptoms.—In many cases of gleet, the discharge is the only symptom. There is, as before mentioned, an entire absence of pain in the part, of redness and tumefaction of the lips of the meatus, and of scalding in passing water. In some instances, however, the patient experiences a feeling of uneasiness in the penis or perinæum, or an itching about the glans or in the deeper portions of the canal, which may either be constant or attendant only upon the passage of the urine. Again, at the first act of micturition in the morning, the obstruction offered to the exit of the stream by the matter which has dried around the meatus and glued its lips together often gives rise to forcible distention of the canal, and a sharp momentary pain in the urethra, which may be avoided by previously separating the lips of the orifice.

The discharge in gleet varies in its character, quantity, and in the time of its appearance. In some cases it is evidently purulent, especially when the gleet has followed a recent attack of gonorrhœa. In other instances, it is perfectly transparent, and, examined under the microscope, is found to consist of a clear fluid, containing epithelial cells and free nuclei, either with or without a few pus-globules. Again, coagulated masses, like the white of an egg, are sometimes forced from the canal. In some cases, the discharge is constant, and sufficiently copious to stain the linen; but in the majority it is perceptible only in the morning on rising. When de-

pendent upon inflammation of the deeper portions of the canal, or of the prostate, it may only appear during the efforts of the patient at stool, or be mingled with the last drops of urine in micturition. The small amount of the discharge in most cases of gleet, and the frequency of this disease among soldiers, has given rise to the name "goutte militaire," employed by the French.

Hunter, in his work on Venereal, states that "a gleet is perfectly innocent with respect to infection," and that in the relapses which sometimes occur, "the virus," in his opinion, "does not return." This statement, although often refuted, still finds place in many elementary works, which are in the hands of medical students. A doctrine more dangerous to the peace of families could scarcely be promulgated. It is, indeed, true, that men are occasionally met with who have for years suffered from gleet, and who have yet had frequent connection with their wives with impunity, but where contagion ceases and immunity begins no one can tell; and even if we were able to pronounce a discharge of a certain degree of purity innocuous, we could not foresee the effect upon it of a few hours' sexual indulgence. It may at the present moment be wholly mucous, and entirely innocent of contagious properties, and yet a short time hence be purulent, and in the highest degree dangerous. The fact is, no one can pronounce sexual congress safe, so long as a urethral discharge exists, and in replying to the frequent questions of patients on this point, the surgeon should not only avoid incurring the responsibility of allowing it, but do all in his power to dissuade from it.

PATHOLOGY.—The pathological changes in gleet are the same as those met with in chronic inflammation of other mucous surfaces, as the conjunctiva, tear passages, the external meatus auditorius, etc. This fact had already been regarded as probable from a few post-mortem examinations made by Rokitansky,[1] Mr. Thompson,[2] and others, but has been placed in a much clearer light since the introduction of the endoscope.

Fig. 7.

Urethral polypus.

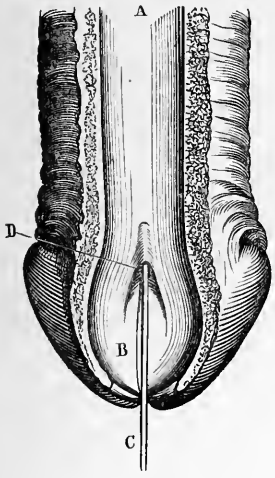
The changes revealed by this instrument as occurring in chronic gonorrhœa have been described in the previous chapter, and the same may be found in gleet. More especially some remains of a granulating surface, a slight stricture, or recurrent attacks of herpes within the canal, will account for the persistency of a discharge. The presence of polypoid growths is not common, but they are occasionally met with, and the accompanying wood-cut represents one, of the actual size, which was removed by Grünfeld through the tube of the endoscope. The continuance of the inflammation within the ducts opening into the urethra, after the canal itself is free from disease, will also explain many cases of

[1] Pathological Anatomy, Sydenham Society's Translation, vol. ii, p. 233.
[2] Stricture of the Urethra, 2d ed., 1858, p. 74.

gleet. The lacuna magna (Fig. 8) upon the superior wall of the fossa navicularis is peculiarly exposed from its situation to participate in the inflammation of gonorrhœa, and its internal surface is not readily accessible to injections. Dr. Phillips[1] states that he has succeeded in curing four obstinate cases of gleet by introducing a director along the upper surface of the urethra until its extremity entered the lacuna magna, and slitting up the wall of the follicle with a narrow bistoury.

Treatment.—Ricord used to say to the students at his lectures—"Gentlemen, if I am to go to —— well, the bad place, I know what my punishment will be. I shall have a lot of fellows with the gleet standing round me, with their lamentations, their importunities, and their prayers to me to make them well." This *mauvais mot* but faintly indicates the annoyance which a case of gleet often gives both to patient and surgeon!

Fig. 8.



A. Superior surface of urethra. *B*. Fossa navicularis. *C*. Probe inserted in *D*, the lacuna magna. (After Guérin, Eléments de chir. opératoire, 1855, p. 526.)

The treatment of gleet should be addressed to the general condition of the patient as well as to the local disease. It may be laid down as a rule to which there are but few exceptions, that in gleet the tone of the general health is more or less reduced. Not that all patients with gleet are necessarily weak and emaciated; on the contrary, many appear to be robust and hearty; but it is almost always the case that they are not capable of the same amount of exertion as formerly; they are sensible that they have lost a portion of their animal vigor; and the benefit of general hygienic measures and tonics in their treatment is unmistakable. The diet should be plain but substantial, consisting of fresh meat, vegetables, eggs, etc., to the exclusion of salt meats, cheese, and highly-seasoned articles; and secretion from the skin should be promoted by means of frequent sponging or bathing. With regard to exercise, although a long walk or ride, especially when carried to fatigue,

[1] This experience of Dr. Phillips was given in the first edition of this work, 1861, p. 87. The "Dr. Phillips" referred to was Dr. Chas. Phillips, *Traité des mal. des voies urinaires*, Paris, 1860, p. 34. With singular coincidence of the name of Phillips and the number of reported cases (4), Prof. Otis (Stricture of the Male Urethra, N. Y., 1878, p. 9) says: "Dr. Benjamin Phillips, in his treatise on 'Diseases of the Urethra,' states that he has found the continuance of a chronic gonorrhœa to depend upon the engagement of the *lacuna magna* in the disease, and cites four cases of cure by slitting up the inferior wall of that sulcus on a director."

Mr. Milton, "On Gonorrhœa," 4th ed., p. 312, says he has "sought in vain for the work referred to by Dr. Otis, of which no date nor page is given," and my own efforts have been equally unsuccessful. Further information of Dr. Benjamin Phillips and his work on "Diseases of the Urethra" is evidently called for!

will be found to aggravate the discharge, yet when commenced with moderation, and gradually and steadily increased in proportion to the strength, it is found to be highly beneficial. Healthy exercise of the mind is no less important than that of the body, and the attention of the patient should be distracted as much as possible from his disease, and all books and associations calculated to excite the passions be avoided. The bowels should be opened daily, if possible by selecting such articles of food as are laxative, and by regularity in the hour of going to the closet, or if required, by the administration of medicine. One of the following pills, taken at bedtime, will usually insure a free stool in the morning.

℞. Strychniæ gr. ss 03
Pil. Colocynth. Comp. ʒss 2
M.

Divide into thirty pills.

In the tincture of the chloride of iron, we have a most valuable combination of a tonic and an astringent; which, in most cases of disease of the generative organs in the male and female, is unequalled by any of the more modern and elegant preparations of this mineral. It may be given in doses of from five to twenty drops, largely diluted with water, three times a day, directly after meals. If the dose be properly graduated, it less frequently excites headache in the male than the female; should this unpleasant symptom occur, iron reduced by hydrogen may be substituted for it, in doses of three grains, three times a day. Where the constitutional debility is marked, the union of quinine with iron may be desirable, as in the following:—

℞. Ferri et Quiniæ Citratis ʒj–iij . . . 4—12
Aquæ ʒj 30
Syrupi Limonis ʒiij 120
M.

A teaspoonful (5.00) after each meal.

℞. Tincturæ Cantharidis ʒj 4
Quiniæ Sulphatis ʒss 2
Tincturæ Ferri Chloridi ʒij 8
Acidi Sulphurici diluti gtt. xxx . . 2
Aquæ destillatæ ʒviij 250
M.

One ounce (30.00) three times a day. (Childs.)

Other salts of iron, as the tartrate of iron and potassa, or the pyrophosphate of iron, may be substituted for the citrate, in the first of the above prescriptions.

With patients of a strumous diathesis, cod-liver oil, the syrup of the phosphates, or Blancard's pills of iodide of iron, may often be used with advantage. I have found that the iodide of potassium has a tendency to increase the discharge from the urethra, as it often does the secretion from other mucous membranes, and I do not therefore administer it. This effect of the iodide may frequently be observed, when we are giving it for tertiary syphilis to patients, who, at the same time, are affected with gleet.

From what has already been said of copaiba and cubebs, it is evident that but little good can be expected from their administration in cases of

chronic urethral discharge. Moreover, most patients whose disease has arrived at this stage, have already taken them *ad nauseam* for the preceding gonorrhœa; hence, we are rarely called upon to administer them in pure gleet. In those cases, however, in which the gleet has relapsed into a clap, they may be given with benefit, especially when combined with a tonic, as in the *dragées* of copaiba, cubebs, and citrate of iron; in Méot's pills, the formula for which has already been given; and as in the following prescription:—

℞. Copaibæ ℥ss 15
Tincturæ Cantharidis ℥ss 15
Tincturæ Ferri Chloridi ℥j 30
M.

Dose.—Thirty drops (2.00) three times a day.

The reader will observe that the tincture of cantharides is an ingredient of several of the above prescriptions. Experience has shown that this drug exerts a decidedly curative action in many cases of gleet, and in gonorrhœa also, in the chronic stage. It is a favorite remedy with the homœopaths, in doses of a fraction of a drop of the tincture every few hours, in the acute stage of clap, and is considered by them to be indicated by scalding in micturition, chordee, and a greenish or bloody discharge. I have used it, however, only in the chronic stage. The tincture may be given in doses of three or five drops three times a day, or it may be combined with iron, as follows:—

℞. Tincturæ Cantharidis ℥ij 8
Tincturæ Ferri Chloridi ℥vj 24
M.

Ten drops (0.65) in water, three times a day.

In some cases of gleet there is considerable irritability of the neck of the bladder, as shown by a frequent desire to pass the urine and unpleasant sensations in the perinæum. In these cases benefit will be derived from the administration of the salts of potash, combined with hyoscyamus, or from the oil of yellow sandal wood or copaiba.

Bougies.—In all cases of gleet, the urethra should be carefully examined with proper instruments, in order to detect the presence of stricture; and if the slightest contraction be discovered, it should at once receive appropriate treatment, since upon its removal will probably depend the cure of the discharge.

Of late years, my friend, Dr. F. N. Otis, has especially insisted upon the dependence of gleet on a narrow meatus or on a slight stricture, "stricture of large caliber," within the canal; indeed, excluding cases of polypoid growths and inflammation of urethral sinuses, he believes that gleet is always symptomatic of stricture, as the following quotations from his writings will show:

"*Chronic urethral discharge means stricture.*

"When there is *discharge*, there will, in every case, be found, if the examination is efficiently made, a *well-defined* and *unmistakable* point of *stricture.*

"The complete division of stricture has, in my experience, resulted *uniformly* in its complete disappearance within a period varying from three months to one year, and the *cure of gleet has, as a rule, followed the complete division of stricture within a period varying from twenty-four hours to four weeks after the final operation.*"[1]

While believing with Dr. Otis that *every undoubted stricture of the urethra should be removed*, and that *without its removal no case of gleet can be permanently cured*, I have yet seen quite a number of cases in which after the most thorough operation for the stricture and when no traces of the same remained, the discharge still continued for months and even years; I cannot, therefore, agree with him, that always "chronic urethral discharge means stricture," or that the removal of all strictures invariably cures gleet. The removal of the stricture is in all cases required, but may not be sufficient to stop the discharge.

Dr. Otis has done great service by calling attention to the influence of strictures of large caliber, both immediate and reflex, which had been generally ignored, and his *urethrometer* to determine the size of the urethra and the presence of coarctations, is a great advance in our means of diagnosis. For a full account of this instrument, as well as of his "dilating urethrotome," the very best devised for division of strictures of large caliber, the reader is referred to the chapter on stricture.

Acorn- or olive-pointed sounds, first proposed by Charles Bell, are also essential for the diagnosis of slight strictures. As frequently made, the shaft is unnecessarily long, for with a straight stem they are only adapted to detect strictures in the straight portion of the canal. If you want to explore the urethra beyond the bulbous portion, use a flexible *bougie à boule*, or, better still, a stiff acorn-pointed steel sound bent in the proper curve. Even then look out that you do not mistake the contraction at the triangular ligament or at the neck of the bladder for a stricture. This mistake has often been made not only by novices, but by those who ought to have known better.

We have already remarked that the tendency of gonorrhœa in its last stages is to limit itself to certain points of the canal, and these points may often be discovered on passing an olive-pointed sound. If we find on repeated introductions that the patient always complains of sensitiveness at the same spot, we have reason to believe that this is the seat of abnormal changes. If granulations exist, there may be a flow of a few drops of blood or the bulb on withdrawal be found smeared with the same. Pus may also be withdrawn in the same manner from the urethral pouch just behind a stricture, even when the urethra might be supposed to have been cleansed by the passage of urine a short time previous.

The frequent passage and retention of bougies is one of the best means known for the treatment of gleet, even when no stricture can be discovered. The manner in which bougies effect a cure of chronic urethral discharges

[1] Am. Clinical Lectures, edited by Seguin, vol. i, no. x. The italics are in the original.

is somewhat obscure, but is probably to be explained on the ground that they distend the canal, expose lacunæ in which matter would otherwise lodge, and separate for a time the diseased surfaces: or, again, they may serve to stimulate the vessels of the part, and thus change their action.

Bougies tapering towards the extremity and terminating in an olive-shaped point, are well adapted for the purpose. They are introduced easily and with little inconvenience to the patient, and the contraction near their point facilitates the introduction of medicated ointments into the deeper portions of the canal. The instrument should be large enough fully to distend the canal but not to stretch it, and is best smeared with vaseline. The bladder should previously be emptied and the patient placed in the recumbent posture. However gently it may be introduced, the first passage of a bougie usually excites a more or less disagreeable sensation, which sometimes gives rise to syncope, and which generally renders it advisable to withdraw the instrument in a few minutes; but after two or three insertions it ceases to give annoyance, and may be retained for half an hour or an hour.

It sometimes happens that the bougie aggravates the discharge, and revives the acute inflammation which has for a time disappeared. In such cases it is best to suspend the treatment and resort to injections, which will often effect a permanent cure. This aggravation of the symptoms however, according to my experience, takes place in a minority of cases only.

With this exception, the passage of the bougie may be repeated every second or third day at first, and afterwards every day, or in some instances as often as twice a day.

Bougies may be medicated in various ways. Calomel rubbed up with sufficient glycerine or oil to cover it, forms a very cleanly and excellent mixture with which to anoint the bougie, and I think materially assists the curative action. Mercurial ointment may also be used either alone or combined with extract of belladonna, the latter being added in case the urethra is irritable.

℞. Unguenti Hydrargyri ℥ss 15
Extracti Belladonnæ ℨss 2
M.

For the purpose of stimulating the mucous membrane, we may employ the diluted ointment of red oxide of mercury, or an ointment containing a few grains of nitrate of silver, but such applications should not be continued for any length of time, lest they keep up the discharge.

℞. Ung. Hydrarg. Oxidi Rubri ℨj . . . 4
Adipis ℥iij 12
M.

℞. Argenti Nitratis gr. v–x . . 30 — 60
Adipis ℥j 30
M.

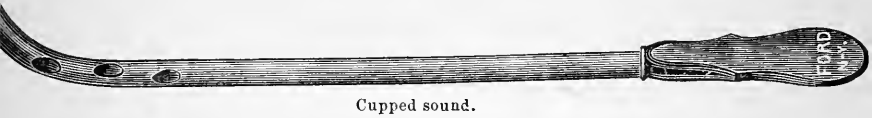
In old cases of gleet I have used the following mixture with very satisfactory results. A full-sized sound should be thoroughly smeared with the

tenacious mass, then oiled and be passed as far as the membranous portion of the urethra, and allowed to remain for three minutes. The first effect is to increase the discharge, which, however, subsides in the course of a few days to a less quantity than before the application, when the process is to be repeated at intervals until a cure is effected.

℞.	Cupri Sulphatis ʒiss	6
	Ceræ Albæ ℥j	30
	Adipis ʒiss	6
M.		

Any ordinary sound will answer for the application, although one may be made especially adapted for the purpose with a number of cup-shaped depressions to hold the ointment, as represented in Fig. 9.

Fig. 9.

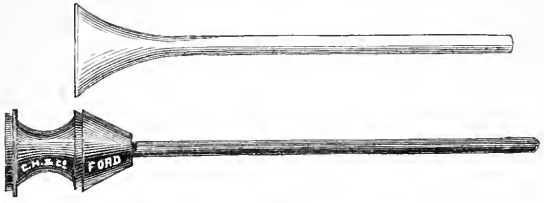


Cupped sound.

Another most excellent application is a mixture of tannin and glycerine in such proportions that, when cold, it will form a solid mass. The cups are filled with the mass, which is liquefied by the heat of the body.

The Endoscope.—It is a good rule to follow in learning the use of the Endoscope, as it is of the microscope, for the beginner to commence with the simplest instruments and afterwards add to his stock as his wants and his own experience dictate. All that is wanted for the examination of the

Fig. 10.

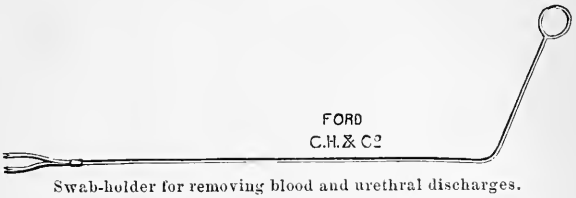


The upper figure represents the metallic endoscopic tube which is blackened on the inside; the lower figure its conductor and handle to facilitate its introduction, made of hard rubber.

urethra is a number of straight urethral tubes adapted to different sizes of the canal, and the necessary means of illumination. The tubes proposed by many different authors are all about the same and equally serviceable. Fig. 10 represents those of Grünfeld, one of the latest and most advanced writers on endoscopy. Cuts of the desirable accessory instruments, a swab-holder for removing blood and mucus, a pencil for the application of caustics or astringents, a powder-blower for the same purpose, forceps and scissors for the removal of urethral polypi, a larger bent tube with a glass

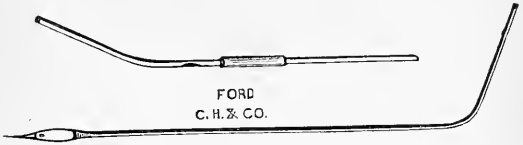
window at the bend for the examination of the deeper parts of the canal and the bladder, are also given. These are enough and more than enough for the requirements of any one but a specialist.

Fig. 11.



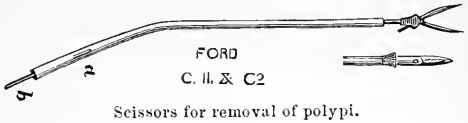
Swab-holder for removing blood and urethral discharges.

Fig. 12.



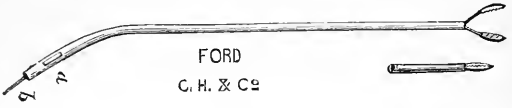
Blower for medicated powders, and pencil for application of caustic and astringent solutions.

Fig. 13.



Scissors for removal of polypi.

Fig. 14.



Forceps for removal of polypi.

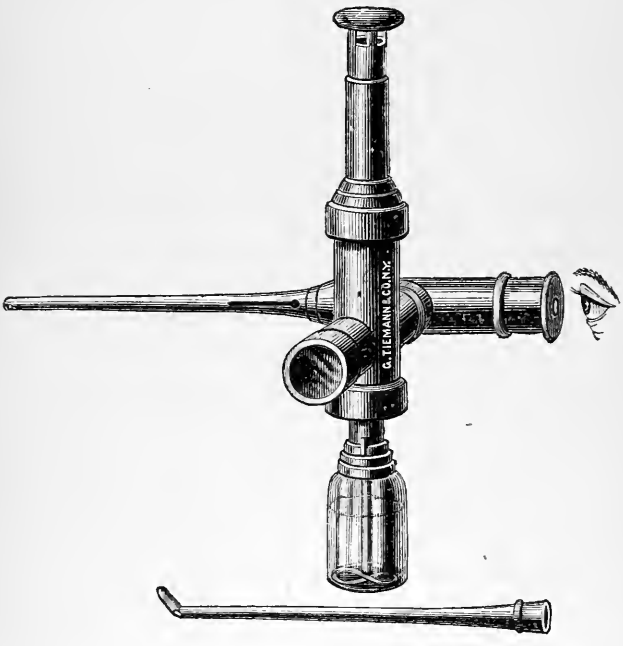
For illumination, sunlight, when obtainable better than artificial light, is thrown in through the tube by means of the ordinary frontal mirror. In the absence of sunlight, an argand burner or Tobold's condenser. Such instruments and such mode of illumination are all that are in general use at the present day. They are indeed in some respects superior to the older and more cumbrous ones, since they enable the observer to control the direction of the light and detect lights and shadows marking not only pathological changes but the openings of the ducts of urethral follicles, observed in this way for the first time by Grünfeld, whose valuable papers are recommended to the reader.[1]

Désormeaux's original instrument, represented in Fig. 15, is expensive

[1] Der Harnröhren-Spiegel, seine Anwendung; Wiener Klinik, Februar–März, 1877. See also Wiener med. Presse, No. 11 and 12, 1874; Die Endoscopie bei Stricturen der Urethra, Wiener med. Wochenschrift, No. 39, Sept. 25, 1875; Auto-endoscopie der Urethra, Wiener med. Ztg. No. 36, 1875.

and not easily handled. The same may be said of Cruise's, which affords rather a better light.

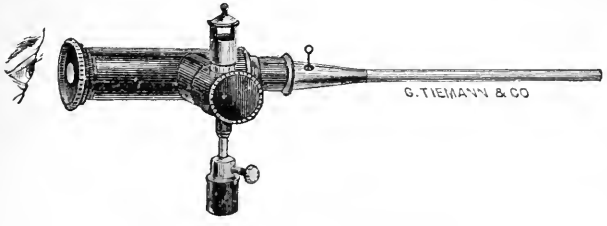
Fig. 15.



Désormeaux's endoscope. The lower tube, with a glass window at the commencement of the bent extremity, is intended for exploration of the bladder.

In the absence of sunlight a modification of Désormeaux's instrument by Dénis is excellent, Fig. 16. It is much cheaper than Désormeaux's and handled more readily and with less discomfort to the patient.

Fig. 16.



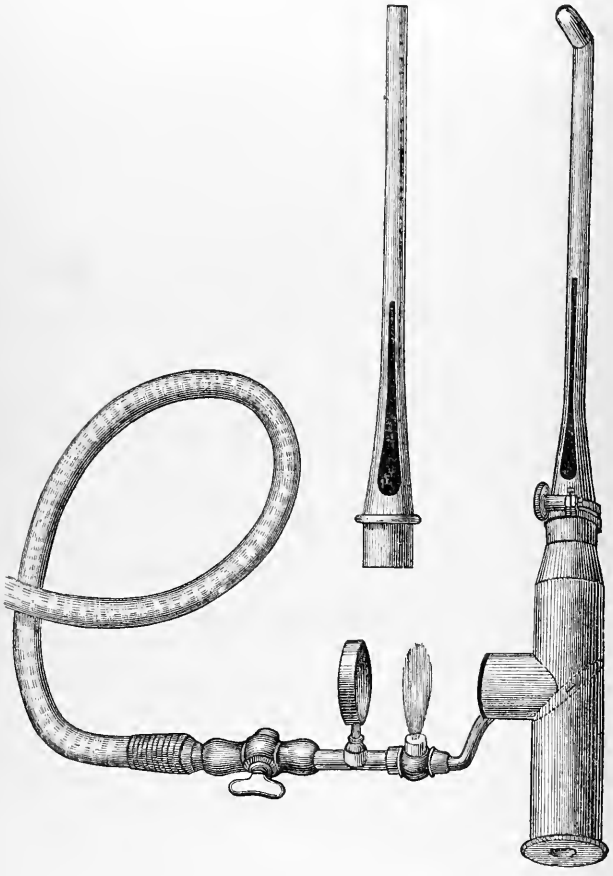
Désormeaux's endoscope modified by Dénis.

Mr. Cruise uses as a burning fluid a solution of camphor in kerosene, ten grains "or more" to the ounce. I use in Dénis's instrument one part of the best sperm-oil and six parts of Pratt's Astral oil, which, by the way, is an excellent compound to burn in the German students' lamp.

Fig. 17 represents an endoscope adapted to ordinary gaslight.

Just as this edition is going to press, a new dilating urethroscope has been presented to the profession by Auspitz[1] (Fig. 18). The name of its

Fig. 17.



eminent inventor is sufficient to lead us to anticipate from it the advantages which he claims it possesses.

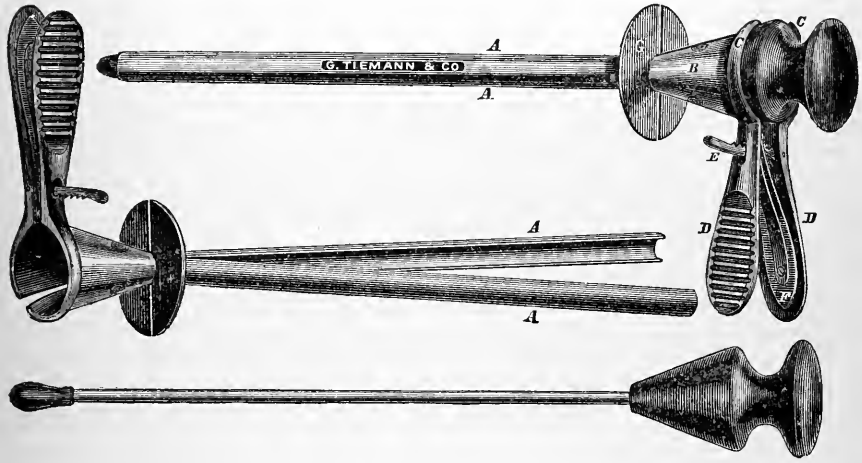
Success in the use of the endoscope requires dexterity on the part of the surgeon, which can only be attained by practice. The patient's urethra should also be habituated to the use of instruments by the passage of sounds before an endoscopic examination is attempted, and this may require several preliminary sessions. The best position to place him in is the horizontal with the knees strongly flexed, and the tube should be introduced into the membranous or prostatic portion of the canal before the plug is withdrawn. Other portions are brought into view as the tube is drawn out.

It will readily be seen that for the purposes of diagnosis, the endoscope

[1] Vrtljschr. f. Dermat., Wien., 1879, s. 3.

proves itself to be an invaluable instrument in many cases, as, for instance, in those of urethral polypi, or venereal ulcers which might otherwise escape detection. It reveals also the presence and the exact seat of patches of granulations, spots of herpes, etc., and as applications can be made

Fig. 18.



through the tube, it enables us to reach these parts directly. Granulations can be touched by the solid nitrate of silver, with a solution of the same salt, or by any astringent in powder, as the sulphate of zinc, either pure or diluted. In herpes of the canal Désormeaux recommends the application of the Oil of Cade, which looks a little as if he were governed by preconceived notions as to the nature of the affection.

There is every reason to believe that the urethroscope, as now improved, will be found of great value in the treatment of chronic urethral affections, but hitherto it has not supplanted other means of diagnosis and treatment, and cases of gleet still make their oft-repeated visits at the cliniques of Désormeaux and other experts in the use of the endoscope.

Injections.—Injections have been so fully discussed in the preceding chapter, that little remains at present to be said of their composition, or the ordinary mode of their administration.

In gleet as in gonorrhœa, weak solutions of the acetate or sulphate of zinc (containing from two to three grains to the ounce of water) are in most instances to be preferred; and the injection should be made to permeate the urethra as deeply as possible, in order that it may be applied to the whole extent of the affected surface, but care should be taken not to distend the canal with too much force, the sensations of the patient being the best indication when a sufficient amount has been employed. So far as inflammation of the testicle and prostate have any connection with the use of injections, I believe they are more frequently due to violent manipulation than to the irritant character or strength of the solution. Hence, injections should always be used with gentleness, while at the same time the canal should be entirely filled, that none of the folds into which the

urethral walls are naturally thrown except during the passage of the urine may escape coming in contact with the astringent fluid. With this precaution, a weak injection may be employed after every passage of the urine, a degree of frequency which will often prove successful when a less degree has failed.

In addition to the formulæ for injections given in the chapter upon gonorrhœa, the following may be added:—

℞. Hydrargyri Bichloridi gr. j . | 06
Aquæ ℥viij–xij . . . . . 250 | —375|
M.

℞. Gallæ ʒj . . . . . 4|
Aluminis ℈ij 2 60
Aquæ ℥viij . . . . . 250|
M.

℞. Acidi Nitrici gtt. xvj–xl . . 1| — 2|60
Aquæ ℥viij . . . . . 250|
M.

℞. Liq. Ferri Persulphatis (Squibb) ʒss 2|
Aquæ ℥vj . . . . . 180|
M.

The strength of the above solution may, in some instances, be increased.

Dr. Lordly,[1] of N. Y., recommends warm medicated injections, about three pints, made daily by the surgeon himself by means of a fountain-syringe, and a catheter introduced into the prostatic urethra. The water is medicated by some astringent, as the sulpho-carbolate of zinc, not more than three grains to the ounce. The injection is to be followed by the insufflation of some astringent powder.

Ricord advises solutions containing iodine in scrofulous subjects, and, although the injection of this mineral into the urethra cannot be supposed to affect the constitutional diathesis, yet it may exert a beneficial action upon the mucous membrane as when applied to the fauces.

℞. Tinct. Iodinii gtt. viij . . . . . |50
Aquæ ℥viij . . . . . 250|
M. (Ricord.)

℞. Ferri Iodidi gr. viij . . . . . |50
Aquæ ℥viij . . . . . 250|
M. (Ricord.)

I will here repeat a suggestion previously given, that the use of any medicated injection, and especially one containing insoluble ingredients, will prevent even a sound urethra from exhibiting its normal dryness. Without due caution, therefore, a patient may go on injecting long after his disease is cured. Hence, after the discharge has for some time been reduced to a very minute quantity, and especially if it appear to consist of little more than the insoluble deposit of the solution, the injection should be omitted for a few days, in order that the exact condition of the urethra may be determined; or again, it may be administered only once in the twenty-four hours, selecting for the purpose the early part of the day, and

[1] Hospital Gaz., Feb. 15, 1878.

the appearance of the meatus the following morning will indicate what progress has been made towards a cure.

Deep Urethral Injections.—In the ordinary method of injecting the male urethra, it is difficult to make the fluid pass through the whole extent of the canal into the bladder. After a certain portion (about half an ounce) of the contents of the syringe has been injected, the remainder escapes above the piston, or, however tightly the glans may be compressed around the point of the instrument, flows from the meatus. The obstruction to the entrance of the fluid is due to the contraction of muscular fibres (the compressor urethræ muscle) which surround the membranous portion and serve as a sphincter to the urinary canal;[1] and this is the posterior limit of the application of the fluid to the urethral walls by the more common method of injecting. In order to reach the deeper portions of the canal which are involved in many cases of gleet, it becomes necessary to resort to injections through a catheter, or by means of the "urethral syringe with extra long pipe," manufactured by the American Hard Rubber Company, or with Tiemann's "universal syringe," which is provided with a catheter extremity.[2]

Mr. Dick and Mr. Erichsen recommended a catheter syringe, Fig. 19, for deep urethral injections; the piston consists of a sponge which will absorb about a quarter of a drachm of fluid, and this is expelled through minute openings whenever the stylet is thrust down.

Still better for use in the deeper parts of the canal is Guyon's injector (Fig. 20). It consists simply of an ordinary *bougie à boule*, perforated by a minute canal which terminates near the point in several fine openings. The injection is made through it by means of a common hypodermic syringe, provided with such a nozzle as will fit the bougie. The only objection to this instrument is the difficulty, in some cases, in introducing a flexible bulbous bougie beyond the triangular ligament.

This objection is obviated in my own instrument, Fig. 21, which I have found to be well adapted for old cases of gleet, spermatorrhœa, etc.

Fig. 19.

Dick's catheter syringe.

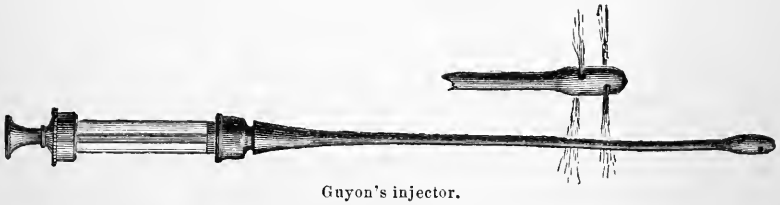
The length of the urethra may be measured by introducing a catheter and marking the point in contact with the meatus when the urine first

[1] See the section on the Anatomy of the Urethra in the chapter on Stricture.

[2] This instrument will be found very useful in the treatment of venereal diseases, for instance in deep urethral injections, in injections into the nostrils and pharynx, etc.

commences to flow; upon withdrawing the instrument the distance between its eye and the mark upon the stem will be the measurement required.

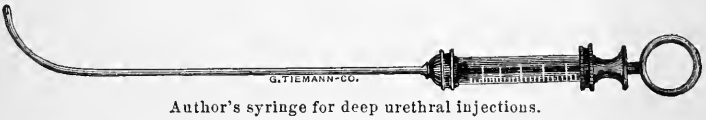
Fig. 20.



Guyon's injector.

On introducing the catheter-syringe for the purpose of injecting (the patient having first passed his water), it is an easy matter to carry its point

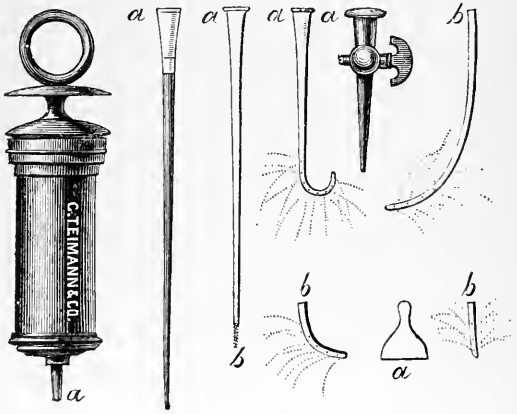
Fig. 21.



Author's syringe for deep urethral injections.

within half an inch of the vesical neck without entering the bladder, when the fluid may be thrown in as the instrument is slowly withdrawn. If the

Fig. 22.



Tiemann's "universal syringe."

instrument be sufficiently large to moderately distend the canal, none of the injection will escape from the meatus so long as the eye is in the prostatic or membranous portion of the urethra, since the contraction of the same muscle which prevents the entrance of fluid from without, also prevents its exit from within, and obliges it to flow backwards towards the bladder; hence we may, if we choose, limit the application of the injected fluid to the deeper portions of the canal exclusively, and the pain excited will be found to be less than when a solution of the same strength is thrown

into the external portion, since the urethra, like other mucous passages, is most sensitive near its outlet. The chief disagreeable sensation following an injection thus confined to the portion of the urethra lying between the compressor urethræ muscle and the neck of the bladder, is an urgent desire to pass water, which, however, should be resisted as long as possible, that the fluid may have time to act upon the urethral walls before it is washed away or neutralized by the urine. During the succeeding twenty-four hours, micturition is somewhat more frequent than usual, but is not particularly painful; and the discharge is often slightly increased for a day or two.

The efficacy and safety of these injections in affections of the deeper-seated portions of the urethra is attested by MM. Diday[1] and Bonnet, of Lyons, Mr. Langston Parker,[2] of Birmingham, and my own experience. The same formulæ may be employed that have been recommended for injections by the more common method, and the application may be repeated once or twice a week.

Blisters.—Blisters were long ago recommended for the cure of obstinate cases of gleet, but had almost fallen into disuse, when they were revived by Mr. Milton, in his work on the treatment of gonorrhœa. This author speaks of them in the following terms: "I have seen two blisters, with a mild injection or two, at once cure a clap which had defied the most energetic treatment; and *as I never found a case which resisted blistering and injections together, that was not complicated with stricture or affection of the testicle, I am slowly arriving at the conviction, that every case of clap or gleet, however obstinate, may, if uncomplicated, be cured by blistering, singly or combined.*"[3] It is to be feared, however, that this remedy has proved less successful in the hands of other surgeons than in Mr. Milton's. Recent writers who have spoken favorably of it appear to have done so chiefly on Mr. Milton's authority; others, as Mr. Langston Parker, have given their testimony decidedly against it, and in my own practice it has not been attended with such success as to lead me to prefer it to other and less disagreeable modes of treatment. Still it may be worthy of a trial in obstinate cases which have resisted the use of bougies and injections.

The manner of applying blisters to this region is of considerable importance. The hair should be shortened around the root of the penis, and a piece of paper be wrapped around the organ, and cut in such a manner as to form a pattern of its surface from the pubis to within half an inch of its extremity. The blister, corresponding in shape and size to the pattern,

[1] Des injections circonscrites à la partie profonde de l'urèthre, de leur mode d'exécution, et de leur efficacité curative; Annuaire de la syphilis, année 1858, p. 61. Diday's method of employing deep urethral injections has been followed in the above description.

[2] Syphilitic diseases, p. 82. Mr. Parker injects the fluid into the bladder, lets it remain for a few minutes, and desires the patient to force it out. This method is not so good as the one above recommended.

[3] Milton on Gonorrhœa. The Italics are in the original.

should be applied to the penis, and tied or fastened in its place, that it may not slip, and, coming in contact with the scrotum, produce a troublesome sore. It should not be retained longer than two hours, during which the patient must remain quiet. The morning is the best time for its application, since, if applied at night, it is likely to prevent sleep. On removing it, the surface is found to be reddened, but not vesicated, unless, perhaps, at a few points; and the penis should now be covered with a rag spread with simple cerate, and be protected from friction by an external layer of cotton wadding.

On examining the parts after a few hours, it will be found that numerous bullæ have formed on the surface, which at first appeared to be only reddened. These may be pricked, and the serum which they contain evacuated, but the epidermis should be carefully preserved. I have sometimes found the extremity of the prepuce beyond the site of the blister, puffed out with an effusion into its cellular tissue, which may be left to take care of itself, or, if excessive, be evacuated by a few punctures with a lancet.

Cantharidal collodion is a more convenient application than the unguentum lyttæ, but its effect cannot be limited like that of the latter, which should therefore be preferred. When applied for a few hours only, I can confirm Mr. Milton's statement, that blisters do not excite severe pain, nor produce a troublesome sore. The first effect of their application is to increase the urethral discharge, which can only be expected to be benefited in the course of five or six days. The blister may be repeated at the end of a week, if any discharge still remain. The perinæum may be blistered in a similar manner, but this will require the patient to be kept in bed until the vesicated surface has healed.

Separation of the Affected Surfaces.—Contact of the diseased surfaces doubtless assists in keeping up the discharge in gleet, as it is well known to do in balanitis. Hence it has been proposed, by means of a probe and a gum-elastic bougie open at the extremity, to introduce a strip of lint, either dry or soaked in some astringent fluid, within the urethra, and thus maintain its walls apart, renewing the application after each passage of the urine. This method, in which I have had no experience, has been successful in some instances, but is very troublesome and inconvenient, and would appear to be attended with danger of the lint slipping entirely into the urethra, and entering the bladder. Civiale mentions a case in which this accident occurred, but does not give the ultimate result.[1] Mr. Milton[2] states that it has happened to him in several instances, and that the lint has always found its way out, but the danger of its retention is too great to be incurred. Separation of the affected surfaces is partially effected by certain forms of injections, as those containing bismuth, calamine, and other insoluble ingredients.

Finally, in obstinate cases of gleet in which the discharge appears to come from the anterior portion of the urethra, laying open the lacuna magna, as recommended by Dr. Phillips, is worthy of a trial.[3]

[1] Maladies des organes genito-urinaires, vol. i, p. 444.
[2] On Gonorrhœa, p. 31.
[3] See page 82.

CHAPTER III.

BALANITIS.

If the prepuce be retracted, a mucous surface of considerable extent is exposed, a portion of which covers the glans penis, and the remainder consists of the internal reflection of the prepuce. This surface may be the seat of inflammation, similar to that which has been described as affecting the urethra. If the disease be confined, as it sometimes is, to the membrane covering the glans, it should, strictly speaking, be called balanitis; if to the internal surface of the prepuce, posthitis, and if it involve both, balano-posthitis; all these varieties, however, for the sake of convenience, are commonly included under the one name, balanitis. Gonorrhœa spuria, balano-preputial gonorrhœa, and external blennorrhagia are other terms by which it is sometimes known.

Causes.—Men in whom the prepuce is long, or who are affected with congenital phimosis, are peculiarly exposed to balanitis, since the mucous membrane covering the glans and lining the prepuce, is maintained in so sensitive a condition, from its want of exposure to the air and friction, that inflammation is readily set up by the least cause of irritation. Such a cause is at hand in the natural secretion which exudes from the very numerous sebaceous follicles that exist on the internal surface of the prepuce and the furrow at the base of the glans. If from inattention to, or the impossibility of cleanliness, as in cases of phimosis, this cheesy secretion be not frequently removed, it becomes decomposed and is changed into an ammoniacal, foul-smelling, emulsion-like fluid, which acts strongly as an irritant upon the delicate mucous membrane with which it comes in contact. When phimosis is present, it will readily be understood how this fluid, coming from a small preputial orifice, may be mistaken for urethral gonorrhœa. I once had a patient come to me from the western coast of South America, simply to consult me for a supposed clap, for which he had been taking copaiba and using urethral injections for many months. A careful examination showed that the discharge came only from the balano-preputial fold in a penis affected with congenital phimosis, and circumcision speedily relieved him of his trouble. The diagnosis in such cases is readily made, by exposing and wiping the meatus, and then noting whether upon pressure the matter comes from the urethra or from beneath the foreskin. Moreover, the pain in micturition in cases of urethritis extends along the course of the canal, while in balanitis it is confined to the excoriated surfaces of the extremity of the penis.

It will be evident that the stagnation and decomposition of any secretion, other than that just mentioned, may have the same effect. Thus the purulent discharge from chancroids situated on or near the glans, the more or less watery secretion from a true chancre, mucous patches or other secondary lesion, the acrid exudation from vegetations, a gonorrhœal discharge gaining entrance from the meatus,—all these are frequently the cause of balanitis. The pressure exercised by a mass of vegetations or by the exuberant development of the indurated base of a chancre are also worthy of mention.

Thus far we have said nothing about contagion as a cause of balanitis. If this were a frequent cause, the number of cases of this affection would be even greater than those of gonorrhœa, considering how much more than the urethra the glans penis is exposed in sexual intercourse, whereas the contrary is the fact, Sigmund reckoning one case of balanitis to seventeen of gonorrhœa, and Fournier one to twenty-four. Still to this cause—contagion—some instances of inflammation of the balano-preputial fold may doubtless be ascribed. Benjamin Bell relates a story of two young men, each of whom introduced beneath his prepuce a pledget of lint soaked in gonorrhœal matter and kept it in place for twenty-four hours. This was followed in one of them by a very severe attack of balanitis attended by paraphimosis. The other had a slight external inflammation, but, the matter having entered the urethra, he was attacked on the second day by a violent urethritis.

To the above causes of balanitis we may add excessive coitus, masturbation, and leucorrhœal discharges in women with whom the sexual act has been accomplished.

It appears from the above that balanitis in the great majority of cases is not due to contagion and is not, strictly speaking, a venereal disease; according to Fournier's statistics it is venereal in only one-fifth of the cases met with.

Symptoms.—In its mildest form balanitis is a very trivial affair. The patient complains of tenderness and an itching or tickling sensation at the head of the penis, and perhaps scalding during micturition if the urine comes in contact with the inflamed surface. On examination we find the glans sensitive to pressure, reddened, smeared with a thin, whitish or slightly yellowish, offensive fluid, and perhaps here and there deprived of its epithelium in patches.

In a more advanced stage the glans appears to be swollen, its redness is intensified, the prepuce is somewhat tumefied, the discharge is more copious and purulent, the parts more painful and sensitive on contact with the clothes. The patches denuded of epithelium are now more marked, and are quite characteristic of this affection. They consist of exulcerations, of a bright red color, sharply defined, but irregular in their outline, isolated at first, but gradually becoming confluent. They are due simply to the epithelium having been macerated and detached; and they form a strong contrast in color with other portions of the surface on which the

latter is only partially detached, but whitened by constant soaking. Sometimes they cover the whole surface of the glans, leaving no trace whatever of its normal outer layer.

The above symptoms may be still further aggravated. The prepuce becomes of a dull red color, and its œdematous swelling so great as to give to the virile organ the shape of an Indian club; sometimes it is twisted in the form of a corkscrew in front of the glans. The discharge is increased in quantity, is of a greenish color, and streaked with blood. Erections are frequent and very painful. The passage of the urine is impeded, amounting in some cases to retention, and, when accomplished, is attended with intense scalding as the fluid passes over the fissured orifice.

Gangrene of the prepuce is not an uncommon occurrence. It is usually partial, in fact, just sufficient to relieve the tension and allow the glans penis to protrude through the opening formed by the slough. In this way arise the oddest deformities, amusing to any one but the patient, as is shown in the accompanying wood-cut.

Fig. 23.

Gangrene of prepuce with glans penis button-holed.

One attack of balanitis predisposes to another. Men with a long prepuce or congenital phimosis are often met with, who have lived thirty or forty years without suffering inconvenience from their malformation, but who, after one attack of balanitis, are constantly subject to others, following intercourse with healthy women or even mere imprudence in diet. In consequence of a succession of such attacks, the foreskin is changed in its texture, resembles in its feel leather or parchment, and can only be peeled off the glans with some difficulty. Its orifice and internal surface and the surface of the glans are uneven, dry, and beset with fissures which readily bleed. In one case which came under my care the patient, a bell-hanger, had suffered in this way constantly for eight years, during most of which time he had been in the hands of quacks, who told him he had syphilis and treated him for such.

Frequent attacks of balanitis, especially in the subacute form, favor the development of vegetations within the balano-preputial fold. Adhesions may also take place between the opposed surfaces, especially in the furrow at the base of the glans. They are usually limited in their extent, but in rare cases become general. Without having actually grown together, the two surfaces may be adherent to each other, as if glued together, and may readily be separated by the nail.

Complications.—Phimosis and paraphimosis which frequently complicate balanitis will form the subject of the next two chapters.

Lymphitis.—Inflammation of one or more of the lymphatic vessels running along the dorsum or sides of the penis is not an uncommon complication of acute balanitis. They may be felt like hard, sensitive cords

running from the base of the glans towards, and sometimes extending to, the pubes. Their course may be visible to the eye by a reddish line upon the skin covering them. They very rarely suppurate unless a chancroid exist beneath the prepuce.

Adenitis.—The glands in the groin occasionally swell and become slightly tender and painful, but rarely, if ever, suppurate.

Penitis.—General inflammation of the penis is said sometimes to occur, marked by "erysipelatous redness and considerable tumefaction of the whole organ; inflammatory œdema of the prepuce extending to the sheath of the penis, which is painful and sensitive to the slightest contact; an abundant phlegmonous discharge; lymphitis and swelling of the inguinal glands. Formidable as it appears, this condition most frequently terminates in resolution, though sometimes the inflammation extends to the cellular tissue and produces superficial abscesses and even gangrene." (Fournier.)

Diagnosis.—The presence of balanitis is easily recognized. The diagnosis of the cause on which it depends is not always quite so easy. We will consider first those cases in which the glans can be uncovered and the whole balano-preputial fold exposed to view, and next those more difficult cases in which phimosis conceals the parts.

In the former an inexperienced observer might mistake the redness surrounding a patch of herpes for simple balanitis, but the characteristics of herpes, as will be shown in another chapter, are sufficient to avoid this error. One or more chancroids situated near the furrow at the base of the glans will be obvious enough, and the same may be said of a true chancre with an ulcerated surface and an indurated base, the diagnosis being confirmed by the induration of the glands in the groin. More difficulty may be experienced in the diagnosis of a superficial chancre, which will often closely resemble one of the exulcerated patches mentioned as occurring in herpes. It is generally, however, isolated, causes little inflammation of the surrounding parts, has a thin layer of parchment induration beneath it, and is attended by induration of the inguinal ganglia.

Secondary eruptions and especially mucous patches often appear on the glans near the furrow in the early stages of secondary syphilis. They are generally multiple, of smaller size than the exulcerations of balanitis, more regular and rounded in their outline, of a less vivid red color, and are accompanied by other secondary symptoms elsewhere.

When phimosis is present and the balano-preputial fold cannot be exposed, we have to distinguish between a discharge coming from the urethra and the discharge of balanitis. The diagnostic signs have been given incidentally on page 97.

The presence of chancroids beneath the prepuce may be difficult to determine. It is almost invariably the case, however, that in such instances the pus from these ulcers inoculates the fissures at the preputial orifice; hence chancroids of the preputial ring, which may easily be seen on partly retracting the prepuce, afford a presumption of their existence within the

balano-prepntial fold. Auto-inoculation of the pus may be practised as a test, but this will rarely be done unless the question of an operation comes up.

True chancres may often be recognized by the mass of induration around them, which can be felt by the fingers externally. Induration of the glands in the groin will remove all doubt, and this will serve also to indicate the presence of superficial chancres which might otherwise pass unnoticed.

TREATMENT.—When the prepuce can be retracted, the treatment of balanitis is exceedingly simple. All that is necessary, in most cases, is to free the parts from any collection of matter by gently washing them with tepid water, and then to cut a piece of lint or soft linen into pieces about an inch square, and laying them upon the glans with their upper margins well up in the furrow behind the corona, to draw the prepuce over them. In this manner the inflamed surfaces are isolated from each other, and speedily take on a more healthy action. The frequency with which this application should be repeated depends upon the copiousness of the discharge; generally from two to four times in the twenty-four hours is sufficient, and a cure is usually attained in a few days or a week. In severe cases, however, other measures than those mentioned may be desirable. If the surface be excoriated, it is well to pencil it over lightly with a crayon of nitrate of silver, or to apply a solution of this salt, of the strength of twenty or thirty grains to the ounce of water.

I decidedly prefer to use the lint dry, because it thus better absorbs the matter exuded. Many surgeons, however, moisten it with some lotion like the following:—

℞.	Liquoris Plumbi Diacetatis ʒij . . .	8
	Aquæ ℥ij	60
M.		
℞.	Acidi Tannici ʒj	4
	Glycerinæ ʒj	38
M.		
℞.	Liquoris Sodæ Chlorinatæ ʒiij . . .	12
	Aquæ ℥v	150
M.		
℞.	Extracti Opii ℈j	1 25
	Zinci Sulphatis gr. vj	40
	Glycerinæ ʒj	38
	Aquæ ʒiij	90
M.		

As a local application to the inflamed surface (after washing and before the introduction of lint), iodoform has been recommended. This may be dissolved in ether, one drachm to the ounce, and be painted on with a brush. On the evaporation of the ether, which causes but little pain, a thin film of iodoform is left. The ether partially removes the bad smell of the iodoform.

Salves beneath the prepuce are to be avoided; so also poultices, which favor œdema.

Chancroids should receive their appropriate treatment and true chancres

can best be treated and their induration removed by the internal use of mercury.

When phimosis, either congenital or acquired, exists, the parts are less accessible to treatment. We may sometimes succeed in enlarging the preputial orifice and thus be enabled to uncover the glans, by the insertion of a few small pieces of compressed sponge, which swell under the moisture of the discharge and distend the ring.

If this procedure fail, we must resort to injections between the prepuce and glans. For this purpose any urethral syringe with a long nozzle may be made to answer, but by far the best is one devised by Dr. Robt. W. Taylor[1] (Fig. 25). It consists of an india-rubber syringe, to which is attached a nozzle which is three inches long and nearly flat, having a diameter of less than an eighth of an inch. Near the end of it and situated on the edge are five minute holes, two on each side and one on the extreme end. This nozzle can be introduced very easily and without pain as far back as the fossa glandis. The syringe should be inserted in different directions and plain water at first be thrown in until the prepuce is thoroughly washed out, as may be known from the returning fluid being clear. This done, a medicated solution should be thrown in and Dr. Taylor prefers a solution of carbolic acid, two drachms to the half pint of water. These injections should be repeated five or six times a day. For the further treatment of supervening phimosis, see the next chapter.

If the balanitis be attended by much infiltration into the cellular tissue of the prepuce, the fluid should be evacuated by several punctures with a lancet. If the patient can keep his bed, the penis may also be enveloped in a single thickness of linen, wet with cold water or diluted Goulard's extract, and exposed to the air. If, however, he continues his daily occupation, no benefit can be expected from such applications, which, when confined by the clothes, act like poultices, and favor rather than prevent œdema. In all cases the cure of balanitis will be accelerated, if the patient be kept quiet and the parts elevated.

With persons who have repeated attacks of balanitis it becomes an important object to take measures to prevent them. To accomplish this the strictest cleanliness should be enjoined. The parts should twice a day be cleansed of all accumulation of their natural secretion, and afterwards moistened with an astringent lotion, as a mixture of equal parts of brandy and water with the addition of alum, a solution of tannin, or any of the astringent washes already mentioned. A good formula is the following:—

℞.	Acidi Tannici ʒij	8
	Aluminis ʒiv	16
	Glycerinæ ʒiij	15
	Aquæ ℥viij	250
M.		

This may be used as a wash or it may be put up in a wide-mouthed phial and the penis be immersed in it.

[1] Am. J. Syph. & Derm., N. Y., Oct., 1872.

It is also desirable to attend to the digestive functions, and to regulate the diet. The influence of a long prepuce in producing relapses of this disease has already been referred to. I have sometimes succeeded in remedying this malformation by directing the patient to keep his prepuce constantly retracted by means of a narrow bandage applied around the penis, posterior to the glans. If this be worn for a few weeks, the prepuce will often remain retracted without further assistance, and the mucous surface of the glans becomes hardened by exposure and friction. If this attempt prove unsuccessful, the superfluous integument should be removed by circumcision.

CHAPTER IV.

PHIMOSIS.

The term Phimosis is applied to that condition of the penis in which it is impossible to retract the prepuce behind the glans. It may be either congenital or accidental.

Congenital Phimosis.—In the majority of cases phimosis is a congenital malformation due to unnatural narrowness of the preputial orifice, and may be associated with adhesions varying in position and extent between the glans and its covering. A remarkable instance of this kind is recorded in the Surgical Register of the N. Y. Hospital: Joseph Smith, of Prussia, aged 49, was admitted into this institution Oct. 19, 1832, with congenital phimosis. Dr. Stevens removed the free portion of the prepuce, which was found to be attached to the margin of the meatus instead of the base of the glans, and formed a tubular prolongation of the urethra nearly an inch in length.

Congenital phimosis is a source not only of great inconvenience to the subject of it, but of increased exposure to venereal diseases in promiscuous intercourse, and is sometimes the cause of serious disturbance in the genito-urinary and nervous systems.

Mr. Jonathan Hutchinson[1] has shown by statistics that syphilis is much less common among Jews than among Christians, probably on account of the practice of circumcision among the former. At the Metropolitan Free Hospital, situated in the Jews' quarter, London, in 1854, the proportion of Jews to Christians among the out-patients was nearly one to three; yet the ratio of cases of syphilis in the former to those in the latter was only one to fifteen; and that this difference was not due to their superior chastity was evident from the fact that the Jews furnished nearly half the cases of gonorrhœa that were treated during the same period. Mr. Hutchinson's observations also lead him to believe that hereditary syphilis is much rarer among the children of Jews than Christians; and the experience of most surgeons will confirm the fact that persons with a long prepuce, and especially those affected with congenital phimosis, are peculiarly subject to venereal diseases.

The size of the preputial orifice in congenital phimosis varies in different cases. In some, it is large enough to permit of the partial exposure of the glans and the removal of the natural secretion of the part, at least with the assistance of a syringe and injections of warm water; while in

[1] Med. Times and Gaz., Lond., Dec. 1, 1855.

others, it is so contracted that it is difficult or even impossible to uncover the meatus; whence it happens that the entrance of the urine at each act of micturition beneath the prepuce, and the collection of sebaceous matter, maintain a constant state of irritation and even chronic inflammation, to which most of the adhesions met with between the opposed surfaces are undoubtedly attributable.

Daily observation proves that congenital phimosis is not inconsistent with a state of perfect health; and yet when we reflect upon the sympathy existing between different portions of the genito-urinary apparatus, and between the latter and other organs, we might reasonably expect to meet with at least occasional instances in which irritation of the head of the penis due to this cause gives rise to disturbance in other parts of the body. These anticipations are realized in practice; but, according to Fleury,[1] who has ably investigated this subject, such disturbance is to be attributed more to the extreme sensitiveness of the balano-preputial membrane constantly protected from friction and exposure to the air, than to the irritation of collections of sebaceous matter; since it is often present even when the condition of the parts admits of the most perfect cleanliness.

Among the ill effects ascribed to congenital phimosis are: balanitis, constant itching and even pain at the head of the penis, inordinate excitability of the genital organs, frequent erections, erotic dreams, seminal emissions, imperfect development of the penis and testicles, incomplete and painful ejaculation of the sperm, vesical tenesmus, incontinence of urine, gastralgia, neuralgia, and general lassitude and prostration. Probably no one will be disposed to call in question the occasional connection between the milder of the above affections and phimosis. Thus no one can doubt that boys with congenital phimosis are peculiarly prone to suffer from nocturnal incontinence of urine, of which they are cured by circumcision; that at a more advanced age the penis does not attain its full development; that they are more apt to practise masturbation and to have seminal emissions; that in married life they do not have the full enjoyment of the sexual act, the usual complaint being of too speedy ejaculation; and that during life they are subject to disagreeable sensations and to attacks of balanitis, which are even aggravated in old age when the integument generally becomes loose and flabby. The same is equally true of persons with a long prepuce, even if no actual phimosis be present.

With regard to the more remote effects of congenital phimosis, some doubts might be legitimately entertained, were it not for the circumstantial report of the symptoms, and the fact that simple excision of the elongated prepuce has in many cases brought complete and permanent relief.[2]

Within the last few years additional cases of the remote effects of con-

[1] Gaz. d. hôp., Paris, Oct. 30, 1851.

[2] Fleury's observations have been fully confirmed by Borelli (*Maladies genito-vésicales, Gaz. d. hôp.*, Paris, Dec. 1851); Anagnostaxis relates a cure of amblyopia by the excision of the prepuce (*Rev. de thérap. méd.-chir., No.* 4, 1850). See also an article by John H. Packard, M.D., "On Congenital Phimosis" (Am. Jour. Med. Sci., Oct., 1870)

genital phimosis and of a small meatus urinarius have been reported by Drs. Sayre, Moses, Otis, Green, Brown-Séquard, and others. These cases have been ably summed up, and others added, in a report from the Surgical Section to the New York Academy of Medicine, by Dr. Yale,[1] who says: "The forms of nervous disturbance observed in these cases, so far as I have ascertained, have been, notably, incoördination of muscular movements, including those necessary to speech, less commonly spasm or spastic contraction, and paresis, generally of the lower extremities. I find no case of paralysis of sensation, but hyperæsthesia is often mentioned. Several cases of amblyopia have been published. A mental condition resembling hysteria or hypochondriasis is a frequent element in the clinical histories."

Verneuil reports a very interesting case in which careful microscopical examination of the excised prepuce showed that the terminal plexus of nerves had become hypertrophied, and in which the nervous symptoms were thus fully accounted for.[2]

Accidental Phimosis.—Accidental phimosis may depend upon any cause enlarging the glans penis to such an extent that it will not pass through the preputial orifice, or occasioning such an amount of thickening or contraction of the prepuce that it cannot be retracted; in other words, the seat of the difficulty may be either in the glans or its covering.

In some cases the obstruction is simply mechanical, as from vegetations within the balano-preputial fold, the induration surrounding a chancre, or the cicatrization of any ulcer situated upon the margin of the prepuce.

More frequently it originates in inflammatory action, as idiopathic balanitis or posthitis, or the same affections excited by the presence of ulcers, secondary eruptions, vegetations, etc., either of which may occasion swelling of the glans or infiltration in the lax cellular tissue of the prepuce.

M. Bourgade (Progrès méd., Paris, Sept. 2, 1876) has observed four cases of phimosis due to the irritating action of the saccharine urine of diabetes upon the meatus, glans, and prepuce, and states that a surgical operation is useless so long as the cause persists. M. Verneuil and M. Comillon, of Vichy, have observed similar cases. The former says a confrère of his has lost two patients on whom he imprudently operated for diabetic phimosis.

There is still another cause of phimosis which, strictly speaking, cannot be included among those just mentioned; I refer to a peculiar thickening of the mucous membrane and submucous tissue, observed both in men and women after the cicatrization of a chancroid or chancre, and which consists neither in specific induration nor œdema, but in hypertrophy of the normal tissues of the organ. Gosselin believes that this effect is peculiar to venereal ulcers. It is most frequently found in the labia minora in

[1] See N. York M. J., Aug., 1877.

[2] Arch. gén. de méd., Paris, Nov., 1861.

women, and in the prepuce in men. In the latter the envelope of the glans may become so thickened that its retraction may be very difficult and give rise to fissures of the preputial orifice, or may be quite impossible.

Treatment.—In congenital phimosis attended by any of the unpleasant effects alluded to at the commencement of this chapter, circumcision is the only sure means of relief. I would go even farther than this, and say, that every case of congenital phimosis, if persistent on the approach to, or after puberty, demands the ablation of the prepuce, whether any unpleasant consequences have ever manifested themselves or not. It would be well for the future comfort and health of the individual, if fathers would inquire into and attend to this matter as their sons approach adult age. If, from any cause, an operation be impracticable, the subject of congenital phimosis should be directed at each act of micturition to expose the meatus as fully as possible in order to prevent the entrance of the urine beneath the prepuce, and intra-preputial injections should be resorted to if sebaceous matter accumulates or any signs of inflammation appear. The best syringe for this purpose is one with a broad, flattened nozzle, to facilitate its introduction between the prepuce and glans, as proposed by Dr. R. W. Taylor. (See Fig. 25.)

In accidental phimosis, the rule commonly accepted is to avoid an operation if possible, unless congenital phimosis has previously existed; but when due to vegetations beneath the prepuce, or to contraction of the preputial orifice from the cicatrix of a chancroid *which has entirely healed*, an operation may be necessary to gain access to the abnormal growths or to restore the opening of the prepuce to its original size.

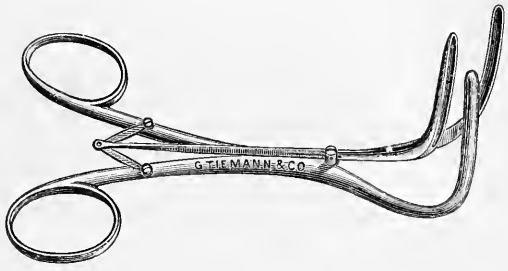
Phimosis dependent upon a large mass of specific induration disappears under the internal administration of mercurials.

An operation should, if possible, be avoided or deferred when the phimosis is due to acute inflammation, which may in most cases be subdued by rest in the horizontal posture, low diet, cathartics, leeches to the groin or perinæum (not upon the prepuce), a lead and opium wash, and, if it be certain that no chancroid is present, by scarifications. The orifice of the prepuce may sometimes be dilated so as to permit retraction of the latter by inserting between it and the glans a number of pieces of compressed sponge, or Nélaton's phimosis forceps may (Fig. 24) be employed.

In some instances we are certain that an ulcer is concealed between the prepuce and glans, where it may have been seen either by the patient or surgeon before the phimosis supervened; in others, its existence is highly probable, from the fact that the patient has been exposed in promiscuous intercourse. Now the mere suspicion of an ulcer within the hidden folds of mucous membrane is sufficient to induce caution in resorting to an operation which may be followed by inoculation of the edges of the wound. It is indeed true that if the sore be a chancre, auto-inoculation will not be likely to take place; but it may be of the mixed variety, or there may be both a true chancre and a chancroid; hence the fact that a mass of

induration can be felt beneath the prepuce is not sufficient of itself to justify an operation. A case in point has fallen under my own observation: A medical friend was called to treat a case of phimosis dependent upon an ulcer, surrounded by a cartilaginous mass of induration which

Fig. 24.



Nélaton's Phimosis Forceps.

could be felt beneath the prepuce. Relying upon the fact that a chancre cannot readily be inoculated upon the person bearing it, he resorted to an operation; but in a few days the edges of the wound assumed the appearance of a chancroid. In doubtful cases the nature of the secretion may be tested by auto-inoculation before resorting to circumcision.

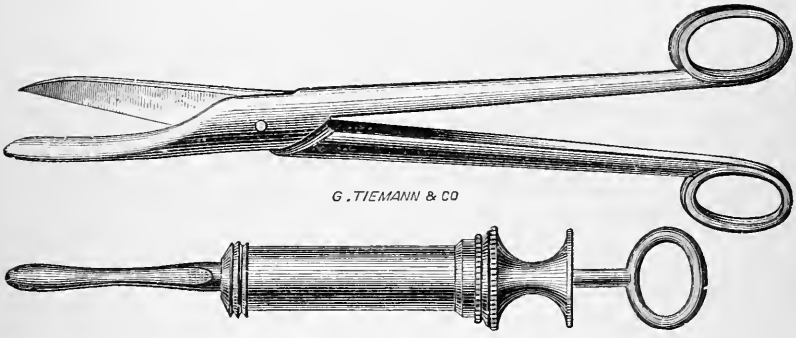
Under some circumstances, however, and especially with gangrene threatening, an operation cannot be avoided. The question then comes up in what manner it shall be performed. In the inflamed condition of the parts, with the prepuce infiltrated, thickened, brawny, and perhaps threatening gangrene, circumcision is for obvious reasons not to be thought of. The immediate object to be attained is to relieve tension and to expose the balano-preputial fold so as to admit of local applications and attention to cleanliness.

The method commonly adopted under these circumstances has been to slit up the prepuce along the dorsum by means of a curved bistoury guided by a director, which has first been introduced from the orifice to the angle of reflexion. The objections to this method are two: In the first place, if there is much thickening of the prepuce it does not fully expose the parts; the flaps on either side are too unyielding and too sensitive to enable us to bend them back and reach, for instance, chancroids situated in the sulcus near the frænum. In the next place, the ultimate result of the operation is undesirable. Two "dog's ears" are left which are anything but elegant or useful in this situation, and which require a subsequent bloody operation for their removal.

For these reasons I prefer the procedure recommended by Dr. R. W. Taylor, in his paper on phimosis, already referred to. This consists in making two incisions, one on either side, exactly in the middle of the lateral portion of the prepuce, either by means of a bistoury, or, preferably, with a pair of strong scissors (Fig. 25), such as those devised by Dr. Taylor for this purpose.

The result of this operation is that the prepuce is converted into two flaps—an upper and a lower—with the glans penis between them, and the upper flap can be elevated and the lower one depressed with the greatest ease, so as to expose the whole surface. Then, after the acute disease has

Fig. 25.



Taylor's Phimosis Scissors.
Taylor's Syringe for sub-preputial injections.

subsided and the edges of the incisions have healed, these flaps may be snipped off without confining the patient to the house or taking him away from business.

But, it will be objected, you thus have double the amount of raw surface exposed to contagion. Very true, but the advantage gained is more than a counterbalance, and, moreover, if the incision be properly cauterized and dressed, contagion will in most cases be avoided. The caustic preferred by Dr. Taylor is pure carbolic acid, rendered fluid by a small quantity of water. Four pieces of lint are to be cut—two to fit the glans, the one above and the other below—and two strips to place between the cut surfaces. These pieces of lint are soaked in the acid and put in their places; the flaps are then brought together and a bandage wound round the penis, allowing the meatus to be free. The whole should be kept wet with cold water, and the dressing repeated daily until the parts are healed.

The thickening of the substance of the prepuce, already described as a sequela of venereal ulcers, is rarely so great as to produce complete phimosis; but the difficulty attending the exposure of the glans and the frequent rents which the act occasions, often justify the removal of the hypertrophied tissues.

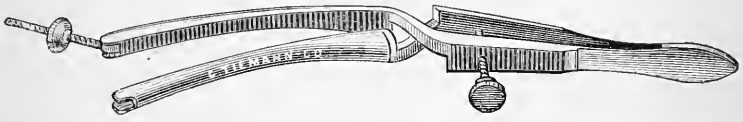
Before describing this operation, let me remind the student that the prepuce is composed of two layers, separated by a cellular tissue of such lax texture as to admit of an almost indefinite amount of motion between them. The internal or mucous layer is firmly attached to the penis posterior to the corona glandis, and hence is incapable of being drawn forwards to any great extent in front of the glans. The external or integumental layer, on the contrary, is continuous with the flaccid skin of the body of the penis, and may be greatly elongated; its anterior portion doubling in

upon itself as the posterior is drawn forwards. It follows from this anatomical arrangement that a section of the prepuce in front of the glans can only include the integumental together with an insignificant portion of the mucous layer.

Of the various methods of performing circumcision recommended by different authors, I prefer the following :—

The patient should be upon the bed where he is to lie until cicatrization is accomplished, in order after the operation to avoid unnecessary motion and hemorrhage, which would interfere with speedy union; and it is decidedly best that he should be etherized. The requisite instruments are a pair of long-bladed forceps, a sharp-pointed bistoury, blunt-pointed scissors, and sutures of very fine silk. Henry's forceps, represented in Fig. 26, are the best on this occasion, although any long forceps will answer.

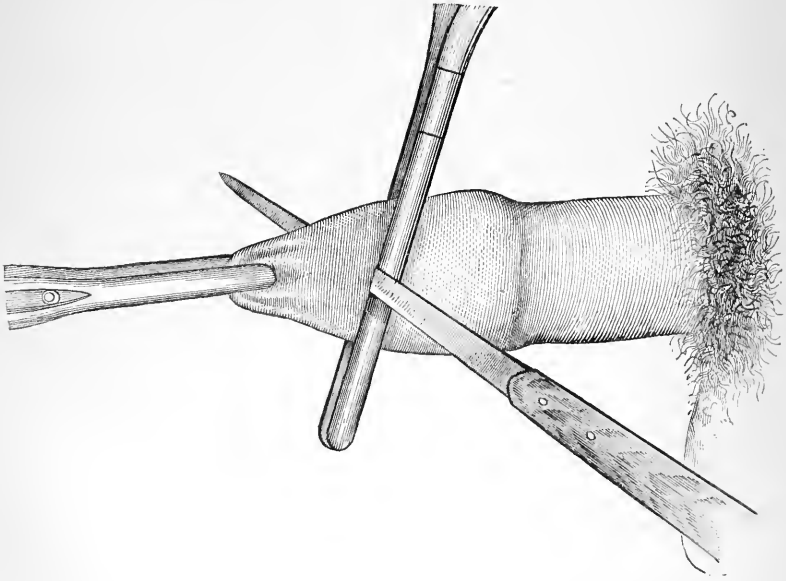
Fig. 26.



Henry's Phimosis Forceps.

A tape may be tied around the base of the penis near the pubes to restrain the hemorrhage. Allow the penis to hang without traction in its

Fig. 27.



natural condition, and, if your eye is not a sufficiently accurate guide, trace with a pen and ink a line upon the skin corresponding to the corona

glandis, to serve as a guide for the incision. Next draw the prepuce forwards, until this line is in front of the glans, and grasp it from above downwards between the long blades of the forceps, which should be intrusted to an assistant; the external part is now to be excised in front of, and close to the blades of the forceps, having first been put upon the stretch by the left hand of the operator. Any attempt to cut from either margin of the fold will be attended with some difficulty, since the several layers of the skin and mucous membrane oppose an amount of resistance to the knife that is not readily overcome; hence, it is better to transfix the centre of the flap (the blade of the knife parallel to, in front of, and in contact with the forceps), cut downwards, and complete the section by turning the knife, and cutting upwards (Fig. 27).

The assistant should now remove the forceps, when the integument will retract, carrying its cut edge back to the base of the glans, and exposing the raw external surface of the mucous membrane which still covers the glans (Fig. 29). If the mucous membrane be in a healthy condition it may be divided with scissors along the dorsum, and turned back to be united to the integument; but if thickened by chronic inflammation, vegetations, or the cicatrix of an ulcer, the flap (E, B, B) on either side should be excised. Indeed the latter course is always best, with this important proviso, however: don't cut off the whole of the flap quite down to the line of its insertion, if you do you will find the introduction and removal of your sutures difficult, and union by first intention is less likely to be attained; hence, make your cuts on either side so as to leave about half an inch of the mucous membrane behind.

This ablation of the flaps may be done by successive cuts with ordinary curved scissors, on a line parallel with the corona glandis; or further accuracy may be secured by the assistance of Horteloup's phimosis forceps[1]

Fig. 28.

Horteloup's Phimosis Forceps ($\frac{2}{5}$ actual size).

(Fig. 28), which, placed astraddle on the penis, are made to grasp the flap, and the redundant membrane is then excised by one stroke of a bistoury.

If the frænum is short, divide it. Several little arteries may spirt in your face, quiet them with a good twist of the torsion forceps, and keep the bleeding surface exposed to the air for a few minutes until you are sure all bleeding has ceased, unless you wish to be called from your bed the coming night. There is still a little cut desirable, which I have for a long time employed, and which has recently been mentioned by Dr. Keyes

[1] Bull. gén. de thérap., etc., Paris, 1878, p. 559.

(Van Buren and Keyes, p. 11). This cut is made with scissors in the retracted integument along the dorsum to a point (*A*) about one-quarter of an inch behind the free margin, and the edges of the incision (*C*, *C*) are to be rounded off. Its object is to insure perfect freedom from constriction at the line of division, without which both cicatrization will be delayed and the ultimate condition of the parts be less satisfactory.

Fig. 29.

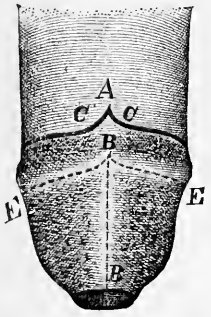
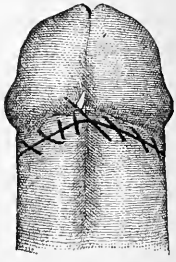


Fig. 30.



For the purpose of uniting the edges of the wound some surgeons employ serres-fines, and others silver sutures. The former are likely to be detached by the movements of the patient before he recovers from the ether, and the latter are too stiff to be removed without unnecessary pain. If very fine silk be used—such as is employed by oculists in operations upon the eye—it will be found to possess all the advantages of metallic sutures, and may be left in for a week without causing suppuration. Moreover, instead of using interrupted sutures, as is usually done, if we employ the continuous suture commencing at the frænum, it will be found that this part of the operation can be finished in one-quarter of the time and the edges will be much better adapted to each other, as seen in Fig. 30.

Simple exposure to the air, and protection by means of a cradle from contact with the bedclothes, is all that is required for the first twelve hours, after which a water-dressing may be applied. The patient should remain in bed until the parts have nearly healed, and, if contact of the urine with the wound cannot be otherwise prevented, should micturate with his penis immersed in a basin of tepid water. In favorable cases, confinement to the house for three to five days is sufficient.

It would hardly seem necessary to caution the surgeon not to excise too large a portion of the integument, were it not for the following case reported by Nélaton:[1] A patient appeared at the clinique who had been operated upon for phimosis eleven days before by the usual method. The physician, forgetting that the integument of the penis is very lax and extensible, had, before making the incision, drawn it forwards to its utmost limits; the consequence was that, after the operation, the penis was de-

[1] Pathologie chirurgicale, t. v. p. 663.

nuded nearly to the abdominal wall. An extensive suppurating surface had remained, which was torn and made to bleed by frequent erections. The case does not appear to have been followed to its termination, but Nélaton remarks upon the rigidity and malformation of the organ, provided cicatrization should take place, and adds that "this case shows the importance of marking the limits of the incision before the operation."

The American editor of Erichsen's Surgery states that the favorite operation for phimosis at the Pennsylvania Hospital, Philadelphia, consists in simple division of the mucous layer of the prepuce, by means of fine scissors, one blade of which is sharp, and the other probe-pointed. The former is made to penetrate between the two layers of the prepuce along the dorsum of the organ, while the latter passes between the glans and its envelope, and thus the internal layer may be divided as far as the corona glandis. The prepuce should be retracted several times each day, especially during micturition, both in order to prevent contact of the urine with the wound, and also immediate union, which would thwart the purpose of the operation.

Faure accomplishes the division of the mucous layer in a simpler manner, as follows: The skin of the penis is forcibly drawn towards the abdomen, when an incision is made with blunt-pointed scissors upon the dorsum of the retracted preputial orifice, implicating the mucous membrane, but sparing the integument. This allows of a still further retraction of the prepuce, bringing into view an additional portion of mucous membrane, which, by a succession of the above procedures, may be divided to the base of the glans.

Dr. Hue,[1] of Rouen, instead of dividing the prepuce with a cutting instrument, passes a needle through its dorsal surface close to the base of the glans, and ties the portion of skin in front of the puncture with an elastic ligature, which is said to cut its way through in three or four days. Dr. H. states that he has operated with satisfactory results by this method in eighty cases, comprising both adults and children.

Jobert (de Lamballe) makes an incision from the preputial orifice on each side of the frænum as far as the corona glandis; then cuts off the frænum, which is now included in a small triangular flap; and finally unites the skin and mucous membrane by the interrupted suture, thus leaving the greater portion of the prepuce intact and merely enlarging its orifice beneath.[2]

These methods, unattended by any loss of substance, may suffice when it is desired simply to relieve uncomplicated phimosis; but when the mucous membrane is in a diseased condition, as is generally the case when an operation is required, circumcision should be preferred.

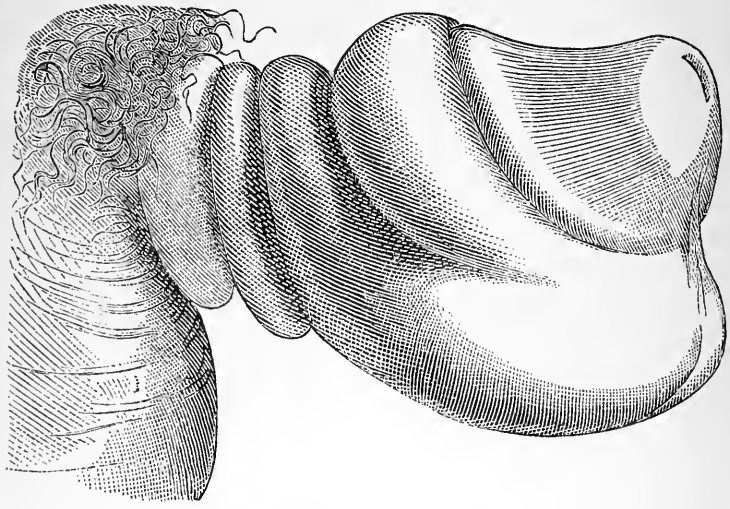
[1] Doctor, Lond., Nov. 1, 1878, p. 235.
[2] Gaz. d. hôp., Paris, 27 Aug., 1861.

CHAPTER V.

PARAPHIMOSIS.

The term Paraphimosis implies exactly the opposite of phimosis, viz., the retracted prepuce cannot again be drawn forward so as to envelop the glans. This condition is often met with in boys with a tight prepuce, as the result of their first attempt to expose the glans; again it may follow coitus with a woman whose vulvar orifice is small, or it is often produced by patients themselves by retraction of the prepuce for the purpose of inspecting or dressing some venereal affection with which they are afflicted. Having thus exposed the glans and ignorant of the danger of thus leaving it for any length of time, they allow the prepuce to stay back and soon find it impossible to bring it forward again. The tight preputial orifice has

Fig. 31.



Paraphimosis. (After Jullien.)

acted like a ring constricting the penis; the glans has in consequence become congested and swollen, and in any attempt at reduction the preputial ring meets with obstruction from the abrupt base of the corona, such as the knuckle offers to a tight ring on the finger. The swelling goes on increasing; the submucous and sub-integumental cellular tissue becomes infiltrated with serum, and the parts present the appearance represented in Fig. 31.

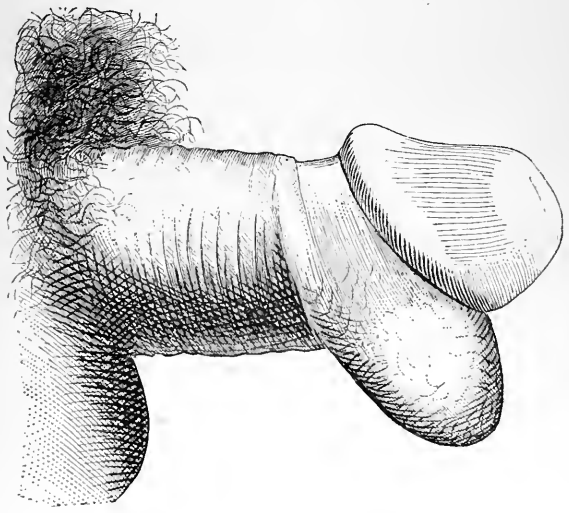
Now it is to be observed that the constricting ring, the preputial orifice,

is buried in the first furrow seen as we proceed from the base of the glans backwards; the swollen fold between it and the glans is the preputial mucous membrane retracted; the folds back of it are folds of the integument of the prepuce and body of the penis; the greatest amount of the œdema is found in the lax cellular tissue below in the neighborhood of the frænum; the glans itself is swollen and tilted backwards so that the meatus looks somewhat upwards.

If the case be left to itself, nature's course (we can hardly call it cure) is as follows:—the constricting ring, in its portion upon the dorsum of the penis, is attacked by ulceration and gangrene, first involving only the skin and subjacent cellular tissue, and appearing as a series of antero-posterior fissures which soon unite and form a transverse open ulcer with irregular borders. The ulcerative process deepens until it has eaten through the fibrous ring beneath, when the constriction is relieved, the patient's suffering is at an end and the œdema soon disappears.

All cases, however, do not terminate thus fortunately. The ulcerative process may result in gangrene, involving a large portion of the integument and the glans, and even opening into the urethra. Venot[1] reports a case in which one-third of the glans was lost. Auger[2] relates a case, in which the urethra was opened to the extent of one centimètre (four-tenths of an

Fig. 32.



"Sub-preputial frill." (After Jullieu.)

inch). Through erosion of a vein or artery, copious hemorrhage may occur. Suppurative inflammation may invade the cellular tissue and destroy the integument of the penis to a greater or less extent. Erysipelas, phlebitis, and lymphangitis are still other dangers, to which patients with paraphimosis are exposed.

[1] J. de méd. et chir. prat., Paris, 1836, p. 347.
[2] Union méd., Paris, 1872, p. 91.

In all or nearly all cases, which are not early treated, adhesions form between the skin and the upper surface of the corpora cavernosa, rendering any later attempt at reduction impossible. Moreover, after the patient has been relieved by the destruction of the ring and the ulceration has healed, these adhesions remain. A depressed cicatrix is left by the ulcer, and the lower portion of the prepuce, which is now redundant, continues swollen and thickened. The appearance of the organ is well represented in Fig. 32.

Under these circumstances, a subsequent operation is evidently required to restore to the organ its pristine elegance and usefulness.

The above symptoms are those of the inflammatory form of paraphimosis, which is the most common. There is another indolent form, in which there is scarcely more than mere œdema of the prepuce without inflammatory action, and in which reduction is easily effected.

Treatment.—When called to a case of paraphimosis, it may not be advisable to attempt reduction until the œdema has first been diminished by rest in the horizontal posture, elevation of the penis, and a saline cathartic, assisted in some instances by scarification of the swollen tissues in front of the stricture, the application of ice or a stream of cold water directed upon the part.

Attempts at reduction are extremely painful and it is hence desirable to put the patient under the influence of ether. Chloroform should not be used in this nor in other minor operations, if ever. The difficulty of reduction is frequently increased by the vicious manner in which the attempt is made. The swollen glans and mucous layer of the prepuce are to be passed through a narrow preputial orifice. Mere pressure from before backwards will increase their transverse diameter and augment the difficulty of reduction; this can be best accomplished by compressing, and, if necessary, elongating them, and drawing the constricting ring and integumental layer over them.

Fig. 33.

Multiple punctures with a lancet should be made in the swollen tissues in front of the constriction, and these parts, after having been well compressed and kneaded between the fingers, so as to evacuate as much of the infiltrated serum as possible, had better be oiled. The surgeon then encircles the body of the penis with the thumb and forefinger of the left hand in the manner represented in Fig. 33, and thus secures a base of support. With the fingers of his right hand, he now still further compresses the glans in its transverse diameters for several minutes, and then endeavors to insert the nail of his

thumb or index finger beneath the constricting ring on its dorsal aspect, at the same time tucking under the latter the fold of mucous membrane in front. As soon as he succeeds in this attempt and can feel the ring riding up on his nail, he knows that no firm adhesions have formed, and he has an inclined plane on which to complete the reduction. His efforts, however, should not be for a moment relaxed until the whole is completed, or, otherwise, the parts will slip back into their former position.

M. Bardinet[1] employs a hair-pin in a similar manner to the above. He describes his method as follows:—"I bend the glans on its anterior (lower) aspect and gently draw the skin of the penis forwards from behind the constriction. I then attempt to insert the bend of a hair-pin between the preputial ring and the body of the penis. This done, I have two levers in the branches of the pin, which I move back and forth for a triple purpose, to depress the prominence of the base of the glans, to elevate the preputial ring and to secure an inclined plane upon which it may gently be made to glide."

Before Badinet, however, the late Abraham Colles, Prof. of Surgery at the Royal College of Surgeons in Ireland, succeeded, after other means had failed, in relieving two severe cases of paraphimosis, by passing a director beneath the stricture from before backwards, and elevating it upon the point of the instrument, while the stem was made to compress the swelling in front, and gradually force it back beneath the stricture. This process was repeated on each side of the penis, after which reduction was quite easy.[2]

After reduction has been accomplished, the parts should be kept elevated and covered with some cooling application until the swelling has disappeared.

The above methods are recommended as the most worthy of adoption. Among the many others proposed, we may mention the following:

In one proposed by M. Garcia Térésa, the centre of a piece of tape is placed upon the dorsum of the corona glandis, the opposite ends passed round the sides of the glans, crossed beneath the frænum, and wound around the little finger of each hand; the glans is then compressed by flexing the middle and ring fingers, and exercising traction in opposite directions, while the other fingers remain free to draw the prepuce forwards, and accomplish its reduction.[3]

Dr. Van Dommelin effects compression of the glans by winding around it a strip of adhesive plaster half a yard long, and about a quarter of an inch wide, commencing at its base, and terminating near the orifice of the urethra.[4]

M. Seutin, of Brussels, has invented a pair of forceps with spoon-shaped extremities, to maintain compression of the glans until the constricting ring can be drawn over them.

[1] Nouveau procédé de réduction du paraphimosis, Union méd., Paris, 1873, p. 900.
[2] Dublin Q. J. M. Sc., May, 1857.
[3] Rev. de thérap. méd.-chir., Feb. 15, 1860.
[4] Med. Times and Gaz., Lond., June 4, 1859.

The three preceding methods are designed for the purpose of compressing the glans during reduction; in the following, which is said to be employed with great success at the Children's Hospital, in Pesth, compression of nearly the whole organ precedes the attempt to restore the preputial orifice to its normal position.

The penis is first well cleansed and dried, when a strip of adhesive plaster, about three lines broad, is applied longitudinally from the middle of its under surface, over the swollen prepuce and glans, avoiding the meatus, to the middle of the upper surface. Another strip is carried in a similar manner from side to side over the glans, and in large boys a third, and even a fourth, strip may be required to cover the whole organ. Finally, still another strip is firmly applied transversely over the preceding, commencing just behind the meatus, and continued by successive turns to the middle of the body of the penis. The application is said to be well borne, and the swelling so diminished within twenty-four hours, that the plaster must be renewed; reduction can usually be effected within forty-eight hours.[1]

Many years ago, Mazade[2] extolled the effects of frequent applications of belladonna ointment. In one case of obstinate paraphimosis, after three applications, the prepuce was less engorged, and the glans less in size. The following day, after only three drachms of the extract of belladonna had been used, reduction was accomplished without difficulty. Jullien states that this result has since been confirmed by Moulas and Langlebert.

When reduction is impossible, and ulceration or gangrene threatens, it becomes necessary to relieve the stricture, by dividing the preputial ring, which—as should not be forgotten—is situated at the base of the furrow between the swollen folds of mucous membrane and integument. This may be done by entering a narrow, sharp-pointed bistoury flatwise, and from before backwards, upon the dorsum of the penis, turning its edge upwards, and dividing the stricture. In some cases, this procedure must be repeated in several places, and the swollen prepuce freely scarified, before reduction, if not prevented by adhesions, can be effected, or at any rate, before relief can be obtained.

It is an interesting historical fact that Ambrose Paré[3] believed it necessary to amputate the penis in cases of paraphimosis, in order to avoid gangrene and save the life of the patient.

The best operation for removing the deformity (Fig. 32) sometimes left by paraphimosis is one proposed by Mauriac:[4] two lines are drawn with ink, one anterior and the other posterior, both of them starting from the extremities of the transverse cicatrix on the dorsum of the penis. The anterior line is made to run parallel with the corona glandis and about four-tenths of an inch from it. The posterior, starting from the same terminal points, is so drawn as to run behind the sub-preputial tumor, which

[1] Schmidt's Jahrb., Leipz.
[2] J. de méd. et chir. prat., Paris, 1834, p. 445.
[3] Chap. xxxi, book xvii.
[4] Mémoire sur le paraphimosis, Paris, 1872, p. 28.

is now circumscribed by two curves forming an ellipse. An incision is now made following each line through the skin only; after which, the subcutaneous mass, which is infiltrated and hypertrophied, is removed by a deep dissection. The edges of the wound are finally stitched together, and union by first intention almost always takes place.

CHAPTER VI.

FOLLICULITIS AND PERI-URETHRAL PHLEGMON.

These two affections resemble each other in their seat, but are entirely distinct in their anatomical characters, and demand different modes of treatment. The first is an inflammation of the follicles of Morgagni which open into the urethra; the second, inflammation, always resulting in suppuration, of the cellular tissue underlying the corpus spongiosum.

Folliculitis.—This affection is by no means common but is occasionally met with in cases of gleet following severe attacks of urethritis. The mode of its production is as follows. The inflammation of the urethral mucous membrane extends to the cavities of the follicles, produces hypertrophy of their lining membrane and obliterates their ducts; hence the normal secretion of the gland mingled with pus is pent up in the cavity, which it distends in the form of a small tumor or intra-glandular abscess. These abscesses have been studied especially by Dr. Ch. Hardy,[1] who describes them as follows:—

"In the early stage of its formation, this abscess or rather this cyst is often overlooked. Only when it has attained the size of a pea, is it perchance noticed. It then appears in the form of a small tumor, either globular or ovoid, sometimes bilobed, occupying the lower surface of the urethra, to which it is attached by a narrow pedicle, which is nothing more than the obliterated and elongated excretory duct. This tumor is subcutaneous, hard, and movable under the skin, which preserves its normal appearance; it is little, or not at all, sensitive to the touch. When it has lasted for some time and has attained the size of a small nut, it becomes soft and possibly shows on palpation signs of fluctuation, which is rarely very distinct. These abscesses are often multiple. We have seen three in a patient who had had them over four months.

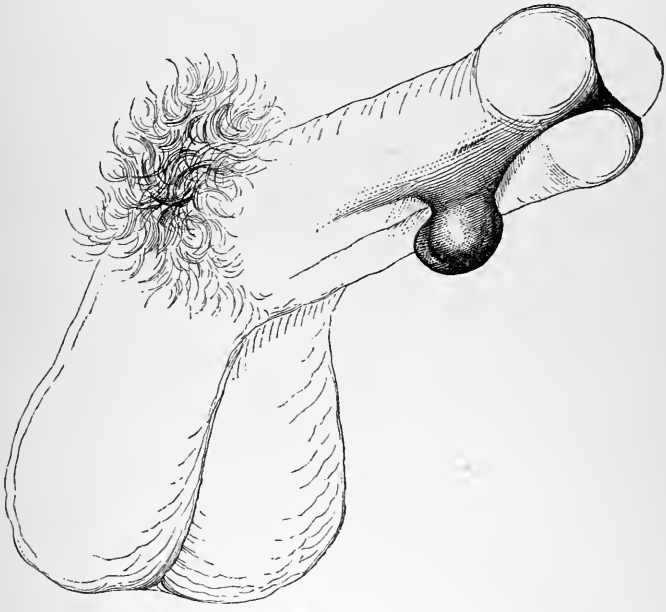
"These follicular abscesses pursue an essentially chronic course, and resemble very much, in their symptoms and their mode of termination, the 'wens' that appear on the scalp. After remaining stationary for a long time, they suddenly become sensitive to the touch, increase rapidly in size, contract adhesions with the overlying skin, which, if they are not incised, they perforate and vent themselves by a narrow opening, which remains fistulous. They do not present the same danger as do abscesses of the peri-urethral cellular tissue; they show no tendency to open into the urethra.

"All that is required for the cure of these abscesses is to cut down upon

[1] *Mémoire sur les abcès blennorrhagiques*, Paris, 1864.

the cyst and enucleate the whole of it, as is done with 'wens' on the scalp; or else, simply cut out a portion of the fibrinous envelope, taking care to keep the wound open. Resolution of these tumors can never be obtained by ordinary means."

Fig. 34.



Follicular abscess. (After Hardy.)

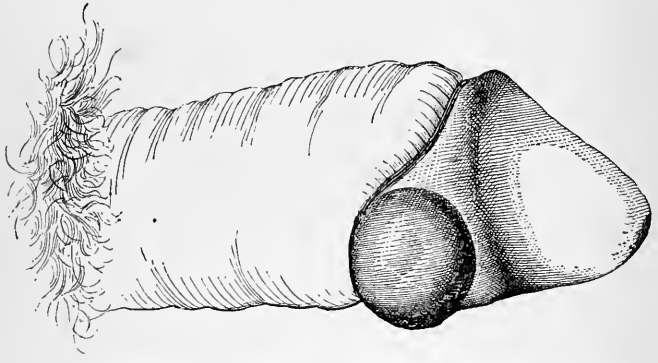
An extreme case of a follicular abscess, forming a pedunculated tumor on the under surface of the penis, is represented in Fig. 34.

Inflammation of Cowper's glands will be considered in a separate chapter.

Peri-urethral Phlegmon.—This affection, situated in the cellular tissue underlying the urethra, is much more common than the former, and is said to be met with in attacks of gonorrhœa which have been decidedly acute or in patients who have indulged in excesses to the neglect of treatment. I have one patient, however, in whom, it seems to be the inevitable attendant upon each attack of gonorrhœa. He has had the clap four times and every time a peri-urethral abscess, so that he now predicts this complication whenever the first symptoms of a fresh clap show themselves. This affection may occur at any point along the under surface of the urethra from the glans penis to the bulbous region, but is much more frequent just beneath the fossa navicularis and at the peno-scrotal angle (in front of the bulb) than elsewhere. These are the two points at which gonorrhœa is most likely to persist, but whether the frequency of phlegmons in these situations can thus be explained is a mooted question and is of little importance; the fact only need be noticed.

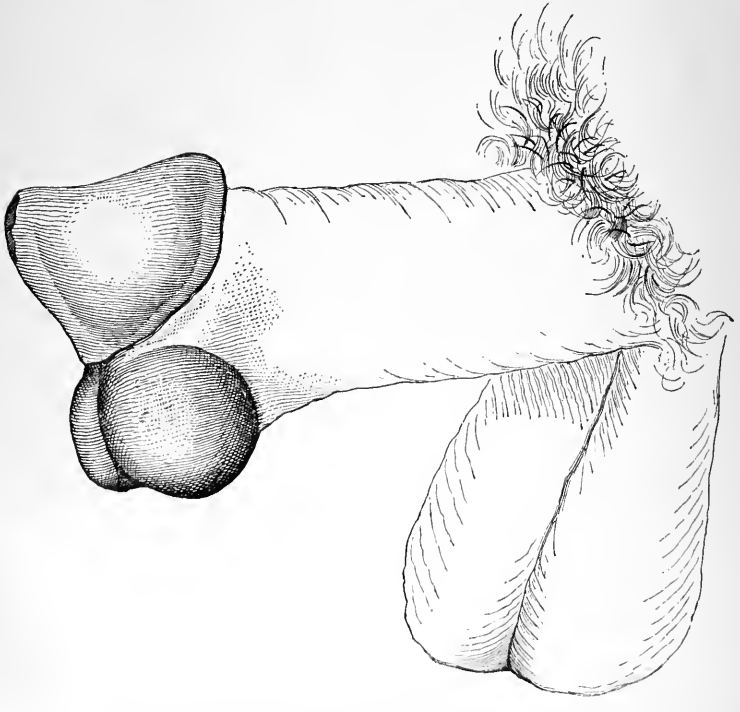
Any premonitory symptoms of the formation of a peri-urethral phlegmon are usually insignificant and are only recalled by the patient after the mischief has been done, when he will recollect (?) that he has felt more or less pain for some time at the point involved; this pain perhaps overshadowed by the more urgent symptoms of his gonorrhœa.

Fig. 35.



Phlegmon limited to one side of the frænum. (After Hardy.)

Fig. 36.



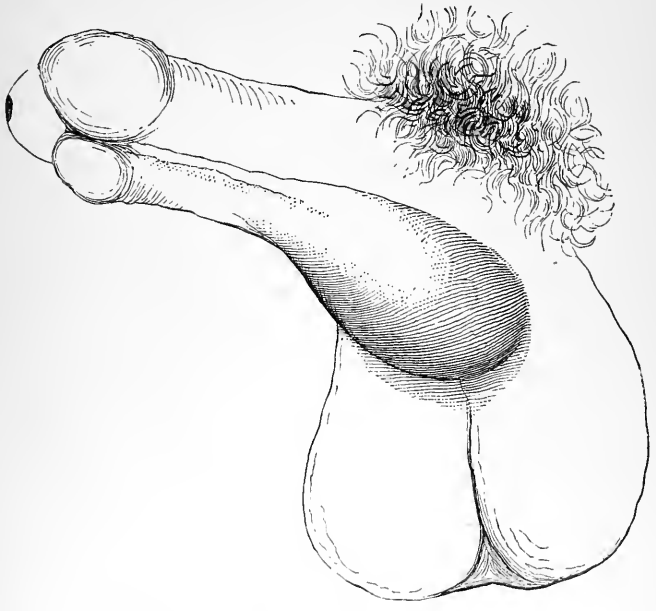
Phlegmon divided by the frænum into two lobes. (After Hardy.)

Suppuration has very likely taken place when the surgeon's attention is called, and is evident upon palpation of the projecting tumor, which is sensitive on pressure and surrounded by more or less œdema. The patient experiences pain at the part involved, and, in rare instances, there is general constitutional disturbance, shown by chills, fever, loss of appetite, etc. The pressure of the tumor upon the urethra may affect the force and shape of the stream of urine or occasion dysuria amounting even to retention.

The seat of the abscess is not without influence. When beneath the fossa navicularis, it rarely exceeds the size of a cherry and is globular in form (Fig. 35); it may be on one or the other side of the frænum, or, when developed in the median line, be bilobed in consequence of the constriction of this bridle (Fig. 36).

An abscess occurring near the bulb, at the peno-scrotal angle (Fig. 37), is usually larger and may reach the size of an English walnut or more. Commonly occupying the median line, it may, however, be lateral. It

Fig. 37.



Phlegmon at peno-scrotal angle. (After Hardy.)

may extend around the scrotum and involve the perinæum or, less frequently, it invades the penis. The skin covering it is of the normal color. These phlegmons never undergo resolution; their only termination is suppuration.

The abscess most frequently and favorably opens externally and cicatrization rapidly takes place. Again it may break into the urethra; in which case, its cavity is exposed to the entrance of the urine and there is danger of urinary infiltration and gangrene of the cellular tissue of the

penis and scrotum. Finally the abscess may break both externally upon the surface and also into the canal.

Treatment.—These phlegmons should always be incised as soon as discovered, even if fluctuation is not as yet distinct, and the cut should be kept open until the abscess has completely emptied itself. If one has opened spontaneously into the urethra, the question comes up whether a counter opening should be made from without. Most authorities pursue this course. Fournier, on the contrary, prefers to wait, closely watching the case and prepared to act in the event of infiltration, which, he says, is not nearly so common as supposed. "It is probable that the opening is often very minute and closes as the abscess discharges itself, so that the entrance of urine into the cavity is prevented."

It is evident that the patient is exposed to the formation of a urinary fistula, which is more frequent near the bulb than at the glans. "When occurring at the latter place it gives rise to an accidental hypospadias which is difficult to cure." (Hardy.)

CHAPTER VII.

INFLAMMATION OF COWPER'S GLANDS.

This is a rare complication of urethral gonorrhœa in the male, but sometimes occurs at about the same period as epididymitis, viz., during the third or fourth week, or later after the appearance of the discharge.

The patient experiences a feeling of tension and pain in the perinæum near the bulb of the urethra, which is aggravated in the sitting posture, by walking and by friction of the clothes. Upon palpation a small tumor of the size of a bean is felt upon either side of the median line; its form ovoid or pyriform, with its base directed towards the anus and its apex connected with the bulb. This tumor may encroach upon the urethra and cause dysuria, and on introducing a catheter an obstruction may be met with near the bulb. Defecation is also painful.

Resolution is possible, but in most cases suppuration takes place, sometimes in the gland itself, but more frequently in the surrounding cellular tissue, and the abscess extends to the base of the scrotum, often crosses the raphé to the opposite side, and, in rare instances, involves the whole of the perinæum. The matter usually finds exit in the perinæum, and an opening may also form in the urethra, giving rise to a urinary fistula; sinuses may also be formed in various directions.

In a patient who died of some intercurrent disease, Littré found "the body of the gland extremely hard, red, and tumefied, and a greenish-yellow fluid could be pressed out of it. The duct of the left gland was distended with a similar fluid, and its tunics were of a reddish color, and harder and thicker than normal. The urethra, in front of the openings of the glandular ducts, was reddened over a space of about four lines in width, and in the middle of this space there was a rounded ulcer half a line in diameter which had eaten away a large portion of the opening of the left duct and a small portion of the canal in the neighborhood."[1]

The gland to the left of the raphé is said to be most frequently attacked. Sometimes both glands are involved. The formation of matter is often accompanied by general febrile disturbance. Since these glands are not surrounded by a fibrous capsule like the prostate, urinary infiltration is likely to occur when the abscess breaks into the urethra, and we may have diffuse suppuration of the cellular tissue. Tarnowski speaks of atresia of the urethral openings of the ducts, as one of the results of this affection; the remainder of the duct becomes dilated, cyst-like, and may interfere with the passage of urine by its pressure on the urethra.

The treatment of this affection consists in the early application of leeches, hot baths, poultices, and rest, and incision of the tumor so soon as it is evident that resolution is impossible even if fluctuation be not clearly detected.

[1] Littré, as quoted by Fournier.

CHAPTER VIII.

AFFECTIONS OF THE CORPORA CAVERNOSA.

In the course of an attack of gonorrhœa, the inflammation may extend to the corpora cavernosa and produce an effusion of plastic lymph, which will obliterate the cavities of these bodies and interfere with complete distention in the state of erection of the penis. "The same effect may be produced by small apoplectic deposits in the substance of the corpora cavernosa, the cicatrization of which always entails a deposit of a certain quantity of plastic tissue" (Robert).

In consequence of such deposits the penis may be bent in such a manner as seriously to interfere with coitus; the concavity of the bend looking upwards, downwards or laterally according as the deposit is situated in either of these directions. If both bodies be invaded at any one point, the portion of the penis behind, *i. e.* towards the pubes, may alone be distended, while the anterior portion remains flaccid. The occurrence of these deposits is attended at the outset by a fusiform swelling of the penis and pain on deep pressure. They usually continue in an indolent condition, are but little amenable to treatment, and may be a source of great annoyance and mental despondency.

The same condition as that now described, may be the result of mechanical injuries to the penis when erected, or of gummy deposits occurring in syphilis.

As to treatment, the attempt may be made to induce absorption by local frictions with an ointment containing mercury or the iodide of lead, and by the internal use of the iodide of potassium.

Chronic circumscribed Inflammation of the Corpora Cavernosa.—Under this title Van Buren and Keyes[1] first clearly described an affection, which was little known and barely referred to in works on Surgery and Venereal Diseases, although mentioned by H. J. Johnson[2] in 1851. The affection is free from pain and progresses slowly, until the patient notices a small lump which is painful on erection of the penis. Upon examination we find a hard firm plate of tissue, a line or two in thickness, situated in the superficial portion of the corpus cavernosum. Its margins are sharply defined and regular, or they may be uneven, slightly nodulated and perhaps thickened. The deeper parts seem to be free from disease. The induration of the plate is variable, in some cases being cartilaginous,

[1] A Practical Treatise on Diseases of the Genito-Urinary Organs, New York, 1874.
[2] Lancet, Lond. 1851.

but it always has a kind of elasticity, which gives to the finger a sensation quite different from that offered by the bony and calcareous plates sometimes found here. The lesion may occupy one corpus cavernosum or both, and always seems to spring from the median line on the dorsum of the penis. The plate generally has an ovoid shape, but in two instances, in which the disease was seated about an inch behind the corona glandis, we found on either side a horn-like process or offshoot extending around to the frænum along the course of the lymphatics. The lesion is always circumscribed and seldom exceeds half an inch in diameter; we have never seen a plate more than two inches in diameter. When each corpus cavernosum is invaded the plates may be firmly united on the dorsum of the penis, or they may be separate. There is no increase of heat in the affected parts, nor is the skin above the tumor at all abnormal. The affection is extremely chronic and sometimes intermittent. The plates may grow antero-posteriorly, or they may remain stationary, or they may extend in one direction as they disappear at the opposite end, thus travelling over nearly the whole length of the corpus cavernosum. Spontaneous pain is rare, but the parts are always sensitive to pressure, and there may be a dull aching sensation along the border of the patch. The lesion interferes with erection, the penis being drawn towards the affected side; when it involves both sides of the penis the organ may be bent upwards to such a degree as to prevent coitus.

The affection has been met with only in those of middle or advanced age. Its *etiology* is very obscure. In some cases it seems to have resulted from injury; although occurring in those who have had syphilis, gonorrhœa, or stricture, there seems to be no relation between the diseases.

We know nothing positive of the *pathology* of the affection, but it is probably, as suggested by Keyes, "in its essence a chronic inflammation of a peculiar kind affecting the erectile tissue at a certain point and so thickening and stiffening the naturally thin walls of the areolæ (probably filling up the interstices with fibrinous exudation), that they cannot be distended with blood during erection of the rest of the organ."

The *prognosis* of the disease is uncertain. There is no case on record in which it disappeared altogether. In most cases the plates persist for many years; sometimes they diminish very markedly in size, but they never become excessively large nor undergo degeneration.

Treatment of various kinds has been tried with little if any benefit. We fully agree with Van Buren and Keyes in deprecating the use of blisters and counter-irritants, since they are painful and inefficacious. Friction with dilute mercurial ointment and the occasional use of the constant current, with iodine internally, may promote absorption of the deposit.

CHAPTER IX.

LYMPHANGITIS AND ADENITIS.

Gonorrhœal lymphangitis may either be seated in the principal trunks or in the reticular network of these vessels.

I. In the former, the course of the inflamed lymphatics can be traced as reddish lines, running, as is usually the case, along the dorsum of the penis from the prepuce towards the pubes. There may be one or several. In the latter case they may be united by transverse bands of erythema, corresponding to the anastomoses of the vessels. To the touch they resemble hard or knotted cords, which can be separated by the fingers from the adjacent tissues. Their sensitiveness varies with the amount of inflammation. There is often some œdema of the prepuce or of the penis and tenderness of the inguinal ganglia. This state of things almost invariably terminates in resolution. Suppuration is reported to occur in rare instances in the form of several small circumscribed abscesses, which are usually of little moment, but which may undermine the skin to some extent and demand surgical interference (Hardy). Zeissl says he knows men who have lymphangitis every time they have the clap.

Fournier speaks of another form of this affection taking place (*à froid*) without any signs of acute inflammation and recognizable only by the hard and indolent cord or cords, perceptible to the touch along the dorsum of the penis, and readily mistaken for the indurated lymphangitis attendant upon the initial lesion of syphilis.

Inflammation of the lymphatic trunks along the dorsum of the penis has been mistaken for dorsal phlebitis. According to Fournier, the latter is an exceedingly rare affection, a few cases having been seen by Ricord. It is distinguishable from the former by the greater amount of œdema, by the impossibility of grasping and isolating the vessel between the fingers, and by the inguinal ganglia remaining unaffected.

II. The second form of lymphangitis, the one in which the general reticular network of the lymphatic vessels is involved, is usually confined to the prepuce and is responsible for many of the cases of phimosis and paraphimosis and their sequelæ (abscesses, perforation of the prepuce, etc.) which have been described in another chapter. The part affected is of a uniform rose or red color, more or less tumefied and exceedingly sensitive. The trunks of the vessels along the dorsum and the glands in the groin usually show signs of participation.

In very rare cases the whole penis is involved, attains an enormous size, is twisted upon itself at its extremity, and is the seat of the most violent pain. Micturition is difficult and painful, erections excruciating. General

febrile reaction, chills, fever, loss of appetite and even delirium (it is said) may complete the bill of fare.

In most cases even these severe symptoms terminate without any untoward result. Suppuration, however, is a consequence to be feared. "When this takes place, it is almost always seated in the prepuce. Very rarely it involves the cellular tissue lining the sheath of the penis. The abscess shows great tendency to destroy the mucous membrane of the prepuce and to empty itself towards the glans. When finally emptied, the swelling of the prepuce subsides, the tension disappears, the pains cease, and the skin can be felt to be thinned at the point affected. In some cases this thinning of the skin is so great that the membrane loses its vitality and is affected with gangrene. A perforation results, through which the glans may be seen. This accident is not the only one to which the patient is exposed. One of the most common and, at the same time, least serious, consists in a hard œdema limited to that portion of the prepuce corresponding to the frænum, and which may be very persistent. In other patients, the edges of the opening of the abscess become indurated and it becomes difficult to uncover the glans. Finally in persons predisposed to phimosis, there remains a narrowness of the preputial orifice or an induration of the whole membrane" (Hardy).

Treatment.—The treatment of gonorrhœal lymphangitis consists in rest in the horizontal posture, elevation of the genitals, full baths, local bathing with hot water and incision of any abscess as soon as formed. Rules for treatment in cases of phimosis have already been given.

ADENITIS.—It is rare to observe anything more serious in the inguinal ganglia in cases of gonorrhœa, than slight enlargement and tenderness, which disappear in a few days. According to the statistics of the Antiquaille Hospital at Lyons, an attendant bubo is met with in only one out of every fourteen cases of gonorrhœa.[1] It is at once recognized by the physician and patient by the enlargement and tenderness of one or more glands in the groin, and it may occasion considerable pain and uneasiness in walking and standing. Buboes attendant upon gonorrhœa, uncomplicated with chancroid, are "simple" buboes; of which a fuller description will be given hereafter, when speaking of buboes in general. They may generally be made to disappear in a few days by keeping the patient quiet and producing a little counter-irritation by painting the skin over them daily with tincture of iodine. It is only in scrofulous subjects, or in consequence of violence, excessive fatigue or general depressing influences, that they ever exhibit a tendency to suppurate. I have known of one instance of a man suffering from gonorrhœa, without the slightest trace of venereal ulceration, who after exposure to great hardship upon a wreck, had a suppurating bubo that confined him to his bed for six months.

[1] Gaz. d. hôp., Paris, No. 141, 1861.

CHAPTER X.

SWELLED TESTICLE.

The most frequent complication of gonorrhœa is an affection of the scrotal organs, variously known by the names of swelled testicle, hernia humoralis, orchitis, and by the more correct term, *gonorrhœal epididymitis.* In order to understand the mode in which this complication supervenes upon gonorrhœa it is desirable to recall to mind the canal which connects the testicle and the urethra, and which is designed for the passage of the seminal fluid. Tracing this canal from before backwards, we have first the aperture of the ejaculatory duct, near the anterior extremity of the veru montanum in the prostatic portion of the urethra; following this duct, we find that it merges into the vas deferens, which passes round the bladder, through the spermatic canal in the abdominal muscles, and finally descends within the scrotum, where it terminates in the numerous and intricate convolutions of the epididymis. We thus have a passage, lined with mucous membrane, which is continuous with the mucous membrane of the urethra, and connects the deepest portion of this canal with the epididymis.

In the early stages of urethral gonorrhœa, the inflammation is generally confined to the neighborhood of the fossa navicularis. At a later period, however, the deeper portions of the canal are involved, and the disease may thus gain access to the ejaculatory duct, and, under the influence of any exciting cause, extend along the spermatic canal to the epididymis, or even beyond this, to the testicle and the tissues which envelop it. The patient's own sensations will sometimes indicate that in this mode has originated the affection of the testicle. He has felt a dull pain in the perinæum and in the groin, along the course of the spermatic vessels, for a day or two before he observed the tenderness and swelling of the testis. Again, in some cases, we find additional evidence of the same, in the fact that the cord corresponding to the inflamed testicle can be felt externally to be swollen and hard, and can be traced from the testicle through the inguinal canal, even into the iliac fossa. Post-mortem examinations, also, have exhibited the ordinary appearances of inflammatory action throughout the whole of the canal connecting the testicle and urethra. There can be but little doubt, therefore, that, in some instances, swelled testicle owes its origin to the extension of the inflammation along a continuous mucous surface.

This explanation, however, will not account for all nor even the majority of cases, for in most instances there is no evidence whatever that the cord

has been involved.[1] Moreover epididymitis may occur before the disease has reached the prostatic urethra. Again, there is another question which comes up here for explanation: Why is it that the urethral discharge commonly ceases or at least diminishes on the occurrence of the epididymitis? It must be acknowledged that as yet no satisfactory solution of this problem has been reached.

"Sympathy," "metastasis," and "reflex irritation" (Brown-Séquard) have been adduced in explanation, but they do not explain the facts nor can they satisfy the mind of the inquirer. Further progress in our knowledge of the nervous system may throw light on the subject, but this end has not yet been reached. The fact is, we know nothing about it, and we do not propose to enter into speculations.[2]

In this connection, a case reported by Mr. Furneaux Jordan[3] comes in, in which inflammation travelled in the opposite direction, viz., from the epididymis to the urethra. The patient received a severe blow on the scrotum, and the left epididymis was found to be enlarged, painful and tender. Inflammation extended up the cord into the ring, followed by a slight urethral discharge and all the symptoms of a mild urethritis.

CAUSES.—Gonorrhœa of the urethra is the only form of gonorrhœa that gives rise to swelled testicle, which is never met with as a complication of balanitis.

The following table, drawn up by M. de Castelnau,[4] exhibits the times of its appearance in the course of the gonorrhœa, in 239 cases, collected from different sources:—

	GAUSSAIL.	DESPINE.	AUBREY.	DECASTELNAU.	TOTAL.
1st week . . .	3	2	8	3	16
2d " . . .	4	6	17	7	34
3d " . . .	5	2	9	8	24
4th " . . .	16	2	15	6	39
5th " . . .	39	2	8	5	54
6th " and later .	6	15	43	8	72
Total . .	73	29	100	37	239

In the experience of most surgeons, swelled testicle is even rarer during the first fortnight of a gonorrhœa, than would appear from the above statistics. As a general rule, it may be said to supervene after the third week, and most frequently after the sixth week.

Cases are reported in which it has occurred after the discharge had entirely disappeared, and in one as late as three months. A patient once came to me with swelled testicle, five weeks after I had treated him for a clap, and had dismissed him as cured, and he assured me that he had not

[1] Out of 346 cases of epididymitis, Berg, of Copenhagen, found the cord involved in only 182. Jahresb. ü. d. Leistung. u. Fortschr. d. ges. Med., Berlin, 1868, p. 588.

[2] For a specimen of the bosh that may be written on this subject, the reader is referred to The Practitioner, London, Nov. 1878, p. 345.

[3] Jr. Brit. M. Ass., Aug. 1871.

[4] Ann. d. mal. de la peau et de la syph., Paris, Mai, 1844.

perceived any discharge in the meanwhile, nor could I discover any upon examining the penis. It is probable, as stated by Velpeau, that in these cases there still remains, in the prostatic portion of the urethra or at the neck of the bladder, a small amount of inflammation, but not sufficient to manifest itself externally.

Instances are recorded in which the swelling of the testicle is said to have appeared before the discharge from the urethra. In one case reported by M. Castelnau, the epididymitis was developed a week after coitus, and the urethral running was first seen five days afterwards. M. Vidal (*Ann. de chir.*, 1844) gives a similar case, and Velpeau (*Dict. de méd.*, art. *Testicule*) admits such an occurrence. Dr. Fred. R. Sturgis (*Med. Rec.*, N. Y. Oct. 9, 1875) also reports a case in which the epididymitis is said to have appeared on the tenth day after exposure, with no discharge from the urethra until five days afterwards. It is not improbable that a gonorrhœa really existed, but was overlooked, in these cases; still it is by no means impossible, especially with the knowledge we now possess of the effects of immoderate sexual indulgence, that the prostatic portion of the urethra alone received the irritation from coitus, and that the effect produced was insufficient to manifest itself by a discharge until after the swelling of the testicle had taken place.

In some instances we are able to trace an attack of swelled testicle directly to some exciting cause, which has aggravated the urethral disease. Thus the patient may have been imprudent in exercising or in exposing himself to cold, or he may have indulged in a debauch or in sexual intercourse. Strongly irritant injections, or any violence done to the canal by a large bougie, or by forcible distention when using a syringe, may also occasion it. One of the most severe cases of this disease that I ever met with had been induced by the forcible introduction of a large bougie in the treatment of a gleet of several years' duration. In other instances, however, the exciting cause of epididymitis is not apparent, independently of the fact that the inflammatory action has had time to involve the prostatic portion of the urethra and gain access to the spermatic ducts. It has been supposed by some surgeons, that the use of copaiba and cubebs is occasionally the cause of epididymitis; while others have not only denied this, but have even recommended these drugs in the treatment of this affection. I have already referred to this subject in speaking of the anti-blennorrhagics, and will only say at present that evidence is wanting in favor of both these assertions. We have no reason to believe that copaiba and cubebs ever occasion this disease, and still less reason to believe that they can be used with benefit in its treatment.

Epididymitis may also be caused by the presence of urethral stricture; by a stone in the bladder or the lodgment of a small calculus or fragment of stone in the prostatic urethra; in fact by any irritation set up in the prostatic sinus; and I have met with a few cases in which the only exciting cause has appeared to be exposure to cold. Mr. Samuel Osborn[1] reports two cases of epididymitis in boys, due to pressure of a truss.

[1] Lancet, Lond., July 13, 1878.

It should not be forgotten that wearing a well-fitting suspensory bandage during an attack of gonorrhœa is the best protection against swelled testicle. The patient is thus relieved of the weight of the scrotal organs, the flow of blood from the part is facilitated, and the liability to inflammatory action is consequently much diminished.

SEAT.—Gonorrhœal epididymitis more frequently attacks the left testicle than the right. Of 1342 cases observed by Prof. Sigmund, of Vienna, the left testicle was affected in two thirds.[1] The greater frequency of this disease on the left side has been attributed by some authors to the fact that men usually "dress" on this side, and that the left testicle consequently receives less support than the right. This explanation, however, is very questionable. The difference is doubtless to be found in that cause, as yet not explained in a perfectly satisfactory manner, which renders the left testicle more prone than the right to take on various forms of morbid action. Both testicles rarely become inflamed simultaneously. Osborn (op. cit.) thinks the reason why only one testis becomes affected at one time, to be that the congestion caused by the inflammation occludes the adjacent opening of the vas deferens on the other side. Not unfrequently one testis is attacked after the other. This usually occurs only after the lapse of several weeks, though I have seen the two attacks separated by only a few days' interval. Sigmund states that both testicles were affected in seven per cent. of his hospital patients, and in five per cent. of his private cases. Occasionally, the inflammation, after leaving one testicle and attacking the other, will return to the first; to this form of the disease Ricord has given the expressive name of *see-saw* epididymitis.

It is the epididymis, of all the scrotal organs, which is first and chiefly involved in most cases of this disease. It is here that the vas deferens terminates, and we may suppose that the inflammatory action is retarded in its progress by the innumerable and intricate convolutions which compose this appendage to the testicle. At an early stage of the inflammation, and also after the swelling has somewhat subsided, the epididymis can be felt enlarged to several times its natural size. The normal position of the epididymis is posterior and external to the body of the testicle, and pressure upon this part excites more pain than elsewhere. The epididymis, not being enveloped, like the testicle, in a fibrous capsule, is susceptible of an indefinite amount of tumefaction, and frequently enlarges to such an extent as to partially surround and encase the body of the testis.

It should be recollected, however, that the position of the epididymis, relative to the testicle, may be abnormal; in which case the seat of the greatest tenderness and swelling will differ from the description just now given. Such malpositions are called by the French *inversions du testicule.*

[1] Brit. and For. M.-Chir. Rev., Lond., Oct. 1856. Mr. Curling (Diseases of the Testis, 4 ed. 1878, p. 267), gives 138 cases, seventy-three observed by Gaussail, twenty-nine by D'Espine, and thirty-six occurring in his own practice, in the majority of which the right testicle was affected.

They have been thoroughly investigated by M. Eugène Royet,[1] who admits the five following varieties:—

1. The epididymis may be anterior to the body of the testicle.

2. It may be on one side, either the external or internal.

3. It may be superior; the long axis of the testis being antero-posterior, and the epididymis resting upon its upper surface.

4. In the fourth variety, the epididymis and vas deferens form a loop or sling, which surrounds the testis from before backwards.

5. In the fifth variety, the relative position of the epididymis and testis varies from day to day, without appreciable cause.

All these varieties are rare, with the exception of the first, which, according to Royet's researches, is met with in one out of every fifteen or twenty persons. The abnormal position of the epididymis in front of the testicle is, therefore, the only one possessing much practical importance. The possibility of this malposition should be borne in mind both in operating for hydrocele and when forming a diagnosis of scrotal tumors. In cases of epididymitis, when the inflammation is not general, the epididymis may be recognized by its hardness to the touch and its sensibility to pressure. When all the scrotal organs are involved in the inflammatory process, Royet states that the chief means of recognizing an anterior position of the epididymis are, a want of mobility in the skin anteriorly, owing to its adhesion at this point to the epididymis, and the fact that the vas deferens can be felt in front, instead of behind the other vessels of the cord.

Next to the epididymis, the tunica vaginalis is most frequently involved in gonorrhœal epididymitis. M. Rochoux has advanced the idea that inflammation of this membrane is the chief and constant lesion in swelled testicle;[2] but this is a mistake. Vaginalitis, although a very frequent, is not a constant symptom, and is always consecutive to the inflammation of the epididymis. There is commonly an effusion varying in quantity and character, within the tunica vaginalis. This may consist only of serum and be apparently due to simple obstruction of the circulation; or it may contain fibrin and other products of inflammation. Sometimes bands of lymph bind the two opposed surfaces together, as in pleurisy. The subscrotal cellular tissue also participates in the inflammatory action, and is thickened by œdema or fibrinous deposit. The frequency with which the tunica vaginalis is involved in swelled testicle, while the body of the testicle is unaffected, has been explained by Gendrin,[3] who states that when the cellular tissue of an organ is continuous with that underlying a neigh-

[1] De l'inversion du testicule; Paris, 1859, p. 55.

[2] Du siège et de la nature de la maladie improprement appellée orchite blennorrhagique, Arch. gén. de méd., 1833, t. ii, p. 51.

[3] Histoire anatomique des inflammation, t. i, p. 143. Curling, op. cit., p. 252, expresses the opinion that the inflammation seldom passes to the testicle, and quotes from Hardy, who professes to have found the testicle involved only nine times in 226 cases of gonorrhœal epididymitis, an experience not at all in accordance with our own.

boring serous membrane, it becomes a ready means of communicating inflammatory action; but when a contiguous organ is not thus connected with the original seat of the disease, the passage of the inflammation is less easy. The connecting link between the epididymis and tunica vaginalis is found in the areolar tissue which penetrates the former and underlies the latter, while the testicle is surrounded by the fibrous tunica albuginea, and, being thus isolated, generally escapes.

Following the tunica vaginalis in the order of frequency, the spermatic cord is next found to be the seat of inflammatory action in gonorrhœal epididymitis. The body of the testicle is rarely affected; and even when involved, the fibrous tunic which invests it limits the amount of swelling of which it is capable, although it greatly increases the suffering of the patient by constricting the inflamed tissues.

Some idea of the comparative frequency with which the different tissues now mentioned are attacked in this disease may be formed from the statistics of Prof. Sigmund, already referred to. In 1342 cases, the epididymis was alone affected in 61; the epididymis and tunica vaginalis in 856; the epididymis and cord in 108, and these three parts together in 317.

The propriety of the name, gonorrhœal epididymitis, will now be evident. It is no objection to this term that the epididymis, in many cases, is not the only part involved. As in diseases of the eye, we call a certain inflammation iritis, though other parts besides the iris are involved, so in swelled testicle, the principal seat of the disease should determine its scientific name. The term orchitis, which is adopted by Vidal, Velpeau, and most English authors, is less correct, and is moreover objectionable, because it is calculated to confound this disease with that affection of the testicle which is produced by syphilis, and which is totally distinct in its character and symptoms.

Symptoms.—There are generally no marked premonitory symptoms preceding an attack of swelled testicle. Sometimes, however, we find that the patient has suffered from malaise for several days; that he has had slight fever, perhaps a chill, and a dull pain or heavy sensation in the perinæum, cord, and scrotal organs, attended with a frequent desire to pass water. His attention is soon attracted to the testicle by pain, felt especially on motion, and on examination he finds this organ swollen, and tender on pressure. The swelling and tenderness rapidly increase, and the pain extends to the corresponding thigh, to the groin, and to the lumbar region. In the course of twenty-four or forty-eight hours, the affected side of the scrotum may have attained the size of the fist; the skin is tense and in some cases of a dark red or almost purplish hue; the pain may be very severe, especially at night, preventing sleep; the least pressure upon the part, even from the bedclothes, is almost unendurable; partial ease only can be attained by keeping perfectly quiet in the horizontal posture with the addition of some support to the genital organs. If the cord be involved the pain, swelling, and tenderness are found to extend upwards to the inguinal canal. The cord may indeed be involved alone without the epidi-

dymis being affected. The possibility of this was denied by Ricord, but Beaumé has reported several and Bergh one case of this kind (Zeissl). Kohn also mentions it.[1]

There is generally more or less febrile disturbance of the system at large. The skin is hot, the tongue coated, the pulse increased in force and frequency, and the patient extremely nervous and agitated. Cases are reported in which the swelling of the cord was so excessive as to produce strangulation at the abdominal ring, attended by symptoms resembling those of strangulated hernia, such as abdominal tenderness and vomiting. It must not be supposed, however, that the symptoms are always so severe as those now described. Such severity is more apt to be met with in persons of a nervous temperament, in whom this disease is one of the most distressing that can occur. In other cases, however, the suffering is comparatively slight, and I have known patients to attend to their daily occupation during its whole course. Between these two extremes we may have every shade of variation.

While the inflammation is at its height it is impossible to distinguish the different portions of the scrotal organs. Judging from mere inspection of the swelling, we might be led to suppose that it was chiefly made up of the body of the testicle. This, however, is not so. It is composed, for the most part, of the swollen epididymis, of an effusion into the tunica vaginalis, and of œdema of the subscrotal cellular tissue. The hydrocele is often, but not always, sufficient to enable us to detect distinct fluctuation, and rarely, if ever, is the tumor transparent; but on gently touching it, the surface is found to yield for a short distance before the fingers come in contact with the firmer body of the testicle beneath. This yielding is due to the displacement of the œdema of the scrotum and of the fluid in the sac. If the tumor be punctured with a lancet, bloody serum, varying in amount from a few drops to several drachms, will escape.

Resolution begins to take place in a few days, commencing in the anterior portion of the tumor. The œdema of the scrotum and the hydrocele disappear, and the different portions of the testis can now be distinguished from each other—the epididymis, still swollen and hard, behind; and the body of the testicle, preserving, in most cases, its normal elasticity, in front. The whole duration of the attack varies from one to three weeks. In a discussion on the treatment of this disease before the Academy of Medicine in Paris, in 1854, Velpeau stated that its duration under ordinary methods of treatment averaged 16 to 18 days.

In some cases of swelled testicle, after the more acute symptoms have subsided, the parts still remain engorged and the disease shows a tendency to become chronic. This is most likely to occur in patients of weak habit, and while this condition lasts the least exciting cause may induce a return of the acute inflammation.

Most cases of swelled testicle terminate favorably. In some rare instances, however, abscesses form in the cellular tissue underlying the scrotum, or

[1] See Am. J. Syph. and Derm., N. Y., vol. ii, p. 165.

in the epididymis or body of the testicle. Mr. Edwards[1] has reported a case in which the whole testicle protruded through an opening formed by an abscess in the scrotum, the skin being drawn in around the orifice. Mr. Edwards "pared the edges, drew them asunder, making with the handle of the scalpel a sufficient separation of the deeper tissues, and the testicle was at once drawn, as it were, back into the scrotum, the wound closing over it. Three hare-lip pins were inserted; the wound closed by first intention, and the patient was walking about perfectly well on the seventh day." If an abscess form and be not early evacuated, the pus generally burrows in various directions, forming sinuses, and destroying a portion of the parenchyma, but the loss of a portion of the organ does not appear to be followed by any disturbance of its function; sometimes a circumscribed abscess is formed, which may become encysted, and, the more fluid portion being absorbed, the solid portion may remain in a concrete state for an indefinite length of time, and closely resemble a tubercular deposit. The presence of the cyst will clear up the diagnosis, since true tubercular matter is always found in direct contact with the parenchyma of the testis, and is never encysted.

The swelling of the testicle attendant upon gonorrhœa may, however, be the exciting cause of true tubercular deposit, in persons of a strumous diathesis.[2]

As the epididymis was the first part attacked, so it is the last to recover its normal condition, and in some cases it retains, for months or years, an irregular and knotty mass of induration, which may obstruct the passage of the semen and render the affected testis useless. If this induration exist on both sides, or if the opposite testicle be undeveloped, as is often the case with an undescended testis, the patient will probably be impotent. In a few rare cases gonorrhœal epididymitis has been known to terminate in atrophy of the testicle. Hypertrophy is extremely rare, but is sometimes seen in persons who have had frequent attacks of swelled testicle.

The reflex neuralgias which not infrequently[3] complicate cases of gonorrhœal epididymitis have been admirably described by Mauriac in a pamphlet entitled *Étude sur les névralgies réflexes symptomatiques de l'orchi-épididymite blennorrhagique*, Paris, 1870, which is well worthy of perusal.

In the majority of cases the pain is unilateral and is confined to the sphere of distribution of the lumbar and sacral nerves upon the same side as the affected testicle. At other times, the pains radiate in various directions, cross the median line and extend far beyond the limits above mentioned.

The pains in the spine appear to have their focus at a point corresponding to the anastomosis of the lumbar with the sacral plexus of nerves; they *may be* bilateral and more intense on the side opposite the epididymitis.

[1] Edinb. M. J. Nov. 1860, p. 455.

[2] A case of this kind was recently exhibited at a meeting of the Anatomical Society of Paris. Bull. Soc. anat. de Paris, 2d série, t. iv, p. 2.

[3] In 200 cases of epididymitis Mauriac found 15 with very decided reflex pains.

Some patients feel as if the pain started from, others that it terminated at, this point.

Sometimes the whole of the lumbar region from the ribs to the sacrum, is the seat of dull pain, or the latter is felt deeply in the region of the kidney; this being due to reflex manifestations in the plexus of the grand sympathetic. From the lumbo-sacral focus the pain radiates to the abdomen and the lower extremity. The abdominal pains, which are almost as common as the lumbar, sometimes feel like a constricting belt encircling the body beneath the umbilicus. Most frequently they do not cross the median line. They are superficial and are relieved rather than exasperated by pressure.

The walls of the thorax are sometimes involved, and a vague aching sensation is felt at a fixed point with radiations along the course of the intercostal nerves.

The sympathetic pains which extend to the lower extremity on the affected side, may be divided into two groups, an anterior or crural and a posterior or sciatic. The anterior group may occupy two-thirds or even the whole of the antero-internal surface of the thigh, and it is then difficult to say exactly what nerves are invaded. Below the knee, the internal saphena, the fourth terminal branch of the crural nerve, is the one evidently involved.

As regards the posterior group, we often find the pains limited to the buttocks and to the postero-external portion of the thigh. They are generally most marked over the upper part of the sciatic notch behind the great trochanter, towards the middle of the thigh behind and in the popliteal space.

The characteristics of these reflex neuralgias are precisely similar to those of the direct neuralgias. In their intensity they vary greatly. Sometimes they become intolerable from their sharpness, their frequency and their extension to all the branches of the nerves which emanate from the lumbar and sacral plexus. The whole side of the body corresponding to the affected testicle may be the seat of agony. There follow insomnia, anxiety, and general nervous excitement which sometimes rises to the point of hysteriform spasm. Patients will cry out with the pain. They try to calm it by bending the trunk towards the thighs or by pressing upon the more painful points; it is not, however, usual to find those painful foci of the disease so much insisted upon by Valleix as a characteristic of neuralgia.

The duration of these pains is very variable, extending from twenty-four hours as a minimum to several months. Those situated in the branches of the lumbo-sacral nerves are much more persistent than those which appear to have their seat in the sympathetic, and among the former those which radiate towards the testicle will commonly be found to be the most lasting.

When appearing in the form of paroxysmal attacks, these pains have no regularity, and occur, as they also disappear, without consulting the clock. Their termination is always favorable, if we except the fact that their con-

tinuance is liable to keep up the engorgement of the epididymis (which the cause and which the effect?).

It may here be remarked in advance of the treatment of gonorrhœal epididymitis that Mauriac speaks highly of the application of leeches over the cord, as well as of puncture of the tunica vaginalis, and other means to be mentioned hereafter. In brief, the treatment of these reflex neuralgias is the treatment of the exciting cause.

Zeissl states that the *most frequent* sequence of epididymitis is chronic hydrocele, which we have often had occasion to observe. Vétault[1] claims that this affection is caused by pressure of the products of inflammation thrown out in the head of the epididymis and in the cord upon the vessels.

Zeissl states as a result of his experience, that those men who have had frequent attacks of epididymitis, are most prone to have orchitis in case they subsequently contract syphilis (?).

The condition of the urethral discharge preceding and during an attack of swelled testicle has been the subject of considerable discussion. It was at one time supposed that this complication of gonorrhœa was usually preceded by a diminution of the running, and hence that it might be attributed to the use of active measures which were supposed to drive the disease from the urethra to the testicle. On this supposition has been founded the theory that swelled testicle may be caused by metastasis. A proper appreciation of the facts in the case, however, does not warrant this conclusion. It is, indeed, true as a general rule, that the urethritis has passed the acute stage, and that the discharge has consequently diminished before the epididymis becomes inflamed,[2] but this is the natural course of the disease when no complication whatever takes place. To prove a metastatic origin of the epididymitis, it would be necessary to show that there is a sudden disappearance or diminution of the running, just preceding the swelling of the testicle; such, however does not occur. On the contrary, as stated by Ricord, there is often an exacerbation of the urethral disease and a slight increase of the discharge for a day or two preceding. When the disease of the testicle is fairly established, the discharge diminishes as a consequence of revulsive action. These phenomena coincide with what is seen in affections of other parts when acute inflammation is established in their neighborhood.

The induration of the epididymis, which frequently remains for some time after an attack of swelled testicle, or which may even become per-

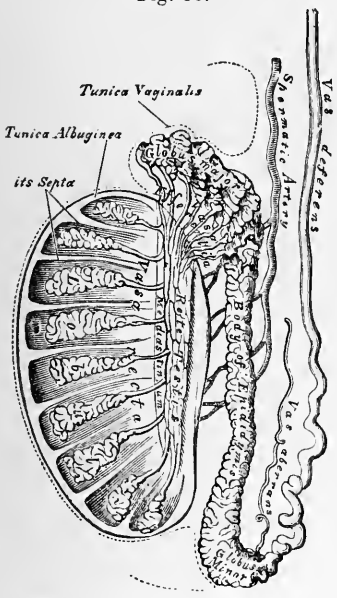
[1] Considérations étiologiques sur l'hydrocèle des adultes, Paris, 1872.

[2] Gaussail's statistics relative to the discharge are as follows: In 67 of 73 cases, the discharge and the other symptoms of the gonorrhœa had diminished more or less—in other words, the acute stage of clap had passed—when the swelling of the testicle took place; in 6 cases, the gonorrhœa was still at its height.

In 30 of the 73 cases, the discharge gradually diminished and disappeared entirely during the treatment of the epididymitis; in 43 cases, some discharge remained after the disease of the testicle was cured.

manent, requires further mention. This induration is commonly situated in the lower part of the epididymis, in or near the globus minor. It will be recollected that the upper portion, or globus major, is composed of the convolutions of the vasa efferentia, which are from ten to thirty in number, but that these minute vessels unite into a single duct, before leaving this portion. Hence the globus major of the epididymis consists of several seminiferous tubes, any one of which would be sufficient to convey the semen, in case the others were obstructed; while the body and globus minor contain but one tube, the obliteration of which must completely cut off the communication between the testis and the penis. But it is in this latter portion, viz., the globus minor, that the induration left by an attack of swelled testicle is almost invariably found; and, as we shall presently see, it generally affects the obliteration of the single duct of the part, and renders the patient impotent upon the affected side.

Fig. 38.



Vertical section of the testis and epididymis. (After GRAY.)

It now becomes an interesting subject of inquiry, what effect this obliteration has upon the testis; whether it remains in a normal condition, and continues to secrete sperm. Again, in those cases in which epididymitis has occurred on both sides, an induration may be left in each testicle, totally obstructing the passage of semen; in such cases does the patient still retain sexual desires; is he capable of sexual intercourse; and if so, how does his semen differ from that of a perfectly healthy individual? These questions have been ably answered in a paper by Dr. L. Gosselin, published in the *Arch. gén. de méd.* for Sept. 1853.

Dr. Gosselin's conclusions are based upon experiments upon the lower animals, and upon the observation of twenty patients affected with double induration of the epididymis following gonorrhœa. The spermatic cord of one side was exposed in two dogs, the vas deferens isolated from the spermatic vessels, and a portion of it excised. The animals were killed several months after, when it was found that the testicle of the side operated on presented the same volume, color, and general character as that of the opposite side; the only difference was that the convolutions of the epididymis in the former were distended with fluid, containing a multitude of spermatozoa. The excision of a portion of the vas deferens had completely cut off the communication with the penis. These experiments proved that isolation of the testicle in the lower animals does not produce atrophy of

this organ, which remains in an apparently healthy condition, and continues to secrete semen.

The twenty persons who had had double epididymitis were met with at the Hôpital du Midi, and in the private practice of Dr. Gosselin. The time which had elapsed since the formation of the induration, at the time of the observation, varied from a few weeks to ten years. The symptoms which they presented were in some respects singular and remarkable. In all of them there was a mass of induration in the lower portion of the epididymis of each testicle. In none of them was there any apparent change in the volume of the scrotal organs, and no pain was felt at any time, not even after sexual intercourse. None of them had observed any change in their sexual desires or powers. They were all as capable of coitus as the most healthy individuals. Their erections and ejaculations were complete. Their semen was normal in quantity, in consistency, in odor, and color; it presented the chemical reactions described by Berzelius, as characteristic of sperm. Only when examined by the microscope, was it found to differ at all from healthy semen, inasmuch as *it was entirely destitute of spermatozoa.* In the recent cases, most of which were still affected with urethritis, pus and blood-globules were found mixed with the semen; in the older cases these were absent. The entire absence of spermatozoa in all of them was confirmed upon repeated examination by Drs. Gosselin, Robin, Verneuil, and other eminent Parisian microscopists. In two of these cases, treatment, continued in the one case for three months, and in the other for nine, resulted in the disappearance of the induration in one of the testicles, and coincidently with this resolution spermatozoa again appeared in the semen, as shown by microscopical examination.

These cases are of the highest interest, looking at them both in the light of physiology, and of pathology and therapeutics. They show, in the first place, that the quantity of fluid ejaculated is as abundant and presents the same general appearances when the canal of the vas deferens is obliterated as when it is free; also, that in case of obliteration, the secretion of sperm in the testis is not sufficient to distend the vessels to any great extent, or to occasion pain. Probably there is some absorption of the secreted sperm, but if as much of this fluid were secreted by the testicles as is commonly supposed, the effect upon the testicular vessels and upon the feelings of the patient would be more manifest. From these facts Dr. Gosselin concludes that the normal function of the testicle is to furnish the fecundating element of the sperm, viz., the spermatozoa; and that the other components of the spermatic fluid, to which it owes its color, odor, and chemical reactions, and which constitute the medium in which the spermatozoa live, are derived for the most part from the vesiculæ seminales.

But the conclusions from these facts which chiefly interest us at the present time are those bearing on the pathology and treatment of epididymitis. These conclusions, as stated by Dr. Gosselin, are the following:—

1. The induration is generally situated in the globus minor of the epididymis, though it may, strictly speaking, be seated in any part of this

organ. Since the epididymis below the globus major is composed of but a single vessel, the obliteration of this vessel is sufficient to prevent the passage of the sperm.

2. The presence of the induration excites no pain, provided that the inflammation which produced it has entirely subsided.

3. It does not occasion any change, appreciable by the patient, in the exercise of the genital functions.

4. If the spermatic vessel be obliterated on both sides, the patient is necessarily impotent; if on one only, fecundation is possible, provided that the other testicle is sound.

5. The success of treatment in several of the cases reported affords assurance that the power of fecundation may sometimes be restored by appropriate remedies.

Two additional cases of bilateral induration resulting from epididymitis have been reported by Gosselin, which confirm his previous observations regarding the retention of virile power and the absence of spermatozoids from the fluid emitted.

M. Godard states that he has confirmed Gosselin's observations by microscopical examination of the semen of thirty-five persons affected with double chronic epididymitis, and in every instance except one spermatozoa were wanting.[1]

Liégeois[2] gives twenty-eight cases of double epididymitis, in the sperm of seven of which the microscope showed spermatozoids at periods varying from eight days to five years after the last attack. Five of these cases were not blennorrhagic, leaving two, of undoubted venereal origin, in which there was restoration of the fecundating elements.

Liégeois concludes from his experience that spermatozoids reappear in cases of blennorrhagic epididymitis only after the disappearance of the induration, which, in non-blennorrhagic cases, has its seat outside the canal, and, therefore, may persist without preventing their passage. He claims to have seen, among three hundred cases of epididymitis, not a single genuine case of consecutive atrophy of the testicle, although he has recognized slight diminution in volume in six or seven instances. In only eight cases has he observed any loss of virile power, while, on the contrary, he has several times seen it markedly increased.

He calls attention to the fact of decided increase in the quantity of ejaculated fluid, which, as observed by Gosselin, presents the characters of normal sperm, with the exception of the spermatozoids, and is probably derived from the prostate gland and the seminal vesicles.

If gonorrhœal epididymitis attack a testicle which has been arrested in its descent from the abdomen to the scrotum, the nature of the case may readily be mistaken. If the testis have not left the abdominal cavity, it may simulate peritonitis or iliac abscess; if it be arrested in the spermatic

[1] Études sur la monorchidie et la cryptorchidie chez l'homme, Mem. Soc. de biol., Par. 1857, p. 105.

[2] Ann. de derm. et syph., Par. 1869, p. 410.

canal, it may counterfeit strangulated hernia or bubo; and the liability to error is especially great, when, as often occurs, the tunica vaginalis is still connected with the abdominal cavity, and true peritonitis is set up by extension of the inflammation, attended by its usual alarming symptoms. Numerous cases in illustration of these remarks may be found in the work of M. Godard before referred to.

A still rarer malposition of the testicle is in the perinæum; an anomaly first observed by John Hunter,[1] who met with two instances. Ricord and Vidal[2] (de Cassis) have each observed two cases; Mr. Ledwich[3] met with one in a dissecting room subject, and Godard[4] gives the history of another, with a plate of the abnormity. A perineal testicle affected with gonorrhœal epididymitis may simulate a perineal abscess or inflammation of Cowper's glands, as in the two instances observed by Ricord.[5] "In one, there was a perineal tumor, which was exquisitely painful, fluctuating and about the size of a pigeon's egg. It was at first taken for an abscess, and Ricord was about to open it, when examination of the scrotum led to the discovery that one testicle was absent."

There is another consideration connected with abnormal position of the testicle, which is worthy of mention. In most cases of this anomaly, the gland is useless for the purposes of procreation. According to Goubaux and Follin,[6] it undergoes fibrous or fatty degeneration. This is denied by Godard, who, however, has equally shown that the gland, as a general rule, is impotent, by microscopical examination of the contained sperm after death. In eight cases out of nine, spermatozoa were wanting. Now, if the anomaly be confined to one side, and the opposite testicle be in a healthy condition, fecundation is still possible; but if the descended testicle be attacked by epididymitis, obliteration of its vas deferens will deprive the patient of all procreative power, as in the cases of double epididymitis observed by Gosselin. Godard gives the history of a man with one undescended testis, who had a child by a mistress, but who, after an attack of swelled testicle on the opposite side, was twice married without progeny, and his semen, twenty-one years afterwards, was found destitute of spermatozoa.

Pathological Anatomy.—Since epididymitis, when uncomplicated, is never fatal, opportunities for post-mortem examination are rare, and only occur in case some intercurrent disease produces the death of the patient. The most complete report of such examination with which I am acquainted, is to be found in the *Gaz. d. hôp.* for Dec. 21, 1854.

[1] Curling, op. cit., p. 51.

[2] Traité de pathologie externe, t. v, p. 432.

[3] Dubl. Q. J. M. Sc., Feb. 1855.

[4] Godard, op. cit., p. 96.

[5] Op. cit., page 75, and plate III.

[6] Follin, Études anat. et path. sur les anomalies de position et les atrophies du testicule; Arch. gén. de méd., Par., juillet, 1851, p. 262.

Goubaux et Follin, De la cryptorchidie chez l'homme et les principaux animaux domestiques; Mem. Soc. de biol., Par. 1855, p. 317.

Case.—The patient entered Velpeau's wards at *la Charité* with swelled testicle, of eight days' duration; the epididymis was situated in front of the testicle, and was swollen and hard; the cord was also involved, while the body of the testicle appeared to be sound, and there was no effusion in the tunica vaginalis.

Eighteen days after his admission, and twenty-six after the commencement of his attack, this patient died of cholera. The post-mortem was made by M. Gosselin, with the following result:—

1. The tunica vaginalis contained no fluid and was free from injection of its vessels.

2. The body of the testicle was healthy.

3. The globus major and the body of the epididymis were also healthy; but the globus minor was swollen and formed a hard, uniform mass, the size of a haricot bean. On cutting open this mass, it was found to be destitute of blood-vessels, of a uniform yellow color, resembling tubercle, and of firm consistency. The sections of the convoluted spermatic duct upon the cut surface showed that this vessel had attained three or four times its natural size, and, instead of being hollow, that *it was filled with uniform yellow matter: there was none of this matter between the convoluted vessels; it was entirely within, and in the substance of the walls.* M. Robin examined this matter under the microscope and found pus-globules, mixed with fat-globules and the granular globules of inflammation. He also confirmed the statement that this matter was limited to the interior of the vessels.

4. The vas deferens, which had recovered its normal size, was filled with yellowish matter, containing no spermatozoa, and composed of pus-globules, cylindrical epithelial cells, and granular corpuscles. Its walls exhibited a perfectly normal appearance.

5. The vesicula seminalis on the affected side was healthy. It contained a small amount of fluid, with pus-globules and epithelial cells, but no spermatozoa. Spermatozoa were found in the vesicula seminalis on the opposite side.

M. Gaussail (*Arch. gén. de méd.*, 1831, tom. xxvii, p. 188) has also reported two cases of post-mortem examination of swelled testicle, in which, however, the examination was made with less care than in the case just quoted.

Mr. Curling (op. cit., p. 249) says that he has twice had the opportunity of making a post-mortem examination of swelled testicle, but gives no account of the appearances presented. Mr. Brodie[1] examined the body of a gentleman who had had gonorrhœal epididymitis twenty years before, and found the testicle smaller than natural and "one-third of the tubuli testis converted into a white substance, having the consistence, but not the fibrous structure, of ligament."

With regard to the changes which take place in the tunica vaginalis, we have ourselves had some opportunities for observation. In one patient under our care the nodules of lymph, perceptible on external examination, were so marked as to simulate the nodules of cancer. This case led us to

[1] Clinical Lecture on Diseases of the Testis: Lond. M. Gaz., vol. xiii, p. 219, 1834.

seek for subjects in the dead house, whose previous history known to us or whose remaining induration of the epididymis showed that they had had epididymitis. The number of bodies thus examined was twenty. In some we found nodules of lymph on the testicular surface of the tunica vaginalis; in others, on the outer reflection of the same, and there were also in many cases false membranes stretching from one reflection to the other.

The first case which I have quoted as occurring in the service of M. Velpeau, is, I believe, the only one on record, in which the examination has been made with all the light which modern science affords, and I would especially call attention to the fact that the fibrinous deposit was found to be situated within the vessel of the epididymis and not between the convolutions. This fact is in opposition to the statement of Mr. Curling; but it can hardly be called in question in the case here reported, and it strongly favors the opinion of M. Gosselin that the communication between the testis and the penis is almost invariably obstructed during an acute attack of epididymitis, and also during the continuance of the induration which is often left behind. I would not be understood as asserting, however, that the exudation is always confined to the interior of the vessel; it may also involve the areolar tissue connecting the convolutions, but its deposit in the former situation appears to be the more persistent, and the more important so far as the procreative powers of the patient are concerned.

The pathological changes produced by epididymitis can be studied to advantage only in recent cases. In the masses of induration which have existed for months or years, the anatomical elements are so confounded that it is impossible to distinguish them.

Treatment.—The remedies proposed for the relief of gonorrhœal epididymitis are legion in number, too numerous, indeed, even to be recorded in full in these pages. Some idea of their diversity may be obtained by consulting the columns of the Lancet for 1876, when they were called out by a discussion upon the value of puncture of the testicle for this affection. It may be said, in general, that the means now adopted are much less severe and heroic than a few years ago, and, we have reason to believe, are attended with better results. I propose, first, to give briefly my own plan of treatment, and then enumerate a few of the others which have been recommended.

Upon the slightest indication of an attack of swelled testicle, absolute rest in the recumbent posture should be enjoined. The bed is the only place for the patient, since lying dressed upon the lounge will not remove the constriction exercised by the clothes, nor permit of appropriate local applications. The scrotal organs must also be well supported, and this is better done by a handkerchief sling, or by a broad strip of adhesive plaster passed under the scrotum and made to adhere to the thighs, than by a suspensory bandage as found in the shops. It is well to unload the bowels by a free cathartic, as three compound cathartic pills or a bottle of citrate of magnesia. The nauseants and emetics formerly employed are now

generally abandoned, except perhaps with plethoric subjects, or in cases of general febrile disturbance; and even then the exhibition of aconite may well be substituted. An opiate may be required at night to secure sleep. The diet should, of course, be restricted. Meanwhile the patient has enough to attend to without bothering with the antiblennorrhagics and injections which he may have been using for the cure of his urethritis.

As to local applications, relief will often be experienced by keeping the part covered with a single thickness of linen constantly wet with a solution of the muriate of ammonia, half an ounce to a pint of water. Better still, especially at night, is to smear the scrotum freely with the following mixture:

℞. Ext. Belladonnæ, ʒij . . . . . 8|
Glycerinæ, ℥ss . . . . . 19|
Aquæ, ʒj . . . . . 30|
M.

or with this;

℞. Pulv. Opii, ʒij . . . . . 8|
Glycerinæ, ʒj. . . . . 38|
M.

In either case, cover it with a piece of lint moistened in the same, and envelop the whole in oil-silk or India-rubber tissue.

I have also used with very good effect, in some instances, a simple procedure recommended by Dr. Edwin Lloyd, of Worksop, Notts County, England. The testicle is first immersed in water as hot as can be borne, and kept in it from ten to fifteen minutes, immediately to be followed by a stream of cold water poured over it from a height for five minutes. This should be repeated two or three times a day.

Under these measures the epididymitis may subside, but, probably in the majority of cases, the tunica vaginalis becomes involved, and more or less fluid may be detected in this sac. And here, in our experience, comes in the golden opportunity of giving almost instantaneous relief, and cutting off the further progress of the disease. The means we refer to consists in the multiple punctures of the scrotum so highly recommended by Velpeau. In performing this slight operation, the tumor is rendered tense by grasping it posteriorly with the left hand, as in making the puncture for hydrocele. With the right hand the surgeon, holding the blade of a common lancet between his thumb and forefinger, at the distance of about one-half an inch from its point, makes from four to six rapid plunges into the tense surface of the scrotum, still retaining his hold with the left hand so as to preserve the parallelism of the incisions in the skin and serous membrane. If there be much fluid in the sac, it will spirt out to some distance; in other instances, only a few drops of serum, mixed with a little blood, escape. In either case, the relief to the sufferings of the patient is most marked, and the further progress of the disease is at once arrested. The pain produced by this operation is so slight as not to *require* an anæsthetic; but if the patient be timid, I usually give him a few whiffs of ether, or let him inhale the nitrous oxide gas, which is now put up in a condensed form in small

cylinders, and is kept on hand by most surgeons for this and like minor operations. So great is my confidence in the effect of these incisions, that I do not hesitate to tell a patient that if he will submit to them he can be on his feet again in two or three days. I have never seen the slightest ill effect from them, although Montanier[1] reports a case in which a simple incision into the tunica vaginalis was followed by excessive hemorrhage very difficult to control, and which even endangered life. Probably some scrotal artery of considerable size was wounded, but this must be a very rare occurrence.

We proceed now to mention other modes of treatment recommended.

Sedatives.—These enter, to a greater or less extent, into many of the plans of treatment proposed, but they constitute the basis of all treatment as recommended by that accurate observer, Mr. J. L. Milton, and some others. Mr. Milton[2] says:—"The surgeon's first object is to arrest the *pain; with this the inflammation stops.*"[3] For this purpose he prefers morphia in doses of a quarter to half a grain two or three times a day, and in very severe cases gives three-quarters of a grain once or twice in succession. In the way of external applications, Mr. Milton recommends the following lotion:

℞. Liq. Ammon. Acetatis,. ℥ j 30
Spir. Ætheris, ʒ iss. 45
Mist. Camphor., ʒ iiiss 110

M. et sig. To be applied by means of a single fold of linen, which is to be kept continuously wet with the fluid.

This is essentially the same method as proposed by Mr. J. Rouse ("Treatment of Acute Orchitis," St. George's Hosp. Rep. Lond., vol. iv, 1869), who gives a purgative draught at the outset; then follows with a grain of opium morning and night, and keeps the testicle enveloped in a hot fomentation of Goulard and laudanum. After subsidence of the acute symptoms, he administers "twenty drops of the acid tincture of steel" three times a day.

I have never myself tried the effects of opiates alone.

The application of the oleate of mercury with morphia is suggested by Prof. Marshall, in the Lancet of May 25, 1872.

Dr. Ed. Warren, late chief surgeon of the Egyptian army, injects beneath the tunica vaginalis, by means of a hypodermic syringe, from one-sixth to one-quarter of a grain of morphia; then straps the testicle firmly with adhesive plaster, and administers internally twenty grains of the bromide of potassium, with fifteen drops of the tincture of gelsemium sempervirens and a drachm of the fluid extract of ergot, in half an ounce of cinnamon water, every third hour. The injection of morphia is to be repeated at intervals of eight hours, if necessary, until a grain has been administered. Relief is promised in twenty-four hours; if it fail to occur,

[1] Gaz. d. hôp., Par., 1858, p. 106.
[2] Pathology and Treatment of Gonorrhœa, fourth edition, p. 221.
[3] The italics are in the original.

discontinue the injections and apply a narrow blister on either thigh, directly over the femoral vessels. (Lancet, Lond.)

Pulsatilla.—Drs. Piffard and Fox, of New York, have confidence in this drug, much used by the homœopaths in the treatment of epididymitis. On inquiry, I learn that they give one-tenth of a drop of the "mother tincture" every one or two hours, and they state that the pain is speedily removed.[1] I have used it myself in this manner in a number of cases with very good effect, though sometimes it fails.

Blood-letting.—Venesection in epididymitis is, of course, a thing of the past. The application of leeches to the scrotum has also been well nigh abandoned. They may be called for, however, when the inflammation wholly or chiefly involves the cord, and should then be placed directly over the external abdominal ring.

Ice.—The application of ice has been recommended by several authorities, and especially by M. Diday;[2] but, according to this author, in order to be successful, it must be done with true French precision. The following are his directions: Two hogs' bladders are to be soaked for a few minutes, in order to soften them and make them pliant. Introduce into each, through their openings, enlarged by a stroke of the scissors, four or five pieces of ice as large as a goose's egg. Before tying the necks of the bladders, thoroughly expel the air from them, so that they will the better adapt themselves to the surfaces to which they are to be applied.

An excellent substitute for the hog's bladder is a bag of thin India-rubber, made expressly for this purpose and sold by surgical instrument makers.

The scrotum should, of course, be elevated by a sling bandage or otherwise. Beneath it is to be placed one of these bladders filled with ice, at the same time protecting the thighs and perinæum from the "impression of cold" by the interposition of napkins. The second bladder naturally goes on top, and is to be extended as far as the inguinal ring.

To enter farther into the details given by M. Diday seems unnecessary, since they are such as will suggest themselves to any one with common sense, unless it is important to mention that "the ice should be renewed when melted!"

According to M. Diday, the ice should remain on constantly, night and day, for at least eighteen hours, but in the majority of cases the application for forty-eight consecutive hours is required. After its removal we are to taper off with the application of cold, wet cloths, lest the return to the natural heat of these parts should cause too great a shock! This method, it is stated, will supersede all others, even in the most desperate cases of swelled testicle.

Judging from our personal experience, or rather from our personal

[1] See Med. Rec. N. Y. of January 12, 1878, p. 39. Also, same Journal for March 16, 1878. Still more recently Dr. F. R. Sturgis has written in favor of this drug (The Med. and Surg. Brief, July, 1878).

[2] Ann. de derm. et syph., Par., 1869.

observation, the use of cold applications, and especially of ice, in the manner recommended by our highly respected friend, M. Diday, will be found to be of value in some cases of gonorrhœal epididymitis, especially at the outset of the attack; but they will prove, in the majority of instances, insufficient. One rule as to their continuance is enough: if they do not afford relief within two hours, leave them off and seek other means.

Poultices.—If cold fails, then heat may be tried in the form of hot poultices—an old-fashioned mode of treatment, to be sure, but one which is doubtless of service in some cases when the patient is unwilling to submit to puncture of the tunica vaginalis. In these poultices, tobacco found a legitimate use. An ounce or so of "fine cut" was to be mixed in half a pint of hot water, which was brought to the boiling point, while stirring the mixture and adding gradually ground flaxseed or ground elm-bark, so as to give it the proper consistency. The poultice should be large enough to envelop the whole testicle; its surface be covered by a layer of thin muslin upon which laudanum may be sprinkled, and a piece of oil-silk applied over the outer surface to protect the bed-clothes. Poultices of tansy, stramonium, hyoscyamus, and belladonna, have also been recommended; while Besnier (*Bull. gén de thérap;* Par., *fev.* 1870) advises that the scrotum, carefully elevated, should be continuously enveloped by compresses saturated in a concentrated infusion of the leaves of digitalis, applied either hot or cold as may be pleasant to the patient.

Strapping the testicle.—This procedure is much less used now than formerly. It was first suggested by Dr. Fricke,[1] of Hamburg, and is sometimes called by his name. It is only applicable after the swelling has been reduced, the pain dissipated, and when the parts will bear gentle handling. When an indolent swelling remains and absorption is tardy, I not unfrequently resort to it. The rubber adhesive plaster, or the mercurial plaster prepared by Seabury and Johnson, of New York, is far more cleanly than the ordinary adhesive plaster; or, when a sedative effect is also desired, we may employ a mixture of two parts of adhesive plaster with one of extract of belladonna, spread upon thin leather.

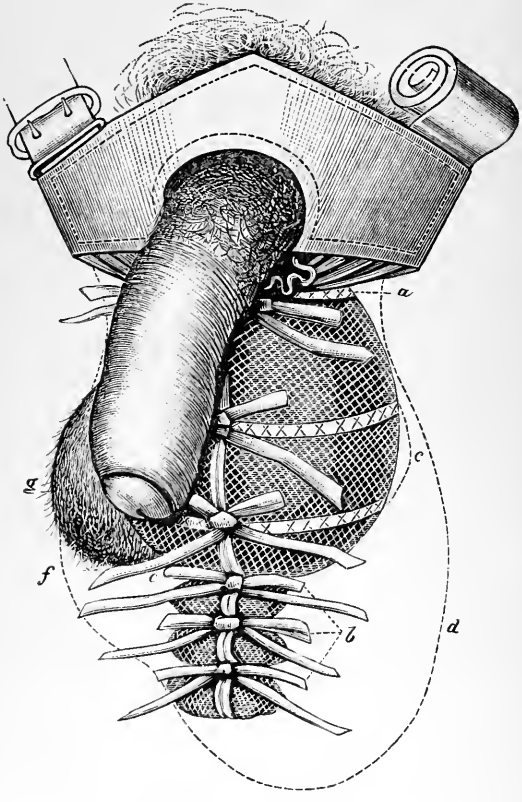
Before applying the plaster, the hair should be carefully removed from the scrotum with a razor or scissors. The plaster is to be cut into strips about three-quarters of an inch in width. The testicle is now to be pressed down to the lower portion of the sac, and held there by the thumb and forefinger of the left hand, while a strip is placed firmly round the affected side of the scrotum, just below the abdominal ring. Successive strips are added, each one overlapping the preceding for one-third its width, and care being taken that they all fit smoothly, until all but the bottom of the testicle is enveloped; the latter should be covered with strips applied longitudinally, like the bottom of a wicker basket, and finally the whole is to be secured by a long narrow strip carried circularly several times around the tumor. In the course of from twelve to twenty-four hours,

[1] Ztschr. f. d. ges. Med., Hamb., 1836. Translation in Brit. and For. M. Rev., Lond., 1836, vol. i. p. 253.

the plaster will be found to be loosened by the decrease of the swelling, when it should be removed and fresh strips applied. The compression should be continued until the testis has nearly returned to its normal dimensions, and in the meantime the parts still be supported by a bandage. Cullerier states that strapping the testicle has been entirely abandoned in France.

Prof. Thiry, of Brussels, the most eminent syphilographer of Belgium, has been publishing a long series of lectures on gonorrhœal epididymitis in the *Presse méd. belge.*, 1876-7, in which he strongly advocates the well nigh abandoned strapping. He claims that it has fallen into disuse,

Fig. 39.



Miliano's compressive suspensorium.

chiefly because it has been reserved for the stage of decline after the inflammatory symptoms have subsided, while, in his opinion, the time for its application is the "*période de stade*," i. e., when the inflammation has fully reached its height. When called to a case, he first ascertains if the general febrile disturbance has subsided, and any trouble in the digestive organs has disappeared. If not, he gives an emetic, "which soon makes

that all right," and proceeds at once to strapping. He, however, rejects all plasters for this purpose, and uses only narrow strips of muslin which are made to envelop the testicle in six to eight layers. The mode of application is about the same as that in general use, except that each strip when applied is finally to be brought back to the strip encircling the neck of the scrotum. The whole is retained in place by spreading starch-paste on the last two layers applied.

Dr. G. Miliano accomplishes compression of the inflamed testicle by a suspensory bandage, that can be gradually tightened as the testicle diminishes in size. The accompanying wood-cut will explain itself.

Antimoninal frictions.—This method was introduced in Strasbourg, by M. Michel, in 1865. It consists in making minute punctures along the cord from the scrotum to the external abdominal ring, and then repeatedly rubbing in an antimonial ointment (*pommade d' Autenrieth*),[1] until pustules appear, the coalescence of which, however, should be avoided, lest ugly cicatrices result. The pain is said to cease in forty-eight hours, and a cure to be effected toward the end of thirty days. I think we can beat that!

Solutions of nitrate of Silver.—Fourneux Jordan[2] treats epididymitis by the application to the affected side of the scrotum of a solution of nitrate of silver (℥ij ad Aquæ ℥j) followed by gentle pressure.

Dr. Marc Girard applies to the affected testicle lint soaked in a solution of nitrate of silver, one part to one hundred of water. In five cases treated in this way, at the military Hospital of Gand. the pain ceased in about twenty-four hours, and the average length of treatment was six days. "The mode of action of the remedy is unknown ; it is not by revulsion, since it does not cause any pain but merely a pleasant sensation of heat, and it does no more to the skin than slightly discolor it." (*Arch. méd. belges, Brux.*, août, 1870.)

Collodion and ether.—The application of collodion to the scrotum as a means of compression, suggested by M. Bonnafont, was a subject of discussion before the Academy of Medicine in Paris, in 1854, and a trial was made of it by Ricord and others, who reported against it. Dr. Assadorian[3] recommends the local application of sulphuric ether, a piece of lint kept constantly wet with this fluid being laid over the inflamed testicle and cord, and the bed-clothes being elevated by a hoop, so as to favor free evaporation.

Punctures.—I have already spoken of the multiple punctures proposed by Velpeau, and expressed my confidence in them for the relief of swelled testicle, no matter how small the quantity of fluid contained within the tunica vaginalis. This procedure, which is also highly recommended by

[1] ℞. Antimonii et Potassii Tartratis, . . one part.
Axungiæ benzoatæ . . . . . three parts.
M.

[2] Brit. M. J., Lond., quoted in N. York J. M., Oct., 1869, p. 63.

[3] Am. J. Syph. and Derm., vol. i, p. 216.

Cullerier, is, I believe, sufficient for the relief of all cases, without resort to any deeper incision.

The late M. Vidal (de Cassis) revived an operation which is said to have originated with a French surgeon by the name of Petit, who published a work on venereal in 1812. This operation is simply an extension into the substance of the testicle of the incisions recommended by Velpeau. Vidal states that he first employed these incisions in swelled testicle when the body of the testicle was involved, to which form of the disease he gives the name of parenchymatous orchitis. His design was, by dividing the tunica albuginea to relieve the constriction exercised by this fibrous tunic upon its inflamed contents. Finding, as he says, that the operation was unattended by any unpleasant result, and that it relieved the pain and hastened resolution, he extended it to the more frequent cases in which the epididymis is alone attacked, and found the effect equally favorable. In his work on venereal, this author states that he has performed this operation with impunity in four hundred cases, and claims for it preference to all other modes of treatment. His directions as to the manner of performing it are to incise the tunica albuginea with a bistoury or lancet passed through the scrotum and tunica vaginalis, to the extent of six-tenths of an inch (*un centimètre et demi*), and to penetrate the parenchyma of the testicle to the depth of less than three-tenths of an inch (*de moins de moitié*). Only one puncture of this kind is to be made. In spite of M. Vidal's testimony in its favor, we can hardly believe this operation entirely devoid of danger, especially since the report of four cases observed by a single surgeon, M. Demarquay, in which the substance of the testicle gradually oozed from the incision in filaments, and in three of which the testicle was totally lost.[1] Salleron gives two similar cases.[2] Diday also reports two cases in which atrophy of the testicle followed Vidal's incision.[3] If resorted to at all, it should probably be reserved for those cases in which it was first used, viz., where the body of the testicle is extensively implicated.

Mr. Henry Smith,[4] surgeon to King's College Hospital, London, has advocated the same treatment by incision into the body of the testicle, and states that he has met "with results which have astonished himself and his numerous pupils." Mr. Smith's recommendation has excited a lively discussion in some of the London medical journals.

Numerous other topical remedies have been recommended in gonorrhœal epididymitis, but many of them are not worthy of mention. Inunctions of mercurial ointment upon the scrotum may relieve the pain, but are liable to cause salivation. They may be used with caution in those cases in which the acute symptoms have subsided, leaving chronic engorgement of the epididymis.

[1] Brit. and For. Med.-Chir. Rev., American edition, April, 1859, from the Bul. gén. de thérap., Par., tome lv, p. 549.

[2] Arch. gén. de méd., Fev. 1870.

[3] Ann. de derm. et syph., Par., 1869.

[4] Lancet, Lond., 1864.

The late Prof. W. Boeck, of Christiania, spoke highly of a curious mode of treatment, viz., the injection of a few drops of a solution of nitrate of silver into the prostatic urethra, and stated that the pain and swelling were thus relieved in twenty-four hours, provided they were not dependent upon effusion into the tunica vaginalis. (Oral Com.)

Dr. L. D. Waterman, of Indianapolis, reports[1] a plan of treatment which he states has been eminently successful in his hands and others. He administers internally acetate of potassa with acetate of morphia, the latter so graduated as to secure full, but not excessive, anodyne effects. Locally, he employs a liniment composed of

Tinct. Iodinii,	Tinct. Opii,	
Aq. Ammoniæ,	Ol. Olivæ.	M.

The proportions of the iodine and ammonia are so graduated that, when a woollen cloth, saturated hourly with the liniment, is kept constantly applied to the scrotum, the effect will be bearable and only cause half blistering of the skin or exfoliation, with a stinging sensation for a short time after application. The pain is said to cease, sometimes in three hours, always within twenty-four, and the effusion to be rapidly absorbed without tapping.

Iodoform.—Dr. Julian Alvarez,[2] of Palma, Majorca, reports four cases of epididymitis, successfully treated by the application of iodoform ointment. He claims that this agent calms the pain in the course of one or two hours; that it exercises a very marked resolvent action, and materially shortens the duration of the disease. He uses, according to the intensity of the inflammation, an ointment containing one to two grammes of iodoform to the ounce of lard.

In a similar manner, iodoform has for several years been used with very satisfactory results, at the Charity Hospital, Blackwell's Island, where it was first proposed by Dr. R. W. Taylor. One drachm of iodoform mixed with one ounce of glycerine is painted upon the testicle, which is to be enveloped in lint and covered with oil-silk or India-rubber tissue.

The induration of the epididymis, which is usually left behind after the subsidence of the acute symptoms of an attack of swelled testicle, will sometimes disappear spontaneously. If, however, it is inclined to persist, the earlier it is attacked the better, for the chances of success are certainly superior while the plastic material is not yet fully organized. If the indurated epididymis is still abnormally sensitive to pressure, the application of a few leeches over the cord, repeated several times at intervals of a few days, will be found of service. A small quantity of mercurial ointment should be rubbed into the scrotum morning and night, and the genital organs should be well supported by a suspensory bandage.

Another local application worthy of trial is the iodide of lead ointment, or an ointment of iodoform, one scruple to half an ounce of lard, the

[1] Practitioner, Lond., November, 1876, p. 334.

[2] Independ. med., Barcel., June 1, 1877.

strength of which may be increased: the latter especially has proved of service in our hands. The application should be made directly over the indurated mass. Much is to be expected also from the internal administration of iodide of potassium, which is so powerful an agent in resolving inflammatory products generally.

It is impossible to say how old an induration of the epididymis can be treated with hopes of success. M. Gosselin's cases show that it may disappear after existing for several months, and it is not improbable that a cure may be effected after a much longer period. Where the epididymis on both sides is affected, the attempt should certainly be made, especially if the patient is young and intends to marry. It is a serious question whether the surgeon should inform him of the impotency which his disease may entail, since the effect upon his mind might possibly be most disastrous.

CHAPTER XI.

HYDROCELE.

By the term hydrocele we understand a serous effusion into the cavity of the tunica vaginalis, producing more or less distention of the scrotal sac. Upon examination we find a pear-shaped tumor, having its base at the bottom of the scrotum, and its apex directed towards the external abdominal ring. The size of the tumor of course varies with the amount of effusion; it is firm and elastic, and on its anterior surface fluctuation may be made out, while posteriorly we encounter the hard, firm body of the testicle, which has the characteristic sensation upon pressure. The walls of the scrotum are tense, and the superficial veins are distended. There is absolute dulness on percussion of the tumor. The crucial test in making a diagnosis is the familiar "light test." Looking at the tumor through a cylinder of paper, or shading the eye with the hands, the light being held on the opposite side of the scrotum, distinct translucency may be observed anteriorly, while posteriorly the opaque body of the testis is detected. In chronic cases the "light test" may be inapplicable on account of the thickening of the tunica vaginalis. Owing to the diffusion of the rays of light in the fluid the testicle always seems much smaller than we expect to find it. In somewhat rare cases we find the testis situated anteriorly and at the upper part of the tumor, the tunica vaginalis being placed posteriorly. If any doubt remains as to the character of the tumor, puncture with a hypodermic needle may be resorted to.

The fluid of hydrocele usually has a pale straw color, and is highly albuminous. It has been found of a dark brown, of a greenish color, and even black. It sometimes contains a small quantity of cholesterine, and in a few instances spermatozoa have been found in it. After exposure to the air the fluid sometimes separates into distinct layers, and it has been found to coagulate on the addition of blood.

In recent cases very little change is found in the structure of the tunica vaginalis, although if the effusion takes place rapidly, or in large quantity, the tunica may be much thinned. In old cases, however, the tunica becomes very much thickened, and may interfere with the translucency of the tumor, and in quite rare cases it undergoes calcareous degeneration. The testis is generally unaffected, but in chronic cases may become atrophied. Cysts have been found projecting from its surface into the cavity of the tunica vaginalis. The hydrocele is sometimes divided into compartments by adhesions between the surfaces of the tunica.

The causes of hydrocele are various. It sometimes occurs as a complication of general dropsy, especially in broken down subjects. It frequently

accompanies varicocele, probably as a result of the impediment to the circulation. The etiology of hydrocele has been carefully studied by Panas and Vétault,[1] who think it is generally due to inflammation of the epididymis. In the latter, the efferent vessels of the testis are often compressed by newly-formed fibrous tissue to such a degree as to produce effusion into the tunica vaginalis. In many cases of acute and of chronic orchitis effusion takes place, which is very often absorbed, but frequently remains. It is stated by some authors that hydrocele is frequent in very warm climates, perhaps owing to the relaxation of the scrotum.

The diagnosis of hydrocele is generally quite easy. Its slow development, its beginning at the bottom of the scrotum, its pyriform shape, and its painless character are presumptive symptoms, while all doubt may be removed by the use of the light-test. Some cases of incarcerated hernia resemble it somewhat, but the following table of diagnostic points, taken from Van Buren and Keyes's valuable work, presents clearly the distinguishing features of the two affections.

Hydrocele.	Incarcerated Hernia.
1. Largest below.	1. Largest above.
2. Commences gradually.	2. Comes on suddenly.
3. Commences at the bottom of the scrotum and grows up.	3. Commences at the external ring and grows down.
4. Is tense and fluctuating.	4. Is usually doughy.
5. Cord can be made out (normal) above tumor.	5. Cord cannot be distinguished, or is felt as a distinct tumor.
6. Testicle cannot be found.	6. Testicle can usually be separated from tumor posteriorly.
7. Dulness on percussion.	7. Resonance on percussion (unless hernia be omental).
8. Tumor heavy, but movable.	8. Tumor unwieldy.
9. Reduction impossible.	9. Reduction impossible.
10. Size usually constant.	10. Size usually varies at short intervals.

The translucency of hydrocele always establishes the diagnosis between it and solid tumors of the testis, resulting from syphilis, cancer, or tubercular deposits.

Treatment.—The treatment of hydrocele may be palliative or radical; by the former we merely remove the fluid, by the latter we hope to prevent its reformation. Although it has been claimed that absorption of the fluid may be secured by means of electrolysis, experience has shown this method to be uncertain as well as impracticable. Acupuncture is open to the serious objection that it often fails to completely evacuate the fluid: moreover it does not prevent relapse, and it is often followed by excessive inflammation. This method is used by some in the hydrocele of young children, which may often be cured merely by external stimulation with tincture of iodine.

[1] Considérations ètiologiques sur l'hydrocèle des adultes. Paris, 1872.

Tapping of the tunica vaginalis with a fine trocar is the best way to remove the fluid. The instrument should be inserted slightly upwards as well as inwards, care being taken to avoid large veins of the scrotum. The scrotum should be held tense with the left hand when the instrument is plunged into the tumor, and the canula must fit the trocar perfectly, else it may push the tunica vaginalis before it, rather than pierce it. The operation may end after withdrawal of the fluid; but if we aim at a radical cure, we inject, with a syringe closely fitting the canula, about two drachms of tincture of iodine, which should be brought into contact with all parts of the tunica by manipulating the scrotum. The injection may then be allowed to run out, although usually only a few drops escape. The after-treatment consists of rest and the application of a cooling lotion to relieve excessive pain. The reaction is sometimes very slight, while in other cases it is very marked. In the majority of cases this operation produces a radical cure, but it certainly fails in some instances.

Of late years the operation proposed by Volkmann has found favor with most surgeons. It should be performed with great care and always by the antiseptic method. It consists in opening the tunica vaginalis by an incision throughout its entire length. The incised edge of the scrotum is then stitched to the corresponding edge of the tunica and the wound is left open exposing the cavity. This seldom fails to give a radical cure. The operation of passing threads of silk through the scrotum is not now looked upon with favor, since it is frequently followed by severe inflammation, and sometimes by sloughing of the scrotum, while it is not always successful. In old men, particularly if they are in poor health, a few days of rest should always be enjoined after tapping a hydrocele. In case the tumor is very large it may be well to draw off only a portion of the fluid at the first operation, which may be repeated in a few days.

Congenital Hydrocele.

This affection is due to incomplete obliteration of the canal which forms a communication between the tunica vaginalis and the peritoneal cavity.

The shape of the tumor differs from that of a hydrocele in the adult, being oblong rather than pyriform, and extending up into the external abdominal ring. The fluid may by pressure be displaced into the abdominal cavity, where it was probably originally secreted; this may be accomplished with more or less ease according as the opening from the tunica vaginalis is large or small. In a case mentioned by Curling this could not be fully accomplished after manipulating the tumor for fifty minutes. The testicle can be readily felt after the hydrocele has been thus emptied. In this form of hydrocele there is marked impulse on coughing. The tumor is translucent, and dull on percussion, unless, as is sometimes the case, a hernia coexists.

The treatment of this affection consists in the application of a nicely fitting truss over the neck of the sac, which soon becomes obliterated. Usually the fluid is gradually absorbed at the same time, but the process

may be hastened by the local use of tincture of iodine. The injection of iodine into the cavity of the hydrocele has been practised by some surgeons without bad results, care having been taken to compress the neck of the sac. In other cases, however, fatal peritonitis has followed this operation: it should therefore not be employed until communication with the abdominal cavity is entirely cut off.

Encysted Hydrocele of the Testis.

There are two varieties of this kind of hydrocele, one arising from the epididymis and the other from the body of the testicle. Either variety may be complicated by hydrocele of the tunica vaginalis. According to Gosselin, Luschka, and Curling, these cysts are of two kinds, subserous and parenchymatous, or small and large.

The covering or walls of the subserous cysts, which are superficial, are composed simply of stretched serous membrane, while the walls of the parenchymatous, which are developed in the connective tissue, are dense and firm. The subserous cysts are usually multiple, and are found above and around the head of the epididymis; they are generally about the size of a pea. They contain a clear, pellucid fluid, which is sometimes of a milky hue; spermatozoa are never found in the fluid. These cysts sometimes become fused together, and form a single large one, having a pedunculated base; they never have any connection with the efferent tubes of the testis and rarely cause any uneasiness. Occasionally, when very old, these small cysts have such thick walls as to be mistaken for solid tumors.

The large cysts, according to Curling, are usually found "below the head of the epididymis, close to the anterior extremity of its lower border. They are formed in the connective tissue beneath the investing membrane of the epididymis and in close contact with the efferent tubes." These have received the name of *encysted hydrocele* of the epididymis. The epididymis is flattened and displaced laterally, while the testis is found below, in front of, or at the side of the cyst, very rarely behind it. Mr. Curling gives an illustration of a striking case of this form of cyst, which was distinctly sacculated. The contained fluid is slightly albuminous, colorless and sometimes contains an abundance of molecules. Curling states that this form of cyst is liable to inflammation, when the fluid becomes albuminous and of a straw color; the cysts may even become lined with a false membrane. Spermatozoa are not infrequently found in the fluid. Regarding the doubtful origin of these bodies, Mr. Paget says "that certain cysts seated near the organ, which naturally secretes the material for semen, may possess the power of secreting a similar fluid." Curling however, does not accept this view. In his opinion, the thin walls of the sac being in close proximity with the efferent tubes, which are likewise of slight texture, a rupture occurs allowing the spermatozoa to pass into the cyst. Being merely an accident, he thinks the term *spermatic* hydrocele is improperly applied to this condition.

Cysts springing only from the body of the testis are quite rare. They are due to effusion between the tunica albuginea and the deeper layer of the tunica vaginalis. Occasionally a cyst is seated partly upon the epididymis and partly upon the testicle. The walls of a recent cyst are thin and translucent; as the cyst grows older, its walls become thick, dense and fibrous, sometimes even containing spiculæ of bone, and becoming lined with false membrane. The fluid is at first pellucid, but after a time it assumes a yellow or even a deep brown color.

Diagnosis.—Encysted hydrocele of the epididymis is usually recognized from the position and number of the cysts. In cases of doubt, especially when the cysts are hard and firm, the introduction of a hypodermic needle will determine whether they contain fluid. The difference in shape between these large cysts and hydrocele of the tunica vaginalis is an important point, while the position of the testicle at the bottom of the tumor confirms the suspicion of large encysted hydrocele.

In some cases, however, on account of abnormalities in position, a positive diagnosis can only be made by drawing off some of the fluid, which is generally pellucid or milky, rather than straw colored. Translucency and fluctuation are additional points in the diagnosis.

Treatment.—The small encysted hydrocele seldom requires any attention, unless it tends to increase in size or become painful, when the fluid may be drawn off with a hypodermic needle or by acupuncture. This operation sometimes gives permanent relief, but may need to be repeated. Large cysts should be tapped separately, and injected. Sometimes the tapping and injection of a single cyst causes subsidence of all the rest. Although the seton has been used with success, it sometimes causes violent inflammation and abscess. Volkmann's operation may be employed after failure of tapping.

Hydrocele of the Spermatic Cord.

There are two varieties of hydrocele of the cord, the diffused and the encysted.

The *diffused* form is merely a serous infiltration into the loose and abundant connective tissue of the cord. The first clear description of the lesion was given by Pott. "In general, while it is of moderate size, the state of it is as follows: the scrotal bag is free from all appearance of disease, except that when the skin is not congested it seems rather fuller, and hangs rather lower on that side than on the other; and, if suspended lightly in the palm of the hand, feels heavier; the testicle with its epididymis is to be felt perfectly distinct below this fulness, neither enlarged nor in any manner altered from its natural state; the spermatic process is considerably larger than it ought to be, and feels like a varix or like an omental hernia, according to the different sizes of the tumor; it has a pyramidal kind of form, broader at the bottom than at the top; by gentle and continued pressure it seems gradually to recede or go up, but drops down again immediately upon removing the pressure, and that as freely

in a supine as in an erect posture. It is attended with a very small degree of pain or uneasiness, which uneasiness is not felt where the tumefaction is, but in the loins. If the extravasation be confined to what is called the spermatic process, the opening in the tendon of the abdominal muscle is not at all dilated, and the process passing through it may be very distinctly felt; but if the cellular membrane, which invests the spermatic vessels within the abdomen, be affected, the tendinous aperture is enlarged, and the increased size of the distended membrane passing through it produces to the touch a sensation not very unlike that of an omental rupture." Curling says that the tumor is at first cylindrical, and becomes pyramidal as it enlarges. The penis, in this affection, is never retracted, as it is in vaginal hydrocele.

This form of hydrocele may be mistaken for a hernia. The latter often passes into the abdomen when the patient lies down, while the former is but slightly if at all displaced. The swelling of hydrocele is firmer, though doughy, and fluctuating; a hernia, moreover, unless it be omental, is resonant on percussion. The impulse on coughing in hernia is quite different from the very slight downward movement of the enlarged cord in hydrocele. In hernia the cord can always be traced of normal size from the testis to the ring. Scarpa calls attention to the resemblance of this form of hydrocele to an irreducible epiplocele, and to the necessity of caution in operating.

The treatment consists in making small punctures at the most dependent part of the tumor, and in subsequently maintaining pressure. Large incisions are dangerous, and unnecessary.

Encysted hydrocele of the cord occurs most commonly in infants. It forms slowly and without pain, and may reach the size of an egg before being seen by the surgeon. It is distinctly circumscribed, round or oval, translucent, firmly attached to the spermatic cord, movable upon firm traction, and not involving the overlying skin. It is firm in consistence, and but slightly fluctuating.

There is seldom more than one tumor, but we sometimes find a series of tumors extending from the testis to the external abdominal ring. When occurring in infancy, the lesion may result from imprisonment of a congenital hydrocele; in adults, however, it originates in the same manner as do the hydroceles of the epididymis. The cyst wall is usually thin and fibrous, but in chronic cases it becomes very thick and tough. The fluid contents of the cyst are colorless, or have a pale straw color, and sometimes spermatozoa are found.

These cysts may be seated at any part of the cord; those of the epididymis are sometimes wrongly considered cysts of the cord. When the latter are seated near the external abdominal ring, the diagnosis may be very difficult, otherwise it is generally easy. The character and situation of the tumor, and its mobility with the cord and testis, are usually distinctive. The danger of mistaking hernia for encysted hydrocele may be avoided by observing the uniform size of the latter, its circumscribed con-

dition, its translucency, and the absence of impulse on coughing, and of the gurgling characteristic of rupture.

In children this affection usually disappears spontaneously. The process of absorption may be hastened, if desirable, by counter-irritation with tincture of iodine. Withdrawal of the fluid and subsequent pressure sometimes produces a perfect cure. Acupuncture has been found of service, while incisions and the seton are liable to cause excessive inflammation. In very obstinate cases, injection of the tincture of iodine may be resorted to.

CHAPTER XII.

HEMATOCELE.

The term hematocele is applied to swellings of the testis or of the cord, caused by effusion of blood. We shall adopt Curling's division of its varieties as the best.

Hematocele of the Testis.—Hematocele of the testis may be either *vaginal*, in which the effusion takes place into the tunica vaginalis, or *encysted*, when blood is effused into cysts of the testis. Either of these forms may have been preceded by hydrocele. Although some authors have doubted the occurrence of vaginal hematocele, independent of other disease of the parts, others are convinced that it does take place as a result of puncture, blows, or any injury. Under such conditions it may be called *traumatic* hematocele in distinction from the *spontaneous* form, which occurs in cases of blood dyscrasia and vascular degeneration inducing rupture of the vessels.

Traumatic hematocele is usually developed very rapidly; the testis becomes enlarged, hard, and painful, and the scrotum may be œdematous or the seat of blood-effusion. There is usually more or less constitutional disturbance and pain from the tension of the parts. The effused blood often acts as a foreign body, causing suppurative inflammation. Again, the blood may coagulate as it does in aneurism. Thus the course of the affection is sometimes severe and, on the contrary, when the effusion is moderate, very little trouble is experienced.

The development of spontaneous hematocele is slow and unattended with severe symptoms.

The shape of the tumor in vaginal hematocele is similar to that of vaginal hydrocele, while that of encysted hematocele varies; the testicle in the latter being found below the tumor. Translucency is not found in any form of hematocele.

The *diagnosis* of traumatic hematocele is generally clear, the history of the case and the local condition indicating its nature. The spontaneous variety is often mistaken for a solid tumor, and frequently the diagnosis can be reached only by making an exploring puncture.

Treatment.—The patient must be placed upon his back, the scrotum elevated and bathed with cooling lotions. Free purgation is often beneficial, and anodynes may be required to relieve the pain. In mild cases improvement begins in a few days, and but little suffering is experienced. In other cases the effusion continues, and the tension must finally be relieved by puncture. The contents of the cavity should be completely

drawn off, and the scrotum be well suspended. Should the cavity become refilled, the operation must be repeated. In some cases, after entire cessation of the inflammation, iodine may be injected as in hydrocele. When the clots are very firm, it may be necessary to make a free incision and thoroughly cleanse the cavity of the sac, antiseptic precautions being observed in the operation and in the subsequent treatment.

HEMATOCELE OF THE CORD.—Hematocele of the cord is very rare, and may occur in a *diffused* or in an *encysted* form. Our knowledge of this lesion is largely due to the observations of Mr. Pott.

Diffused hematocele occurs quite suddenly from rupture of a spermatic vein during violent exertion, as in lifting a heavy weight, or in consequence of a blow on the parts, or during the act of copulation (Maunder). The swelling is usually cylindrical, extending from the upper part of the scrotum to the external ring, and may attain very large proportions. The parts lying over the tumor are unaffected, unless the lesion is a result of contusion.

The *symptoms* are sometimes slight and sometimes severe. On palpation the tumor is found to be firm, but doughy, with ill-defined outlines. The course of diffused hematocele of the cord is, under favorable circumstances, towards gradual subsidence; in some instances severe inflammatory action is set up. Ultimately the cord is left in a normal condition, or perhaps a little thickened.

The *diagnosis* of this affection usually offers no difficulty. The history, position, and general features of the swelling are unmistakable. An important point is the absence of impulse on coughing.

Encysted hematocele of the cord is very rare, and is due to effusion of blood into a cyst in consequence of injury.

Treatment.—The first indications are to prevent inflammation by the use of the ordinary methods. Subsequently puncture followed by pressure will effect a cure.

CHAPTER XIII.

VARICOCELE.

The term varicocele is used to denote a varicose condition of the spermatic veins. Usually, it is a very mild affection, and occurs on an average in about ten per cent. of all male subjects. It is developed slowly and painlessly, and the first discovery of the patient is a mass within the scrotum which presents the sensation of a bundle of worms. In many cases this increase in the size of the veins is very slight and scarcely worthy of attention; in others, it is so large as to constitute a serious deformity. Again, in exceptional instances the development of varicocele is more rapid, and attended with more or less discomfort. The symptoms, even in well-marked cases, vary within considerable limits; while some patients seem to suffer no inconvenience, others complain of a dull aching and dragging sensation, and some also suffer from pain in the groin, loins, and even in the lumbar region. These sensations are most commonly experienced during walking or active exercise, and they wholly cease when the patient lies down. As a general rule, varicocele occurs only on the left side, though some enlargement and tortuosity has been found in the veins of the right side. Various reasons are given for the constancy of occurrence of varicocele on the left side. The main cause probably lies in the fact that the left spermatic vein empties at right angles into the corresponding renal vein. Further, the left spermatic vein may sometimes be pressed upon by the sigmoid flexure distended by fecal accumulation. Whether our modern method of dressing has any influence in causing enlargement of the veins of the left side of the scrotum is yet an unsettled question. Certainly, any tumor in the groin, particularly when seated in or near the external ring, is liable to press on these veins and produce varicocele. Various other causes have been thought to induce this condition. For instance, it is stated by some authors that ungratified sexual desire, excessive venery and masturbation are important factors in its cause. Our own opinion is that as predisposing causes these perhaps may be considered as somewhat influential, since any condition which tends to induce engorgement of the spermatic vessels is of course liable to aggravate this condition and perhaps even to lead to its development. In our own experience we have usually seen the mild congestion of the spermatic veins of continent young men speedily pass away after marriage. Varicocele very often occasions more or less mental suffering to some patients afflicted with it. Some regard it as the result of masturbation practised in early years, and fear that it will ultimately lead to impotence, while in others again its existence causes the most gloomy thoughts, which sometimes end in

well marked hypochondriasis. Varicocele is an affection mostly seen in young men, and it rarely, if ever, occurs in the later years of life. In some rare instances it coexists with a varicose condition of the veins of the legs, but the latter condition very frequently occurs without varicocele. The affection consists in excessive development of the veins, the walls of which become thickened by cell increase, and are subsequently the seat of fatty change, and, in some cases, even of calcareous degeneration. Phlebolites are sometimes found within them, while in general their valves are wholly effaced, and their walls much thinned. Certain secondary changes in parts in connection with the spermatic veins often follow varicocele. For instance, under the influence of the presence of the venous tumor the scrotum sometimes becomes more or less redundant and relaxed, and its walls are much thinned. In such instances the power of the ductor muscle is more or less impaired. Further, in very chronic cases, atrophy of the testes is a not uncommon sequela, while early in the course of varicocele it is not unusual to find a slightly congested condition of this organ, due of course to the impediment to the return circulation. As a result of these changes it often happens that ultimately the testicle grows gradually smaller until in some cases it is reduced to the size of a pea, and sometimes it seems wholly absorbed. Hydrocele is another not infrequent complication, but it is always of a subacute character, and usually not very extensive.

The diagnosis of varicocele offers no difficulties whatever, as the most superficial examination reveals the worm-like mass within the scrotum.

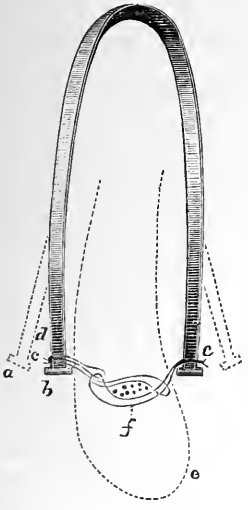
TREATMENT.—The treatment of varicocele is either palliative or radical. The former consists simply in the use of means which relieve the patient temporarily of the inconveniences of the affection. Of these the most important is the use of a properly fitting suspensory bandage, by which the scrotum is kept up. One of the best forms of suspensory is that devised by the late Mr. Morgan of Dublin. "This consists of a piece of webbing $4\frac{1}{2}$ inches long, $3\frac{1}{2}$ inches wide at one end, 4 inches at the other, and gradually tapering to the narrower end. A piece of thick lead wire is stitched in the rim of the smaller end, two tapes sewn along the entire length of the webbing, and the sides furnished with neat hooks, a lace and a good tongue of chamois leather. When the suspender has been applied to the testicle the tapes are to be attached to an abdominal belt. The size may vary more or less. The lead wire encircling the lower end gives a foundation to the general means of support and keeps the testes within the bag; the patient can mould it more or less to his convenience, and it need not be worn at night." Much benefit results from frequent bathing of the parts in cold water, and in all cases constipation

Fig. 40.

Morgan's suspender.

must be avoided. Whereas in many cases these simple measures are sufficient, there are some which require surgical interference. The most varied procedures have been recommended for the relief of this condition, but we shall only mention those which are most efficacious, and attended with the least danger and trouble, for with many of them there is a certain amount of risk. Since the introduction of antiseptic methods in surgery the old operation of excision of a portion of the vein has been revived. This consists in the removal of about an inch of the vessel just below the external ring, after the application of a ligature of carbolized cat-gut above and below the part excised. This operation, however, even when thus performed, is not always successful, and is sometimes attended with bad results. The operations of Ricord and Vidal are now never used. The aim of all operations is the occlusion of the veins, which is very often accomplished in a perfect manner by a procedure advocated by Mr. Henry Lee, and which is performed as follows: grasping the scrotum of the affected side, we easily eliminate, owing to its cord-like feel, the vas deferens, and insert the ends of the forefinger and thumb behind the bundle of veins—thus bringing a scrotal fold together, through which a needle is passed and then a figure-of-eight ligature quite firmly applied over it, not so tightly, however, as to cut the skin. A second needle is passed through the scrotum in the same manner about an inch lower down, and then the veins are divided subcutaneously with a tenotomy knife. This incision may be done at the same time that the needles are inserted, or a day or two later. This operation has the confidence of many prominent surgeons especially in England. Another operation has been performed by Mr. John Wood of King's College, London. This consists simply in the introduction subcutaneously of a double wire noose, while compression is produced by a metallic spring until division occurs. This operation has been modified by Dr. R. F. Weir, of New York, and will be best understood by reference to the accompanying figure. Dr. Weir's assistant says: "In Wood's operation, tension upon the wire passed around the veins is made by a spring shaped like a horse-shoe, one arm of which, by means of a short foot-piece, rests against the scrotum, and through it the wires pass to be attached to the other arm of the spring. The effect of the pressure is to bury the foot-piece in the tissues of the scrotum and to give rise to an abscess. To secure the same traction upon the encircling wires, Dr. Weir uses, it will be seen, a steel bent spring, the ends of which do not, however, touch the scrotum, but stretch, by its elasticity, wires (*c c*) passed after Ricord's method around the veins (*f*). Moreover, instead of leaving the wire in, as suggested by

Fig. 41.



Weir's varicocele spring.

Wood, until it cuts its way out, it has been found by experience best, after eight or ten days, to remove the wires, as by that time a sufficient amount of inflammatory action will have been excited to obliterate the veins satisfactorily. Inasmuch as this removal is attended at times with considerable difficulty, Dr. Weir has adopted the plan, which originated at St. Luke's Hospital, of passing a reserve wire (*d*) through one of the loops before the latter is drawn around the veins, so that when the encircling wire of one side is cut loose from the spring, the imbedded portion can be readily withdrawn from the other side by means of this same reserve wire, and then the remaining wire, being thus set free, can also be removed without difficulty."

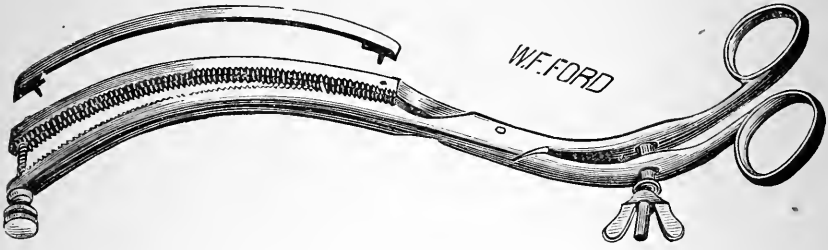
In the cases thus treated the wires were in this way removed on the seventh and eighth days respectively, with satisfactory results, as the patients have been examined since and no relapse has occurred. Another method of treatment advocated by Dr. Weir is rather more simple, and is performed as follows: A small incision having been made at the upper part of the scrotum, a ligature of carbolized catgut is passed around the veins, avoiding the other parts, and brought out of the same opening and then tied and cut off short. This ligature being left in place, the wound is treated very carefully by the antiseptic method and heals, leaving the veins thus thoroughly obliterated, and the ligature is absorbed.

A very simple operation has been used by Prof. T. M. Markoe, and for many years has been attended with success and never with any bad result. It is performed as follows: Grasp the cord well above the mass of enlarged veins and, separating with the finger and thumb the vas deferens from the vein-trunks, pass a good-sized needle, armed with silver wire, between the vas and the veins, bringing out the needle on the back part of the scrotum. Drawing the wire partly through, return the needle by the same opening, passing it now from the back to the front and outside of both vas and veins, and bringing it out on the front at the point of entrance. By drawing on the wire we have the veins surrounded by a loop from which the vas has been excluded. A piece of sheet lead of an oval form, two inches long and one inch wide, made very smooth at its edges and bent slightly concave in its long diameter, so as to apply itself to the neck of the scrotum, should be ready, with a good-sized hole in its centre through which the wires are to be passed, care being taken that the wires do not cross each other. A roll of sticking plaster about an inch long and as large as a quill should now be laid on the outside of the lead plate, so that the wires can be drawn and twisted over it. By drawing well home the loop of wire and twisting it over the roll of adhesive plaster, the veins are firmly inclosed, and the force of compression can be increased from day to day by further twisting of the wire. As this twisting process, however, is apt to break the wire if carried too far or repeated too often, it is better to use a small wedge of pine wood above and below the wire, pushed in between the lead and the roll of sticking plaster. By this means all necessary pressure is secured; the veins can be obliterated in a few days and the wires removed, or the pressure can be kept up for ten or

fifteen days, within which time the wire will probably cut through. Either plan is effectual, but as the apparatus usually gives no pain and excites no inflammation, it is perhaps better to let the wires cut through. The removal of the wires is perfectly easy if care has been taken not to cross them in passing them through the lead plate.

Of late years the operation originally advocated by Sir Astley Cooper, of ablation of a portion of the scrotum, has found favor with some of the prominent New York surgeons, particularly in the cases of varicocele complicated with redundancy of the scrotum. For the performance of this operation we require a pair of clamps and, in an emergency, the straight blades of a long and heavy pair of scissors will suffice. The best instrument, however—and there are several clamps used—is that devised by Dr. Henry, and called the scrotal forceps. It consists of two double curved blades made of steel, ten inches long, sufficiently heavy to give strength and admit of pressure without injury. The handles are large enough to admit the finger and thumb readily. The lower half of the instrument below the joint is fenestrated in both blades; the coapting surfaces are evenly notched to prevent the parts from slipping. The fenestra afford the

Fig. 42.



Scrotal clamp.

surgeon the facility of inserting all the ligatures before dividing the parts, if he so desires. The thickness of the upper blade from the line of insertion of the ligatures leaves ample tissue for healing to take place before they cut through. The curve of the blades is that necessary to be given to the incision, which must be rounded at the ends, otherwise there are two teat-like prominences. The screws are sufficiently heavy to give firmness and evenness of pressure. The extra blade is made of steel, nickel-plated, and is maintained in the lower blade of the forceps by two small pins and the slight tension put on the spring of the metal. It is easily inserted and as readily thrown off by elevation with the thumb-nail. The mode of operation is very simple. It is well to first adapt the forceps when the patient is in the erect position, as a better idea is gained of the amount of scrotum to be excised and of the proposed line of incision. Care must be taken that only the scrotum is included between the blades. An anæsthetic having been given, the forceps are held in the median line, and the parts are cut off on their convex border by means of a strong pair of scissors curved on the flat. The object of the extra blade is to

leave a small rim of scrotal tissue, beyond the blade proper, in which the continuous suture may be applied. In our experience this amount of tissue does not allow the sutures to be placed deeply enough, a point which must never be forgotten, since the traction of the ductor muscle is considerable and the success of the operation depends largely upon the continuous coaptation of the lips of the wound. It is well, therefore, to always use the extra blade and insert the sutures—using, preferably, the interrupted—about half an inch apart, after the patient is anæsthetized and before the ablation is performed. Care must be taken to check hemorrhage; to prevent it, the operation should not be hurriedly performed, and the patient should be watched for some time afterwards. In general, acupressure needles and *serre-fines* are the only appliances necessary to control hemorrhage. After the operation, a band of adhesive plaster may be applied around the base of the scrotum, while a number of narrow strips of the same, about two inches long, may be placed between the sutures. Then, the parts being supported by a pad of oakum, which is renewed from time to time, the wound may be covered with a strip of lint saturated in a ten per cent. solution of carbolic acid. The subsequent treatment is upon general principles. In favorable cases union occurs by first intention within a few days, while in other cases it is delayed as long as a fortnight. Occasionally the healing process is attended with certain complications such as a varying amount of infiltration of serum or blood into the scrotal tissues, or one or more abscesses. Secondary hemorrhage may also occur, and occasionally causes considerable trouble. Erysipelas rarely occurs when the operation is done upon a healthy subject, though it is to be feared in persons suffering from any constitutional dyscrasia, such as Bright's disease and chronic alcoholism. Of course such an operation is wholly inadmissible in patients in the early and active stages of syphilis and in those of the hemorrhagic diathesis. Surgeons are not of one mind as to the final result of this operation: some think it merely palliative, others radically curative. Our own opinion is that in most cases it produces a cure, while, in some, subsequent elongation of the scrotum certainly does occur. The propriety of performing it, therefore, depends upon the nature of the case and other circumstances connected with it.

CHAPTER XIV.

GONORRHŒAL PROSTATITIS.

Acute Prostatitis.

Acute prostatitis may be due to violence from sounds, catheters, or lithotrity instruments; to the application of caustics to the deeper portions of the urethra; to stricture, the irritation of a stone in the bladder, or a fragment of a stone impacted in the prostatic urethra; to immoderate coitus, or excessive purgation; yet by far the most frequent cause is urethral gonorrhœa.

Gonorrhœal prostatitis owes its origin to the extension of the inflammation from the urethral walls to the substance of the prostate gland; it occurs, therefore, at a time when the disease has invaded the deeper portions of the canal, and is consequently rare during the first two weeks, resembling in this respect its more frequent congener, gonorrhœal epididymitis. The accessory causes of the last mentioned disease, viz., highly irritant injections, forcible distention of the urethra in using a syringe, excessive exercise, alcoholic stimulants, exposure to cold and wet, and venery, may also contribute to the production of prostatitis. There is little ground for believing that this affection is occasioned by the use of copaiba and cubebs, although the contrary has been asserted.

If we inquire into the pathology of this affection, we shall find that the first effect of the gonorrhœal inflammation was exercised upon the mucous membrane of the prostatic urethra, and upon the underlying cellular tissue surrounding the gland. In this manner the size of the organ is increased; it encroaches upon the urethra and interferes with the passage of the urine; it may be felt to be of unusual dimensions by examination *per anum*, when its sensitiveness will also be noticed. The inflammation next involves the prostatic follicles, whose secretion is thereby increased and takes the place in a great measure of the urethral discharge from the meatus, which diminishes or entirely disappears on the occurrence of the prostatitis. The prostatic secretion is readily recognized by its thin, viscid, white-of-an-egg-like character.

If the inflammation proceed to the suppurative stage, a number of these follicles, or perhaps all of them, become filled with pus distending their walls, and as many little abscesses are formed as there are follicles involved, which may subsequently coalesce and unite into one single abscess, with dimensions corresponding to the greater or less amount of the organ invaded. There is never, then, at the outset one abscess of considerable size. Such occurs only by the coalescence of a number of small ones

seated in the follicles. Meanwhile, the muscular tissue, which constitutes so large a portion of the prostate gland, is unaffected, except that it is in a constant state of contraction, thereby inducing urethral and rectal tenesmus.

The prostate is most intimately related anatomically with the urethra, and it is into this passage, therefore, that an abscess most frequently breaks, sometimes by one, sometimes by several openings. If only a portion of the organ has been involved, the remainder may retain its integrity; the entrance of urine into the cavity does not appear to be attended with the evil consequences which have been feared. The evacuation and closure of the abscess leave a cicatrix, and the function of the gland may eventually be unimpaired. It will be observed that under these circumstances—a prostatic abscess opening only into the urethra—the abscess is confined within the fibrous capsule of the gland, and is from first to last strictly *intra-prostatic.*

Far otherwise is it when the abscess breaks in any other direction, for then the surrounding cellular tissue is infiltrated; and we have besides an *intra-prostatic* a *peri-prostatic* abscess, capable of much greater mischief than the former. But of this more anon.

Symptoms.—The earliest symptom of an attack of prostatitis is commonly a sensation of weight or a dull pain in the perinæum. There is not that vesical tenesmus which we find in cystitis, but the exit of the urine is obstructed by the swollen gland, and the calls to micturate will be frequent and urgent simply because the bladder is never fully emptied of its contents, and a short time suffices to fill it to distention. The stream is generally quite small, is only forced out by prolonged straining, and ex-excites a severe scalding sensation in the deeper portion of the canal. Complete retention of urine often occurs, requiring the use of the catheter. The bowels are commonly constipated, although the patient is constantly led by a feeling of fullness in the rectum to make fruitless efforts at stool; and should defecation take place, the act excites severe pain. The system at large sympathizes with the local trouble, and general febrile excitement ensues. Exploration of the prostate by the finger in the rectum reveals abnormal sensibility, increase of temperature, and tumefaction of this organ proportioned to the severity of the disease. On attempting to introduce a catheter, it meets with an obstruction in the prostatic urethra, and, before entering the bladder, its point deviates to one side or the other in an opposite direction from the lobe of the organ involved. If the middle portion of the prostate is the chief seat of the inflammation, the introduction of a catheter may be impossible or can only be effected by force. Both rectal and urethral exploration are attended with extreme suffering to the patient.

A majority of cases of acute prostatitis terminate in resolution; the minority in suppuration. The formation of matter is not always announced by well marked symptoms, but may be strongly suspected if, after the disease has been increasing in intensity for eight or ten days, the patient is seized with repeated chills followed by fever and general depression. It

is possible, however, for an abscess to form without affording the least reason to suspect it. A case occurred at St. George's Hospital, under the care of Dr. Pitman, in which prostatitis supervened upon an attack of gonorrhœa, and terminated in suppuration and death of the patient, with entire absence of rigors and the ordinary symptoms of abscess. At the post-mortem examination, an extensive abscess, which had not been suspected during life, was found between the bladder and rectum.[1]

If the abscess be deeply seated in the gland, tending to point towards the rectum, a soft fluctuating tumor can be felt in the region of the prostate by the finger introduced into the gut, especially if the gland be immovably fixed by a sound in the urethra. An abscess in the neighborhood of the urethra is more difficult of detection, except from its encroachment upon the canal, and its interference with the exit of urine and the introduction of a catheter.

A prostatic abscess most frequently breaks upon the side of the urethra during the efforts of the patient to expel the urine or feces, or it is often perforated by the point of an instrument introduced for the purpose of exploration or catheterization. With the bursting of the abscess, the patient experiences delightful relief from his sufferings; his urine once more flows naturally, and his febrile symptoms soon disappear.

In those cases before referred to, in which the rupture takes place in another direction than the urethral, the point of exit of the matter varies. Sometimes it opens into the bladder, probably when the peri-prostatic abscess is seated chiefly above and behind the prostate. Its escape into the rectum is, however, more frequent; and although this event is much less favorable than a urethral opening, since it allows of the entrance of fecal matter from the gut, and although a rectal fistula may remain for some time, yet the latter accident is rare, and these cases usually turn out well in the end. Sometimes communication is established both with the bladder and rectum, forming a recto-vesical fistula, in which case the urine may trickle into the rectum on each act of micturition, and, if the patient is troubled with flatus, the "wind" may be heard gurgling through the urine contained in the bladder.

But, having gained access to the ischio-rectal fossa, these abscesses may make their way in various directions and appear on the surface at points far distant from the seat of their origin. Thus the matter may point in the perinæum, or extend to the scrotum, and even to the sheath of the penis. Guyon reports one case in which the abscess pointed in the left thigh, and another just below the false ribs. I had a case in which prostatitis was set up by the introduction of a sound for seminal emissions, and fistulous openings formed in the perinæum and just below the groin. The patient ultimately recovered, married, and had children. Béraud[2] cites a case in which the pus followed the course of the vas deferens and appeared in the inguinal fold.

[1] Lancet, Lond. Am. ed., January, 1861, p. 69.
[2] Mal. de la prostate, Thèse, 1857.

Diagnosis.—Acute prostatitis is chiefly liable to be confounded with cystitis. It is not likely that any one would confound prostatitis with inflammation of Cowper's glands, which presents such different characters.

Treatment.—The appearance, during an attack of gonorrhœa, of symptoms of prostatitis, should lead the surgeon at once to abandon the use of injections, and, neglecting the urethral discharge for a time, to direct his whole attention to the more serious affection which has supervened. The patient should now observe the most perfect rest and quietude. If the symptoms be severe, from six to a dozen leeches may be applied to the perinæum, and be followed by a hot bath at the temperature of one hundred degrees, which may be repeated with benefit several times in the twenty-four hours. It is very doubtful, however, whether any decided benefit really ensues from the application of leeches either to the perinæum or within the rectum, as recommended by some authors. In the intervals of the baths, the perinæum should be covered with hot fomentations or poultices.

In place, however, of the above classic treatment of acute prostatitis by means of hot applications, the contrary course of introducing ice into the rectum, as will be mentioned in the next chapter on cystitis, is worthy of a trial. In this, as in many other affections, both heat and cold may find their appropriate application.

Internally we may resort to those remedies, as the salts of potash and soda, which are supposed to render the urine more dilute and mild in its character. A mixture of mucilage, bicarbonate of potash, and hyoscyamus, is well adapted for the treatment of the disease we are now considering. The diet should be light, consisting of gruel, mucilaginous drinks, milk, and farinaceous substances, at least in the early stages of the disease; at a more advanced period, and after suppuration has taken place, our utmost efforts may be required to sustain the strength of the patient by a nourishing diet and even tonics. The bowels should be opened daily either by warm enemata or by a dose of castor oil.

Sleep should be secured by the exhibition of a Dover's powder at night. Mr. Adams speaks highly of warm enemata, consisting of four or five ounces of simple water or gruel, administered at bedtime, which are said to afford comfort to the patient, and to act as a fomentation to the inflamed gland.

Complete retention of urine will require evacuation of the bladder by means of a flexible catheter, or pneumatic aspiration above the pubes. When an abscess has formed and fluctuation can be distinctly felt by the finger in the rectum, it should be punctured through the intestinal wall. Tarnowski prefers to make a careful opening from the perinæum, so as to avoid communication with the rectum and the entrance of fecal matter into the cavity of the abscess. Diday also favors an opening in this situation. When the collection of matter is most prominent towards the urethra, it may sometimes be opened by a conical sound introduced as far as the prostatic portion of the canal, while a finger within the rectum presses the tumor against the point of the instrument. This attempt, however, is by no means free from danger, and should never be made, unless the

symptoms are urgent and the existence of matter in the neighborhood of the urethra is highly probable.

When the abscess has opened into the rectum, warm water should be injected after each passage of the stools, so as to remove any fecal matter which may have lodged in the fistula, and also to favor the exit of the puriform secretion.

Mr. Milton treats prostatitis by the free application of water, as hot as it can be borne, to the perinæum; orders tartar emetic in large doses, or, if the patient object to this, small doses of calomel or hydrargyrum cum creta, a sedative every night, rest in bed, and very light diet. He believes in the administration of the iodide of potassium to get rid of any hardness remaining after the acute attack.

I may mention that iodoform, given internally or in form of suppository, is also used for the same purpose.

Chronic Prostatitis.

An acute attack of prostatitis may subside into a chronic form, or the latter may first appear in the course of a case of gleet, or as a result of onanism, excessive venereal indulgence, or sedentary habits. In its mildest form it has been described by Dr. Gross[1] and others under the name of "prostatorrhœa."

This affection is confined, at the outset at least, to the glandular elements of the prostate and their excretory ducts opening into the neighborhood of the caput gallinaginis. The mucous membrane is thickened, and more vascular than natural. The openings of the ducts are enlarged and filled with a lactescent, opaline liquid, which is in some cases mixed with pus.[2]

One of the most frequent and prominent symptoms of this affection is a discharge of clear and transparent, or sometimes turbid, mucus from the meatus, which is found by the microscope to consist of, first, morphous crystals of uric acid, or ammoniaco-magnesian phosphates; second, mucus-corpuscles; third, blood disks; and, fourth, epithelium cells, either with or without a few pus-corpuscles. The discharge may be almost constant in its appearance and sufficient in quantity to stain the linen; or more frequently it is forced from the urethra by the pressure of the hardened feces during straining at stool, and is not perceptible at any other time. Most patients suppose that it consists of semen, from which it may be distinguished under the microscope by the absence of spermatozoa. Very

[1] N. Am. M.-Chir. Rev., Phila., July, 1860. Dr. Gross describes this as a hitherto unknown affection under the name of "prostatorrhœa;" but his account of it corresponds in almost every particular with that given by Mr. Adams under the head of "Prostatitis from Onanism." The increased secretion of prostatic fluid is a mere symptom of irritation or inflammation of the gland, and it is, therefore, desirable that the term prostatitis should be retained.

[2] Picard, Mal. de la prostate, 1877.

many of the cases of spermatorrhœa so called are doubtless instances of this affection.

In most cases, the frequency of micturition is more or less increased; the stream of urine is ejected without force; the last drops dribble away, or are only expelled with considerable effort, and a scalding sensation is felt in the urethra during and after the act. Zeissl ascribes the dribbling away of the last drops of urine, and the undue moisture of the meatus after the act, to the "capillarity existing between the prostatic secretion collected in the urethra and the last drops of urine."

Pain and uneasy sensations are experienced in the perinæum, thighs, and lumbo-sacral regions; there is often great irritation about the anus attended by hemorrhoids or eczema; the bowels are constipated, and defecation difficult and painful; the passage of an instrument into the bladder excites severe pain as it passes through the prostatic region; on examination per anum, the gland is found to be tumefied, sensitive on pressure, and sometimes indurated. The patient is irritable and low-spirited; is incapable of mental or physical exertion; suffers from weakness, headache, and dyspepsia; watches his symptoms with the greatest anxiety; imagines that he is losing his memory, that he is impotent or affected with syphilis, and in short becomes a desperate hypochondriac.

Independently of its action upon the nervous system, chronic prostatitis is not a serious, although a very obstinate, disease, often persisting for years. During its continuance, the patient is especially exposed to acute inflammation of the prostate in consequence of excesses of any kind or of a fresh attack of clap; otherwise chronic prostatitis rarely terminates in suppuration. By its long duration, however, the mucous membrane of the vesical neck may become involved, giving rise to frequent calls to urinate, attended with straining, and the exit of blood at the close of the act as in gonorrhœal cystitis. Still further, in consequence of this constant straining, the muscular portion of the prostate may become hypertrophied in whole or in part, resulting in an increase in the size of the organ similar to that which takes place in old age; one or the other lobe or the whole prostate acquires a hard, almost stone-like consistency, and, on post-mortem examination, its tissue is found to be traversed by whitish, tense, and tough fibrous bands, while the glandular elements seem to have disappeared through atrophy. (Zeissl.)

Mr. Ledwich[1] had an opportunity, in two instances, of becoming acquainted with the pathology of this affection: "One case occurred at the age of eighteen, the second at thirty; both were well marked examples of the disease, and succumbed to phthisis, but this latter had no connection with the urethral affection. The prostato-vesical plexus was full, and many of its branches varicose; the capsule of the prostate adhered intimately to its surface, and, on slicing the gland, it seemed soft, with large, open, venous branches on the section, from which blood exuded, whilst the whole gland exhibited an augmented volume; the mucous membrane

[1] Dublin Q. J. M. Sc., Aug. 1, 1857, p. 30.

of its urethral aspect was *red*, *soft*, thickened, and *villous*, whilst the ducts could be distinguished with the unassisted eye; the uvula and trigonum vesicæ were red and turgid, but the remainder of the bladder was healthy. I examined with some anxiety for the presence of tubercular deposit in the gland, but, although this morbid condition was often anticipated, no evidence of any such structural lesion could be detected. The seminal ducts did not present any alteration as to size, their excretory orifices being discovered with the greatest difficulty, the vesiculæ seminales being full and swollen, but without any other abnormal appearance; scrofulous tubercles existed in the epididymis, yet the testicles, although soft and small, were otherwise healthy."

M. Bouloumié,[1] in numerous autopsies, "has found especially dilatation of the prostatic glands and numerous calculi of concentric stratification, but no muscular hypertrophy. Guerlain[2] mentions increased density and cohesion of the cellular tissue surrounding the gland, which he has seen infiltrated with pus forming an abscess around the organ, as also noticed by Sir Henry Thompson. (Picard.)

Treatment.—In most cases of chronic prostatitis, the patient is laboring under a combination of mental as well as physical symptoms, and the treatment must be directed to the mind equally with the body. It is not sufficient in these cases to dash off a hurried prescription and dismiss the patient after five minutes' conversation. The victim of mental more than physical suffering has for weeks, or even months, been brooding over his complaint during all his waking moments not absolutely necessary to his daily occupation, exaggerating each trifling symptom, entertaining the most gloomy forebodings of the future, and perhaps contemplating suicide. First of all, he needs a friend who can lead him, however reluctantly, to unburden his mind of its sorrow. This load removed, he at once feels lighter and more hopeful. The surgeon's first object, therefore, should be to gain his confidence by friendly yet manly conversation, lending a ready ear to the familiar story of the hypochondriac, encouraging him to feel that he has found a sympathizing friend as well as physician, and gradually and skilfully leading him from the depths of despondency to more rational views of his position and prospects in life.

One great source of anxiety to the patient is probably the idea that the transparent viscid discharge which appears during straining at stools, or is mingled with the last drops of urine, consists of semen. The surgeon is generally safe in assuring him of the contrary, without special examination, since diurnal spermatorrhœa without some degree of spasmodic action is exceedingly rare; but any doubt upon the subject may be removed by placing a drop of the fluid under the microscope, which will probably confirm his assurance by showing the absence of spermatozoa.

Most cases of chronic prostatitis require the administration of a tonic,

[1] Considérations générales sur la pathogénie des maladies de la prostate, Paris, 1874.

[2] Thèse de Paris, 1860.

as iron, of which the tincture of the chloride, in the dose of twenty drops after each meal, is one of the best preparations. I have also obtained favorable results from a solution of strychnia in dilute phosphoric acid:—

℞. Strychniæ gr. iss. 0 10
Acidi Phosphorici Diluti ℥iv . . . 125
Sig. A teaspoonful three times a day.

Ergot, either alone or combined with camphor, is another remedy which may often be employed to advantage.[1]

Chronic inflammation of the prostate is perpetuated by the constipated state of the bowels and consequent straining at stool which usually attends it, and which should, therefore, be obviated by laxatives or enemata; but aloes, which is a constituent of most of our officinal preparations for this purpose, should be avoided, on account of its well known tendency to produce congestion of the hemorrhoidal vessels. Saline cathartics may be administered in small doses in the morning on rising; but I much prefer enemata of cold water, taken immediately before the usual time of going to stool, which are followed by a loose evacuation unattended by straining, and which prevent the discharge of prostatic fluid.

Injections of a few drops of a solution of nitrate of silver—one to five grains to the ounce—into the prostatic sinus, by means of a deep urethral syringe, may prove serviceable. It is probable that many of the cures of "spermatorrhœa" by Lallemand with his *porte-caustique*, were in cases of mere prostatitis, but the use of his instrument is attended with no little danger. In cases complicated with gleet, astringent urethral injections may be required. The presence of strictures of large calibre in the straight portion of the canal should always be sought for, and if found they should be cut. Slitting up a small meatus, as recommended by Civiale and more recently by Dr. Otis, is found to have a decided influence upon affections at or near the neck of the bladder, partly by removing an obstruction to the free exit of urine and partly through reflex action.

Blistering the perinæum is also of very decided benefit in these cases. This is best done with cantharidal collodion, which is to be painted over a small surface upon either side of the raphé; and the application should be repeated over another spot as soon as the soreness of the first has begun to subside.

Moderate sexual indulgence is found to relieve the morbid irritability of the genital organs, and matrimony, when practicable, should be recommended to those who are single.

[1] See an article by Dr. C. L. Mitchell, on Ergot in Spermatorrhœa, Congestion, and Irritation of the Genital Organs in the Male; Am. M. Monthly, N. Y., April, 1861, p. 283.

CHAPTER XV.

INFLAMMATION OF THE BLADDER.

Cystitis is another complication of gonorrhœa, occurring as a consequence of the extension of the inflammation along the continuous mucous surface common to the urethra and bladder. It has also been attributed in rare instances to the gonorrhœal discharge finding its way, or being forced into the bladder, and there lighting up inflammation similar to that affecting the urethral walls. A case of this kind is reported in the *Arch. gén. de méd.*, Paris, tome xiii, p. 454, 1829, in which cystitis suddenly supervened after using a simple emollient injection. All those causes which aggravate the urethritis may concur in exciting cystitis, among which may be mentioned sexual intercourse, indulgence in alcoholic stimulants including malt liquors, fatigue, and the use of highly irritant injections. Persons who have suffered from hemorrhoids or hemorrhages from the rectum are especially exposed to it. Cystitis never occurs at the commencement of an attack of gonorrhœa, but usually after the third week or at a much later period, when the disease has invaded the deeper portions of the urethra.

Gonorrhœal cystitis may be said to be confined to the neck of the bladder. Instances of the whole internal surface being involved are denied by Fournier, although admitted as of rare occurrence by Zeissl and others.

The first symptom that attracts the attention of patients is a frequent call to micturate. This may occur every hour or so, or even every five or ten minutes. The call, too, is imperative, and if unattended to at once the urine will be passed in bed or within the pantaloons. At the same time there is a feeling of uneasiness, not amounting to actual pain, in the perinæum, and this is apparent chiefly at the commencement and at the close of micturition. This may be accompanied by a tickling or itching sensation at the head of the penis. The first portion of the urine that appears on urinating is often clear, but the last few drops that escape are mixed with pus and more or less blood, or a few drops of pure blood may alone appear. This appearance of blood at the close of the act is a valuable diagnostic sign of inflammation of the neck of the bladder.

Another valuable diagnostic sign, experienced at the same moment—the close of micturition—is *vesical tenesmus* often of the most painful and acute character, and which is probably due to spasmodic contraction of the vesical neck. At this time, in severe cases, there is a feeling of weight in the perinæum, which the patient endeavors to relieve by pressure at that point, and also by pinching the extremity of the penis. He feels as

if there were still a little urine left, and with great suffering manages to force out a few drops of muco-pus or blood, which scald the urethra in their passage. In some cases, the calls to urinate are so frequent as to amount to incontinence, and the patient passes a few drops every minute or two. As ordinarily met with in practice, however, cystitis of the neck is much milder in its character, and amounts simply to a frequent and imperative desire to urinate, accompanied perhaps with a small amount of tenesmus and the admixture of pus in the last drops passed.

A few other symptoms of gonorrhœal cystitis remain to be mentioned. The urine is acid and not alkaline, as is often erroneously stated. It becomes alkaline only when there is general inflammation of the bladder, and then in consequence of its fermentation when mixed with the vesical pus and mucus. Retention of urine, which we have seen to be frequent in prostatitis, is rare in cystitis. In many cases pressure above the pubes is not at all painful; in others there is a certain amount of sensitiveness, the difference being due, as is supposed, to the amount of urine in the bladder causing its distention or not. With the finger in the rectum, we find the prostate of normal size, but firm pressure, which is communicated to the vesical neck, may cause some uneasiness. The bowels in this affection are habitually constipated. The discharge from the urethra slackens or holds up during the continuance of the acute symptoms, but returns in full force as these subside.

Unlike prostatitis, gonorrhœal cystitis, except in severe cases, is attended by little or no general febrile reaction, but, as may well be imagined, getting out of bed every little while during the night to pass water, the consequent loss of sleep, the repeated attacks of pain and tenesmus, and the mental anxiety attending it all, are not conducive either to health or happiness, and patients lose their appetite and flesh, and become morose and irritable.

Fortunately the acute symptoms are of but short duration, terminating perhaps in three or four days, and rarely lasting more than eight to twelve.

It has been questioned, as by Fournier, whether the whole internal surface of the bladder ever becomes inflamed in consequence of the extension of gonorrhœal urethritis, although such an event, and even inflammation of the ureters and kidneys, has been reported. Dr. C. Murchison relates two fatal cases, one in a man and the other in a woman, of acute pyelitis and nephritis apparently consequent on gonorrhœa (Trans. Clinical Soc. of London, vol. ix, 1876, p. 25).

In rare instances cystitis of the neck may terminate in chronic cystitis, but the latter is generally due to other causes, as stricture of the urethra, hypertrophy of the prostate, the presence of stone or morbid growths in the bladder, disease of the kidneys, paralysis, etc.

The diagnosis between prostatitis and cystitis of the neck of the bladder will be rendered still clearer by the following table, which is borrowed from Fournier:—

Cystitis of the Neck of the Bladder.	Prostatitis.
I. Characteristic *vesical* tenesmus; frequent and imperative desire to urinate.	I. Vesical tenesmus much less. *Rectal* tenesmus more marked.
II. Micturition especially painful with the passage of the last drops of urine, when there is a characteristic convulsive contraction.	II. Nothing similar.
III. Toward the close of micturition, excretion of a thick fluid, a mixture of pus and blood; often also of pure blood.	III. Nothing similar. Urine normal.
IV. Mere perineal sensibility; pains radiating towards the anus much less violent than in prostatitis.	IV. Deep perineal pain, very acute, increased by motion, defecation, etc.
V. Prostate normal.	V. A very sensitive, hard, prostatic tumor is felt on rectal examination.
VI. No retention of urine.	VI. Dysuria. Retention of urine.
VII. Few or no general symptoms.	VII. General symptoms marked; fever, loss of appetite, etc.

Treatment.—Rest in the recumbent posture is of the first importance in the treatment of gonorrhœal cystitis, and it is well to place a pillow under the hips so as to elevate the pelvis and favor the return-flow of blood in the pelvic vessels. The frequency of micturition and the painful spasms which accompany the act constitute the most distressing symptoms, and these may often be greatly relieved by the introduction of pieces of ice in the rectum, as recommended by Horand.[1] To avoid injury to the rectal walls from the sharp edges of the ice, it should be inclosed in a thin piece of rubber or oil-silk, or better still a condom, and the latter should be well greased. The application should be renewed every hour or two.

In extreme cases, fortunately rare, the abstraction of blood from the perinæum by means of cups or leeches may be advisable. This region, however, and the internal surfaces of the thighs may be smeared with the extract of belladonna, rubbed up with glycerine. Further treatment consists in the internal administration of cold mucilaginous drinks, with the addition of the nitrate or bicarbonate of potassa and the fluid extract of hyoscyamus, given in small quantities at a time. Opium, although objectionable on account of its increasing the constipation, must often be given to relieve the pain, and the sulphate or acetate of morphia [gramme .015 (gr. $\frac{1}{4}$)], with the extract of belladonna [gramme .01 (gr. $\frac{1}{6}$)], in the form of suppository, is the best.

All urethral injections must be stopped and no attempt be made to introduce instruments except in the rare cases of retention. It remains to allude to a few other modes of treatment which have been recommended. Zeissl's favorite mixture for internal use is the following:

℞. Ext. Sem. Hyoscyami,
Ext. Cannabis Ind., āā gr. ij . . . . . 0|12
Sacch. alb., ʒj . . . . . 4|
M. et div. in ch. no. 8. One to be taken every three hours.

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[1] Emploi de la glace contre la cystite blenn., Lyon méd., t. xv., 1874, p. 214.

The use of the Balsamics, although favorably spoken of by Hunter, was at one time abandoned and indeed thought to be injurious, but has since been recommended by Baizeau,[1] Rollet,[2] and Fournier.[3] The last-named author says that copaiba sometimes calms the erethism of the vesical neck in a marvellous manner in a few hours, but adds that it often fails completely. Sir Henry Thompson[4] also speaks well of copaiba in some cases of chronic inflammation of the bladder, but says that the doses should be small, as five minims, and be given in mucilage three or four times a day.

In place of the ice above recommended in the acute stage, some authorities recommend poultices or hot fomentations over the hypogastrium, and hot baths. If the latter be employed, immersion of the whole body is preferable to sitz-baths. If there be general febrile disturbance, aconite should be given internally.

After the more acute symptoms have subsided, benefit will be derived from the internal use of cantharides, but it must be given in very minute doses, as, for instance, one drop of the tincture to an ounce of water, of which the patient is to take a teaspoonful three times a day. Stronger doses will only aggravate the trouble. A few drops of a tincture of chimaphila umbellata, administered in the same manner, has also been highly recommended.

[1] De la cystite hém. du col complicant l'uréthrite et de son traitement par les balsamiques. Gaz. d. hôp., Paris, 1861, p. 457.

[2] Traité des mal. vén., Paris, 1861, p. 314.

[3] Nouveau dict. de méd. et de chi. prat., t. v, p. 180.

[4] Diseases of the Urinary Organs, 3d ed., 1873, p. 199.

CHAPTER XVI.

GONORRHŒAL INFLAMMATION OF THE VESICULÆ SEMINALES.

Gonorrhœal Inflammation of the seminal vesicles has been described by several authors, as Cruveilhier, Andral, Mercier, Velpeau, Lallemand, Gosselin, and Prof. V. Pitha,[1] upon whom I must chiefly rely for its description.

It is unnecessary to dwell upon the mode of its occurrence, since this is so readily explained by extension of the inflammation from the urethra through the ejaculatory ducts. It may also be caused by any mechanical or other irritation of the prostatic portion of the urethra. The symptoms noticed by the patient are much the same as those of prostatitis. A constant dull, pressing pain is felt in the rectum, shooting from the neck of the bladder to the sacrum. This pain is increased by the passage of the feces, especially if they are hard; also by micturition, by erection of the penis, and above all by any attempt at coitus. The calls to defecation and micturition are frequent, and the latter is attended with dysuria. Erections of the penis are frequent and may amount to constant priapism. Involuntary emissions occur from time to time, which are excruciatingly painful, and the semen is found to be reddened with blood or of a yellowish color due to the admixture of pus. Even between the emissions a slimy secretion mixed with blood and pus may be discharged from the urethra, and, under the microscope, be found to contain spermatozoa.

"Bloody semen" is not an uncommon occurrence in men who have for some time suffered with a chronic gonorrhœa, or gleet. They usually discover it by the stains on their bedclothes after a wet dream, or by the color of the semen in a condom which they have worn *in coitu*, and they are naturally frightened by it. It does not always indicate that the vesiculæ seminales are involved, but shows that some inflammation still remains in the prostatic urethra or ejaculatory ducts. It is not serious, and often disappears spontaneously. Its appropriate treatment, if any be required, is a deep urethral injection of a few drops of a solution of nitrate of silver, either by the author's deep urethral syringe or by Guyon's method.

Physical examination is somewhat difficult; but with a long finger and some adroitness the vesiculæ seminales may be reached through the rectum. They lie directly above the prostate, not more than a finger's breadth apart,

[1] Handbuch der speciellen Pathologie und Therapie, redig. von Virchow, 6 Band, 2 Abtheilung, p. 132.

and one or both of them when inflamed may be felt as an oval, sensitive, hard or fluctuating tumor, which, with care, need not be mistaken for an abscess of the prostate. Pressure upon them excites a dull pain.

In some cases, this affection is said to be of short duration and to leave no traces behind it. In others, the cavity of the vesicula becomes enlarged, even to twice its normal size, and is transformed into a puriform sac, which may either break in the perinæum, giving rise to infiltration of the neighboring tissues and the formation of a fistula, or it may empty itself through the urethra. Again the walls of the vesicula may become ulcerated and the sac itself obliterated, in which case, according to Gosselin, the vas deferens and even the epididymis share the same fate.

When the acute inflammation terminates in a chronic form, we may have thickening and induration of the walls of the sac, with chalky deposits, or, especially in scrofulous subjects, deposits of true tubercle. Usually such tuberculosis accompanies a general affection of this character, but occasionally it is limited to the vesiculæ seminales, or at least to the urinary organs, especially the kidneys, in addition to the seminal vesicles.

Prof. V. Pitha reports a case in which the left kidney and the left vesicula were infiltrated with numerous coarse masses of tubercle, partly pulpy in the centre, and a portion of the prostate gland and the membranous part of the urethra were the seat of large tuberculous ulcers. The patient was a day-laborer, aged 50.

Velpeau observed a case in which vesiculitis terminated in an abscess, followed by peritonitis which proved fatal. (Tarnowsky, op. cit., p. 330.)

In spite of the nearness to each other of the two openings of the ejaculatory ducts, both vesiculæ are rarely attacked at the same time. If both are involved, resulting in such changes as those described, impotency must necessarily follow.

Inflammation of the vesiculæ seminales can rarely be diagnosticated with absolute certainty during life, and we can only say of its treatment that symptoms must be met as they occur, and that, in general, the same remedies are applicable as in prostatitis.

CHAPTER XVII.

GONORRHŒAL PERITONITIS AND SUBPERITONEAL ABSCESS IN THE MALE.

Only a few cases of these rare complications of gonorrhœa have ever been reported, and I am indebted for the material of this chapter to the valuable paper, appearing in the October and November numbers of the *Archives générales de médecine*, 1877, by Dr. A. Faucon, who reports a case of subperitoneal abscess occupying the internal portion of the internal iliac fossa, and extending upwards four fingers' breadth above the inguinal cord.

Instances of gonorrhœal peritonitis had before been reported or briefly referred to by Hunter,[1] Ricord,[2] Gosselin,[3] Dr. Peter,[4] and Godard;[5] one of perinephritic abscess, by Dr. Laforgue,[6] of Toulouse, all of them originating in the extension of the inflammation, first from the urethra to its annexes, and second, from the latter to the subperitoneal cellular tissue or to the peritoneum itself.

Dr. Faucon's conclusions at the close of his paper give a summary of what is known of this subject, and I shall quote them verbatim:—

1. Peritonitis and subperitoneal abscess should be ranked among the possible complications of gonorrhœa.

2. These accidents are only distant effects of the gonorrhœal inflammation, extending from the urethra to the peritoneum or the subperitoneal cellular tissue through the intervention of the vas deferens, vesiculæ seminales, the prostate (possibly the bladder, ureters, and kidneys), and the cellular tissue surrounding these organs.

3. Their appearance is, therefore, always preceded by the more ordinary complications of gonorrhœa, resulting from the preliminary inflammation of the tissues or organs which serve as intermedia (inflammation of the vas deferens, vesiculæ seminales, etc. etc.).

4. Gonorrhœal peritonitis may appear at different points; thus it has been seen to commence in the pelvic region opposite the recto-vesical *cul-de-sac*, while at other times it starts from the internal orifice of the inguinal canal.

5. It may remain localized at the point where it commenced, and

[1] Ricord and Hunter on Venereal (Bumstead's translation, 2d ed.), p. 90.
[2] Ibid., p. 96.
[3] Clinique chirurgicale de l'hôpital de la Charité, Paris, 1873, t. II, p. 364.
[4] Union méd., Paris, 1856.
[5] Gaz. méd. de Paris, 1856.
[6] Rev. méd de Toulouse, Dec., 1876, p. 355.

terminate favorably, or it may become general (or at least extend to a more or less considerable portion of the abdominal cavity), pass into a purulent stage, and result in death.

6. The gonorrhœal subperitoneal abscess has been observed in the lumbar fossa and at the lower portion of the internal iliac region, and of the anterior wall of the abdomen. It may terminate by resolution or by suppuration. Its influence is less mischievous than that of peritonitis.

7. When a subperitoneal abscess has formed, it should be opened as soon as possible. Decided antiphlogistic treatment, the prolonged use of ice and early incision may arrest its development and prevent its passage into suppuration.

CHAPTER XVIII.

GONORRHŒA IN WOMEN.

The mucous membrane of the genital organs is far more extensive in the female than in the male. Besides lining the urinary canal and the vulva—parts corresponding to the urethra and balano-preputial fold in man—it is continued over the walls of the vagina, where its surface is increased by numerous folds, and, reflected over the os tincæ, extends into the cavities of the cervix and body of the uterus. Any portion of this extensive surface may be attacked by catarrhal inflammation, which, according to its seat, is called gonorrhœa of the vulva, urethra, vagina, or uterus. Some of these parts are more frequently affected than others. Thus, gonorrhœa of the vagina is more common than that of the urethra or vulva, and gonorrhœa of the uterus is the least frequent of all. Zeissl states that, according to his observations, only about 5 cases of urethritis are met with to 100 cases of vaginitis. It is rare for all the different portions of the female genital organs to be attacked together, though two or more are, in many instances, combined as the seat of gonorrhœal inflammation. The manner of union appears to be chiefly determined by the anatomical relation of the parts. Thus, when the vulva is affected, the urethra and lower portion of the vagina are likely to be involved; while on the other hand, the upper part of the vagina and uterus are not infrequently implicated together.

Causes.—Gonorrhœa is a much less common disease in women than in men. This may be accounted for by several reasons. The mucous membrane of the vagina is less sensitive than that of the male urethra; it receives no little protection from the sebaceous and mucous secretions which constantly cover it: the size of the passage is such that it can be readily cleansed; and the urethra, in consequence of its being but very slightly concerned in the sexual act, and of the situation of its meatus, is less exposed to contagion. But another reason, and one perhaps of still greater weight, is to be found in the absence in men of those chronic discharges of simple origin, the presence of which in women is so fruitful a cause of urethritis in the opposite sex. When speaking of the causes of gonorrhœa in the male, I endeavored to show that it is frequently due to the irritation produced by a leucorrhœal discharge, by the menstrual flow, or by the normal secretions of the female genital organs. Women, in sexual intercourse, are not exposed to these exciting causes of gonorrhœa. In a condition of health, there is no secretion about the male genital organs capable of exciting inflammation in the female; while during the acute

stage of gonorrhœa the pain excited by turgescence of the penis is generally sufficient to deter from coitus, and even in cases of gleet, the amount of the discharge is so small, the urethra so frequently cleansed by the passage of urine, and the vagina so well protected by sebaceous matter, that intercourse may often take place without much exposure to the woman. Owing to these circumstances, women more frequently communicate than receive gonorrhœa.

It would seem to be a fair deduction from the foregoing, that, taking a given number of gonorrhœal cases in the two sexes, more are due to infection in women than in men; and such I think is unquestionably the fact. But while assigning to direct contagion the first place in the etiology of the gonorrhœa of women, other influences must not be overlooked. These, however, are less appreciable in the female than in the male. The history of women seeking advice for gonorrhœa can rarely be ascertained with certainty, or their disease traced with accuracy to its source. It is notorious that a woman often receives the embraces of several men within a short space of time, and there are many reasons for her concealing important facts which a man would readily confide to his physician. It is, therefore, only under peculiar circumstances that we can satisfactorily ascertain the origin of gonorrhœa in women; still, opportunities for such investigation do sometimes occur, and, in several which I have met with, it was evident that the disease was due to other causes than contagion. Thus, I have known intercourse with a healthy man to excite acute and extensive inflammation of the genital organs in women suffering from leucorrhœa and congestion of the cervix, especially if the stimulus of liquor was added to that of coitus. In such cases, chronic may readily be transformed into acute inflammation in the same way as a gleet in man may be changed into a clap. In some instances, I have had reason to believe that the frequent repetition of the sexual act has produced gonorrhœa in women free from any previous disease, and it is a well established fact that a purulent discharge sometimes follows the first exercise of marital rights, although there may have been no laceration of the female genital organs. The use of pessaries is also sometimes the cause of vaginitis, which has again been attributed to working on a sewing machine. In general, the causes of gonorrhœa in women, independently of contagion, may be enumerated as follows: Immoderate sexual intercourse, violence, masturbation, the presence of vegetations, syphilitic or other eruptions, errors of diet, ascarides in the rectum, and the external influences of cold, moisture, etc.

Certain conditions of the constitution at large, as chlorosis and scrofula, play an important part in the causation or maintenance (when first excited by other causes) of gonorrhœa in women, far more so, indeed, than they do in men.

Many women have, during pregnancy, a muco-purulent discharge, which usually makes its appearance after the fourth or fifth month, though sometimes before, and chiefly affects the upper portion of the vagina. An examination of the vaginal mucous membrane reveals the existence of nume-

rous granulations, similar to those observed also in some cases of vaginitis from contagion. Cazeaux states that this discharge may produce disorder of the digestive functions, as shown by the coexistence of gastralgia, which is more or less severe according to the intensity of the vaginitis.[1] The discharge usually disappears spontaneously after the termination of gestation.

Vaginitis may be attendant upon *scarlet fever*, or it may follow this and the other exanthemata as a sequela.[2]

Very *young girls* may be attacked with inflammation of the genital organs, producing a copious purulent discharge from the vulva, and sometimes from the vagina also, the cause of which has often been misapprehended. It has been supposed that the disease was contracted from men who had been seen to caress or fondle them, and innocent persons have been arrested and tried on this charge. No one in such cases has done more for the honor of our profession and for the cause of humanity than the late Mr. Wilde, of Dublin, who repeatedly came forward when the accused party was about to be convicted for an offence which he never committed, showed the groundlessness of the charge and proved his innocence. In most cases the discharges in question are no more venereal in their nature than the otorrhœa which is so common in children. Their predisposing cause is general cachexia, or, as it is commonly called, a strumous diathesis. The exciting cause may be deficient cleanliness, derangement of the digestive functions, the irritation of teething, and the presence of ascarides in the rectum, or within the vulva, where they may have found their way from the gut. Such discharges are contagious when applied to the ocular conjunctiva, and not less so, in all probability, if brought in contact with the genital organs of a second person; thereby proving that the contagiousness of gonorrhœal matter depends upon the seat of the disease, and not upon the presence of a specific poison necessarily transmitted from one individual to another.

Symptoms.—The initiatory symptoms of gonorrhœa in women are often obscured, in the rare instances afforded for their examination, by the previous existence of a leucorrhœal discharge. They do not differ from the early symptoms of inflammation of other mucous membranes, and consist in the gradual development of swelling, redness and tenderness, and an increase of, and change in, the secretion of the part. The discharge varies in consistency and color as in gonorrhœa in the male. It is at first transparent and mucous, then muco-purulent, and finally, when the disease has attained its height, thoroughly purulent. When secreted by the vagina, it is acid, fluent, creamy, and readily removed from the surface; when derived from the cavity of the cervix,[3] without being mixed with the acid

[1] Traité de l'art des accouchements, 4e édition, p. 317.

[2] Cormack, London Journal of Medicine, Sept. 1850, p. 872; and Barnes, Medical Gazette, July 12, 1850, p. 65.

[3] The most convenient method of collecting the cervical secretion for the purpose of examination, unmixed with the vaginal mucus, is by means of Lallemand's porte-caustique, uncharged.

matter of the vagina, it is alkaline, nearly transparent, tenacious like the white of egg, and very adhesive. Examined under the microscope, the vaginal secretion is found to consist of pus-corpuscles, mucus, an abundance of epithelial scales and flakes of epithelium in masses; while the viscid plug drawn from the cervix, which, as shown by Dr. Tyler Smith, is glandular in its structure, exhibits mucus-corpuscles, oil-globules, and purulent matter. The consistency and yellowish color of the vaginal secretion are dependent upon the quantity of organized elements it contains. The thicker it is, the more opaque, and the more resemblance it bears to cream or pus, the greater the quantity of pavement epithelium and pus-globules, as shown by the microscope.[1]

M. Donné has also called attention to the presence of a small infusorial animalcule which he at first supposed to be pathognomonic of gonorrhœal vaginitis. He has since renounced this opinion, but still asserts that the *Trichomonas* is not seen in healthy vaginal mucus, but only where there is a large admixture of pus-globules. Farther researches by Kölliker and Scanzoni[2] would show that it is never present in the secretion of the cervix, so that it cannot be a mere cell of ciliary epithelium, and these authors state that there can be no doubt of its independent animal nature. It was first found by them in pregnant women, and, after their attention was called to it, in more than half the women whom they examined. Hence it cannot be considered as characteristic of gonorrhœa. Still, it is never met with in perfectly healthy mucus, destitute of pus-globules. It appears to depend upon certain changes in the vaginal secretion, and is not developed to any extent except in mucus which is clearly abnormal.[3]

Traces of a discharge from the genital organs are to be sought for chiefly upon the posterior portion of a woman's linen, and not upon the anterior. The absence of any external evidence of disease does not, however, prove her sound, since the upper portion of the vagina may be inflamed and the secretion be retained within the vulva. The symptoms of gonorrhœa in women vary according to the part affected, and it is convenient to make a corresponding division in their description, recollecting, at the same time, that the different forms may be more or less combined in a given case.

Gonorrhœa of the vulva is less common than that of the vagina, and, in many cases, is secondary to the latter, being produced by contact with the discharge flowing from above. It is, however, often primary, and is that form which is commonly met with as the result of violence, or the presence of vegetations and syphilitic or other eruptions, as venereal ulcers, mucous patches, etc. The gonorrhœa of young girls, already referred to, is also, in most cases, vulvar.

The patient's attention is early attracted to the part by a sensation of

[1] Pathology and Treatment of Leucorrhœa, Phil. ed., 1855, p. 122.

[2] Das Secret d. Schleimhaut d. Vagina und des Cervix Uteri. Scanzoni's Beiträge, Bd. ii, p. 128. Wurzburg, 1855.

[3] Traité pratique des maladies des organes sexuelles de la femme, par F. W. de Scanzoni; traduit de l'Allemand, Paris, 1858, p. 452.

heat and pruritus. On examination, the mucous membrane is found to be reddened, tumefied, and more moist than natural. As the disease advances the discharge increases in quantity and becomes muco-purulent, or purulent, and very offensive. The labia and nymphæ may be swollen to such a degree as to render it almost impossible to expose the orifice of the vagina. If the nymphæ be naturally large, they may swell to such an extent as to protrude beyond the labia and become constricted; a condition which may be compared to paraphimosis. The mucous membrane may be deprived of its epithelium in patches, identical in character with the superficial excoriations of balanitis. The inflamed parts are exceedingly sensitive to the slightest touch or pressure, and motion is very painful. The last drops of urine fall upon the excoriated surface and give rise to severe scalding. The discharge collects in the hair on the mons veneris and upon the external surface of the labia, and flows upon the integument of the perinæum, and upon the upper portions of the thighs. Wherever it remains for any length of time it irritates and inflames the skin, which soon assumes an erythematous or even excoriated condition, and itself secretes an acrid humor. If the discharge comes in contact with the anus, as is very likely to occur when the patient lies upon the back, it may produce irritation of the rectum, attended with frequent desire to go to stool, pain on the passage of the feces, and sometimes slight diarrhœa.[1]

The sexual desires are often heightened, and amount at times to nymphomania, but coitus is attended with severe pain, if it even be possible. No other form of gonorrhœa in women equals this in the suffering which it occasions. This is partly owing to circumstances already mentioned, and partly also to the great sensibility possessed by the vulva in common with other outlets of mucous canals. The general system sometimes sympathizes with the local disease, and the patient is found to be hot and feverish. All cases of vulvar gonorrhœa are not, however, so severe as that just described. Instances occur in which there is but little redness, tumefaction, or sensibility, and merely an increase of the mucous secretion of the part; and the symptoms may vary all the way from this mild character to the intensity of the above description.

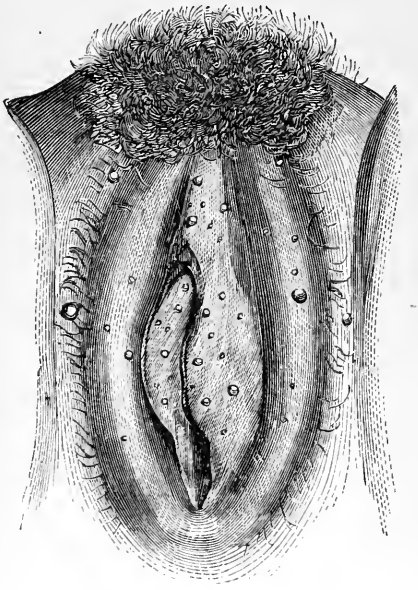
The anatomy and pathology of the glandular apparatus of the female genital organs have been admirably given by M. Huguier.[2] The vulva is abundantly supplied with sebaceous and muciparous follicles, which are lined by a prolongation of the mucous membrane. Travelling along this continuous surface the inflammation readily gains access to the interior of the follicles, which soon pour out a thick purulent secretion from their mouths. The follicles project from the surface of the mucous membrane, in the form of numerous small prominences with ulcerated tips from which the matter escapes. This is the "sebaceous or follicular vulvitis," so called by French authors.

The entrance to the vagina is also provided with two larger and more

[1] Baumès, Précis sur les maladies vénériennes, t. ii, p. 163.
[2] Mémoires de l'Académie de méd., 1850, p. 529.

deeply situated secretory organs, which, although noticed by several anatomists subsequent to the seventeenth century, were comparatively unknown up to quite a recent date. These glands were first discovered by Duverney in the cow, and afterwards by Bartholin in women, but, having been sought

Fig. 43.



Sebaceous vulvitis. (Huguier.)

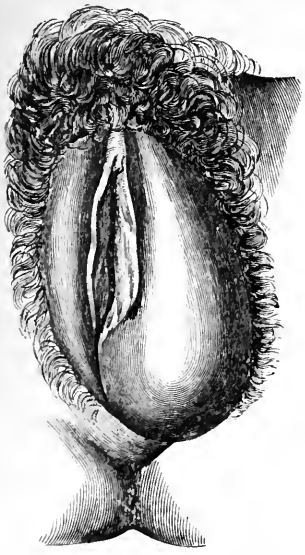
for in vain by Haller, they were entirely forgotten, until attention was again called to them, in 1840, by Tiedmann.[1] of Heidelberg, and by M. Huguier, of Paris, in 1850. They are now known by the name of Duverney's, Bartholin's, Cowper's, or the vulvo-vaginal glands. In a few rare cases they are said to be wanting. They are situated, one on either side of the entrance to the vagina, in the triangular space, bounded by the ascending ramus of the ischium, the vaginal orifice, and the transversalis perinæi muscle, and are covered by the superficial perineal fascia, and some fibres of the constrictor vaginæ. Their size varies in different subjects, and they appear to be largest in women addicted to sexual intercourse. When most developed their diameter usually measures about six-tenths of an inch. They are conglomerate glands, consisting of congeries of small tubes, surrounded by a common envelope, and during the act of coitus, pour out a copious secretion of albuminous fluid, by means of a duct six or seven lines in length, opening just in front of the hymen, or near the lateral and posterior caruncule myrtiformes, which often conceal the orifice.

[1] Von den Duverneyschen Drüsen ; Heidelberg, 1840.

The inflammatory process may invade this duct and the gland beyond it, in the same manner that it does the superficial follicles; and when suppuration has taken place, if the matter do not find free exit through the natural outlet of the gland, an abscess is formed either within the dilated duct, or in the substance of the gland itself; the former being generally the case when gonorrhœa is the exciting cause. The copious cellular tissue of the labium major surrounding the gland may also take on inflammation and an abscess form both within and without the gland, as we see occur in inflammatory buboes in the groin.

A frequent and peculiar feature of abscesses of this gland, is the facility with which, having once emptied themselves, they again fill up on the occurrence of any slight cause, as a return of the menstrual period, indulgence in sexual intercourse, exacerbation of the vulvar inflammation, etc. This circumstance has led some authors to the erroneous conclusion that these abscesses are surrounded by a true cystic wall, whereas their envelope continues to be, as at first, either the dilated duct or gland, which, to a certain extent, performs the office of a cyst. These glandular abscesses, however, may generally be recognized without much difficulty. The patient complains of a "swelling" in the vicinity of the vulva, which, on examination, is found to occupy the lower third of the labium, and borders upon the posterior commissure. The affected side is more prominent than its opposite, and the labium is pear-shaped, with its broader extremity directed backwards and inwards towards the median line; the integument on its external aspect preserves its normal color, and is free and movable, while the internal surface of mucous membrane is red and adherent to the tumor. The part is exceedingly sensitive to the touch, and the patient can neither walk, stand, nor sit, without difficulty, owing to the pain excited by the slightest pressure. The contents of the tumor are occasionally discharged through the normal duct of the gland, but usually, unless art intervene, the abscess bursts in the neighborhood of the glandular orifice, and very rarely on the external or integumental surface of the labium. M. Huguier contradicts the statement made by Vidal and other authors, that a recto-vaginal fistula is liable to form. This never occurs, according to the first named surgeon, if the rectum be in a sound condition. The frequent recurrence of abscesses of the vulvo-vaginal gland, or duct, is a source of great annoyance to women of the town, when suffering from chronic inflammation of the vulva.

Fig. 44.



Inflammation of the vulvo-vaginal gland.

Inflammation of Bartholin's gland may be caused by onanism in women who have never been entered, and also by syphilitic lesions in the neighborhood, although it is generally due to extension of the inflammation of vaginitis or vulvitis.

Dr. Salmon[1] has called attention to certain cases of gonorrhœa, in which the vulvo-vaginal gland and duct are alone affected, the remainder of the genito-urinary organs retaining their normal condition. According to this surgeon, the affection is quite common, and especially so among young prostitutes, in whom it would seem to be due to the irritation of coitus upon parts as yet tender. The patient experiences no pain or inconvenience, and an examination, such as is ordinarily made, might lead to the conclusion that the genital organs were sound; but if the labium, on one or both sides, be firmly pressed against the ramus of the ischium, the gland, which is not perceptible to the touch in a state of health, may be felt as a moderately firm tumor, and its muco-puriform contents escape from the orifice of the duct.

Some women of the town are said to learn the trick of performing this little manœuvre before being examined by a surgeon so as to conceal their disease. This may also explain some instances in which two men have connection with the same woman in rapid succession, and the first catches a clap but the second escapes. The first, by his pressure, evacuates the abscess and pays the penalty, while the other goes free (Zeissl). Dr. Salmon expresses the opinion that many cases of gonorrhœa in the male, following intercourse with women apparently healthy, are due simply to the puriform secretion furnished by this gland. Dr. Le Pileur has reported a very interesting and carefully observed case, in which a physician contracted a severe clap from a woman in whom no disease could be found except an abscess of the vulvo-vaginal gland.[2]

Vaginitis is more common than any other form of gonorrhœa in women. The whole extent or only a portion of this passage may be inflamed. The lower part is more or less implicated in most cases of vulvitis, while frequently the upper part is alone involved, and the woman might be supposed free from disease if not examined with the speculum; especially as, from the comparative insensibility of the upper portion of the vagina, her sensations are an unreliable index of its condition. Ricord states that the posterior wall of the vagina is more frequently affected in leucorrhœa, and the anterior wall in gonorrhœa.

The modern application of the speculum to the study of venereal diseases (for which we are indebted to Ricord) has rendered an affection, which was before obscure and of difficult diagnosis, at once clear and easily recognizable, and the zeal, of late years, brought to the pathological investigation of the female genital organs, has induced many observers to describe the lesions of vaginitis with great minuteness and detail. It is not

[1] Med. Times and Gaz., Dec. 23, 1854, p. 646, quoted from Union médicale.—Braithwaite's Retrospect, part 31, p. 208.

[2] Ann. de Derm. et Syph., Paris, t. 9, 1878, no. 5, p. 374.

to be regretted that these lesions have been subjected to so severe a scrutiny, although they have for this reason acquired an unmerited degree of importance, since it has been shown that they are characterized by no features sufficiently peculiar to indicate their venereal origin, and that they are, in nearly all respects, identical with the more familiar morbid appearances of other mucous membranes, as the conjunctiva oculi, the lining membrane of the mouth, ear, etc.

The speculum should not be employed during the acute stage of vaginitis, as it is likely to excite severe pain and irritate the inflamed tissues. The presence of the catamenia is also a contraindication to its use. The ordinary cylindrical instrument, made of glass and coated with a layer of India rubber, is of easy introduction, and is generally sufficient for the examination of the vagina in suspected cases of gonorrhœa, but when it is desired to make local applications, or when thorough exposure of all the recesses of this passage is requisite in order to discover if any concealed chancre, or chancroid, be present, either a valvular or Sims's speculum should be preferred. In order to remove the discharge which may obstruct the field of vision, the surgeon should provide himself with several swabs, which may be conveniently made by winding cotton wadding around the end of a thin splinter of wood.

When the vaginitis is intense and seen at an early period, a portion or the whole of the vaginal walls may be found red, hot, and dry, and entirely destitute of moisture. Ricord states that in several instances he has seen this condition finally terminate in resolution without the slightest discharge appearing at any time. Similar cases of dry or erysipelatous gonorrhœa have been reported as occurring in men, although the difficulty of examining the internal surface of the urethra throughout its whole extent has left them open to criticism. Generally, however. this dry condition of the vagina, if present at the outset, is succeeded in the course of twenty-four hours by the appearance of a discharge, which, at first transparent, afterwards undergoes changes similar to those which occur in gonorrhœa in the male; and when the disease has attained its height, the vaginal walls are bathed with offensive, purulent matter of a creamy or greenish color, or sometimes streaked with blood. As already stated, this discharge is acid, whereas the secretion from all other inflamed mucous membranes of the body is alkaline. Zeissl endeavors to explain this by saying that the secretion from the vagina and vulva is not identical with that from the mucous follicles of the cervix uteri in women and the urethra in men, but, to my mind, this seems to be only carrying the difficulty one remove further off. Before proceeding with the examination, the field of the speculum must be cleared from the discharge by the assistance of the swabs of cotton-wadding, when the mucous membrane will be exposed. This surface is found to be red and tumefied. The redness varies in intensity and also in extent. It is sometimes uniform, and at others arranged in spots or striæ. Frequently patches are seen from which the epithelium has become detached, forming superficial abrasions similar to those met with in balanitis, or resembling blistered surfaces. Another condition

which is at times met with has received the name of granular vaginitis. It consists in a development of the vaginal papillæ, which project above the surrounding surface, and are readily recognized by their darker red color. It may also be due to the enlargement of follicles, as is evident from the pus oozing out of them as the edge of the speculum passes over them. These granulations are most frequently observed in the upper part of the vagina, where they may exist in large numbers covering the whole surface, or they may be merely scattered here and there. They have been erroneously regarded by Dr. Deville as peculiar to the vaginitis of pregnant women.[1] They are analogous to the granulations which are so common upon the palpebral conjunctiva. Ricord says that, in one case of vaginal gonorrhœa, he observed an eruption presenting every appearance of herpes phlyctenodes situated upon the deeper portion of the vagina, and Ashwell speaks of "herpetic pustules," which by bursting form ulcers.

In addition to the above symptoms, vaginitis is characterized by increased heat and sensibility. The former may be verified by introducing a finger within the vagina, when the parts will be felt to be much hotter than natural. The degree of sensibility varies, and is greatest when the vulva is also involved. In such cases, it is generally quite impossible to introduce a speculum, owing to the pain which it excites; but when the disease is confined to the vagina, this instrument may often be employed without causing much suffering. During the course of vaginitis, there is often a frequent desire to pass the urine, and dull pain is felt in the hypogastric region, owing to sympathy excited on the part of the bladder.

Gonorrhœa of the vagina rarely continues any length of time without extending to the mucous membrane covering the *cervix*, which may exhibit lesions identical with those now described, but more especially patches of superficial erosion. Gonorrhœa of the uterus is commonly confined to the cavity of the cervix. It is usually secondary in this situation, being occasioned by the extension of the disease from the vagina, and very rarely primary. The lips of the os are seen to be tumefied and red, the cervix congested and enlarged, and its cavity filled with tenacious and transparent muco-purulent matter. This secretion owes its transparency to the alkali which it contains. It becomes curdled and opaque when mixed with the vaginal acid, and hence cannot always be recognized after it has descended into the vagina or is discharged from the vulva. The fact that gonorrhœa confined to the cervix uteri may readily be overlooked, may explain some of the cases in which a clap is derived from an apparently healthy woman.

The acute stage of vaginitis rarely continues longer than a week or ten days, and may be of much shorter duration. As the acute symptoms subside, the pain and difficulty of motion are diminished. The discharge becomes less copious and purulent, and the redness and tumefaction of the tissues gradually disappear. After this partial advance towards recovery, however, the disease often lingers for an indefinite period, and is extremely

[1] Arch. Gén. de Méd., Paris, 4e série, vol. v, p. 305.

difficult to eradicate. The vaginal walls may seem to have recovered their normal condition, having lost the morbid appearances which characterized the acute stage, but there is still a small amount of discharge from their surface or from the cervical cavity, which is capable of producing gonorrhœa in the male.

The occurrence of menstruation is always a set-back in cases of vaginitis, both on account of its interrupting treatment and the congestion of the parts during this period. If a woman was supposed to be well or nearly well at the time her courses came on, she should always be examined again after they have ceased. The persistence of this disease in a subacute chronic form is almost always due to those constitutional causes already mentioned when speaking of its etiology. In consequence of its long duration the vaginal walls may lose their soft velvet-like feel, and become coarse, rough, and dry.

Dr. Tilt[1] says that vaginitis, even when not very severe, may be followed by such an amount of contraction, that it becomes necessary to notch the unyielding ring to facilitate labor. "The occlusion has been known to be complete through the whole length of the canal." He quotes Dr. Daniel[2] as saying that in one West African tribe, a young woman who permits illicit connection is handed over to the matrons of the community, who stuff her vagina with a pulp made of the unripe pods of capsicum, and thus produce a super-acute vaginitis, which is followed by so contracted a state of the vagina, that intromission is ever after prevented.

Gonorrhœa of the uterus.—The cervix uteri is often involved by extension of gonorrhœal inflammation from the vagina. It may also be primarily attacked, as is readily explained by the fact that this is the part of the female genital organs against which the glans penis most impinges in the sexual act, and consequently the part where, in chronic gonorrhœa especially, a drop of contagious matter issuing from the meatus of the male, is very likely to be alone deposited. I have seen repeated instances in which the mucous membrane covering the cervix and the upper part of the vagina was the seat of acute inflammation, while the lower and outer portions of the genitals were intact.

On examination with the speculum, we find the usual symptoms of inflammation of a mucous membrane, congestion, redness, varying in intensity, development of the papillæ, and at first a thin and afterwards a purulent discharge. As the acute inflammation subsides, we often see superficial ulcerations of the cervix, seated especially upon the posterior lip. When the muciparous follicles are involved, they appear in the form of granulations, varying in size from a millet-seed to a pea, and capable either of undergoing resolution or of breaking of the follicular abscesses, leaving behind small, roundish ulcerations. Since the cervix is almost devoid of sensibility, gonorrhœa confined to this part occasions but little pain, but may give rise to general malaise, reflex neuralgias, disturbance of digestion, and irregularity in menstruation.

[1] Uterine Therapeutics, 4th ed., 1878, p. 353.

[2] Native Diseases of the Gulf of India, London, 1849.

Gonorrhœal inflammation may also involve the cavity of the cervix, in which case we find a peculiar gelatinous secretion, resembling in appearance the white of an egg, projecting from the os, and so tenacious that it is with difficulty removed even by a swab. It is sometimes detached spontaneously in lumps, falling into the vagina, where it excites no little irritation, and is finally discharged through the vulva upon the patient's linen. The alkaline reaction of this secretion in contrast to the acidity of the vaginal discharge has already been mentioned.

In describing this secretion, we should not fail to observe that it is by no means to be considered as characteristic of gonorrhœal contagion, since it may depend upon many other affections incident to women. A probability of its gonorrhœal origin would be afforded by the fact that it had been preceded by acute vaginitis, or that it had coexisted for a considerable time with chronic, subacute inflammation of the upper portion of the vagina. Here, as in urethral discharges from the male, an accurate diagnosis is often impossible, for the simple reason that there is nothing specific in the disease.

This discharge from the os uteri is often innocuous, especially in married life and in persons of cleanly habits, but under the (usually) oft-repeated intercourse between the unmarried or when attention to cleanliness is not observed, it is liable to occasion gonorrhœa in the male.

Still further upwards may the inflammation of gonorrhœa extend, involving the lining membrane of the cavity of the uterus itself. We do not propose to enter fully into the category of symptoms which may be thus produced, and which belong rather to the domain of gynæcology. We will merely enumerate some of them, as various disturbances of menstruation and especially an irregular and profuse monthly flow; gradual dilatation of the uterine cavity from the collection and decomposition of the secretion from its walls, and hence so-called physometra; abnormal flexions of the uterus; and, finally, the disturbances of the digestion and general health of the patient which these conditions are sure sooner or later to entail (Zeissl).

Gonorrhœa of the urethra usually coexists with that of the vulva, or vagina, and sometimes with that of the uterus alone. Cases, however, are reported in which this was the only part of the genital organs affected. Gibert met with three such instances,[1] Ricord with two,[2] and Cullerier with one;[3] and in several of them, it was noticed that the stains of the discharge upon the woman's linen were small and circular, instead of being large and irregular as in cases of vulvar and vaginal gonorrhœa.

The shortness of the urethra in women and the oblique position of the canal, which favors the spontaneous flow of matter, render the diagnosis of the urethritis less easy than in the male. The discharge in cases of

[1] Gibert's first case was published in the Rev. méd., Paris, t. i, 1834. He has also given two other cases in his Manuel sur les maladies syphilitiques, p. 284.

[2] Mém. Acad. roy. de méd., t. 2e, p. 159, Paris, 1833.

[3] N. Dict. de méd. et de chir. prat., Paris, t. 4e, p. 253.

vulvitis, also, being seen, as might easily happen, in the vicinity of the meatus, may be erroneously supposed to come from that orifice. Again, the passage of urine causes all traces of urethritis to disappear for a time. An examination, in order to be conclusive, should be made at least an hour or two after an evacuation of the bladder, and any discharge around the meatus should first be removed. The finger may then be passed into the vagina, and pressure be made against the pubic arch, in the course of the canal, from behind forwards; when, if urethritis be present, one or more drops of purulent matter will appear at the meatus, the lips of which will be found swollen and inflamed; and the introduction of a sound into the canal is attended with considerable pain. Scalding during micturition may easily be a deceptive symptom, since it may be produced to a still greater degree by the contact of the urine with the excoriated mucous membrane of the vulva, when the latter is involved. If no vulvitis be present, it is a symptom of value. A few drops of blood are sometimes mixed with the discharge, but hemorrhages are never so copious as in urethritis in the male. Gonorrhœa of the urethra, occurring in women otherwise healthy, does not show the same tendency to run into a gleet as in men. It almost always disappears before the accompanying vaginitis or vulvitis, and is therefore to be regarded as of secondary importance.[1] In broken-down constitutions, however, and in women who have borne many children, or who are suffering from congestion of the abdominal viscera, it may assume a chronic form, and prove exceedingly obstinate. A thickening takes place throughout the whole canal, which can be traced as a firm cord behind the pubes, and may be seen standing out in relief at the upper part of the entrance of the vulva, when the nymphæ are separated. This condition is attended with uncomfortable sensations in the part, and a frequent desire to pass water, aggravated by motion, by coitus, and the return of the menstrual period, and relieved by rest and the recumbent posture.[2]

The shortness of the urethra in women also favors the extension of the inflammation to the neck of the bladder, in which case the dysuria is very distressing.

Vegetations often spring up around the meatus, partially or almost wholly closing the orifice, and interfering with the passage of the urine.

The value of urethritis as indicating contagion has been noticed by many authors. In the majority of cases in which it is present, patients acknowledge that they have been exposed to impure intercourse. Every physician knows how common it is for the vulva and vagina to become inflamed from causes other than contagion, but he will find it difficult to recall a single case of like character, in which the urethra was inflamed and gave forth a purulent secretion; hence purulent urethritis in women is strong presumptive proof of contagion.

[1] Durand Fardel, Mémoire sur la blennorhagie chez la femme, et ses diverses complications. J. d. conn. méd.-chir., Paris, juillet, août, et Septembre, 1840.

[2] West, Lectures on the Diseases of Women, 2d ed. p. 618.

Complications.—Bubo is a less frequent complication of gonorrhœa in women than in men, and Ricord states that it very rarely occurs unless the urethra is affected.[1] Durand Fardel reports the case of a woman who had a rape committed upon her by several men, and in whom a bubo formed and terminated in suppuration.[2] An examination showed that she had acute inflammation of the vulva and vagina, and that there was no laceration or ulceration of the mucous membrane, yet the violent origin of the disease would excite suspicion as to the bubo being due entirely to the gonorrhœa. No mention is made of the condition of the urethra.

Vegetations, mucous patches or tubercles, chancroids and chancres, are frequently found to coexist with gonorrhœa of different portions of the female genital organs, and especially with vulvitis. Their presence is a constant source of irritation, and their removal is essential to a cure of the primary disease. Vegetations should be destroyed by the knife or caustics; mucous patches are a symptom of syphilis, and require general as well as local treatment; and chancres and chancroids are to be treated according to rules to be laid down hereafter.

Inflammation of the Fallopian tubes sometimes occurs as a consequence of the extension of the disease from the uterine cavity. At the post-mortem examination of a case of this character, M. Mercier[3] found one tube obliterated by a deposit of lymph upon its fimbriated extremity, and the peritoneal surface inflamed to a considerable extent around it. In a case reported by Bernutz and Goupil, small abscesses were found upon the walls of the tubes on one side, while on the other side there was a purulent collection within the peritoneal cavity, possibly due to the passage of matter from the tube. The obstruction and obliteration of the Fallopian tubes in this manner will doubtless account for the well-known barrenness of prostitutes in some cases.

Ovaritis has been mentioned by a number of authors as another complication; among others by Ricord,[4] who considers it analogous to gonorrhœal epididymitis in the male. Ricord describes his case as follows: The patient, aged thirty-two, an inmate of the *Hôpital du Midi*, was suffering from acute gonorrhœa of the uterus and external genital organs, when a swelling suddenly appeared in the left iliac fossa. The part was very sensitive to the touch and its temperature increased. There was considerable febrile excitement and nausea. The patient lay on her back, inclined a little to the left, with the thighs flexed. The discharge from the urethra and vagina had almost entirely disappeared. Pressure upon the neck of the uterus, with the finger introduced within the vagina, was not painful; but when the womb was pressed toward the right side, pain and a sense of tension were felt in the left broad ligament. Pressure toward the left side, tried for the sake of comparison, caused scarcely any

[1] Notes to Hunter, Bumstead's translation, 2d ed., Phil., 1859, p. 107.

[2] Op. cit.

[3] Mémoire sur la peritonite considerée comme cause de stérilité chez les femmes, Gaz. méd. de Paris, 1838, p. 577; also Gaz. de hôp., Paris, 1846, p. 432.

[4] Notes to Hunter, 2d ed., p. 106.

inconvenience. The passage of the feces and urine, and all motion of the abdominal walls were painful. Under the use of antiphlogistic remedies, these symptoms gradually diminished and disappeared in about twelve days, and at the same time the discharge increased in quantity. The patient, however, was shortly afterwards seized with a second attack on the opposite side, with the same symptoms and the same suspension of the discharge.[1]

The late Mr. De Méric also reported three cases of gonorrhœal ovaritis in the London *Lancet*, June 14, 1862, which were followed by two cases, by Mr. John Taylor, in the same journal for July 12, 1862.

It is doubtful, however, whether the ovaries can be affected in the same isolated manner as the epididymis in man. Their inflammation in these cases is probably part and parcel of the gonorrhœal pelvi-peritonitis already alluded to, and which was first thoroughly studied in the admirable work of Bernutz and Goupil.[2] These authors observed this affection at Lourcine Hospital, in Paris, in an extraordinary proportion of cases, since out of ninety-three women who entered with gonorrhœa, twenty-eight had pelvi-peritonitis, or nearly one in three! This proportion cannot, of course, be taken as the general rule, for it was doubtless the occurrence of this severe complication which led many of them to come to the hospital, while hundreds of uncomplicated cases of gonorrhœa stayed away.

In the cases seen by Bernutz and Goupil there was no instance of the occurrence of the peritoneal affection before the eighth day. It was rare before the fourteenth, but frequent towards the end of a month, that is, about at the menstrual period. De Méric, on the contrary, states that in his cases the ovary became affected at the most acute point of the disease. The immediate causes may be regarded as the recurrence of the menses, fatigue, and excessive sexual indulgence. There follows an almost complete cessation of the vaginal discharge. For the symptoms I must refer the reader to works on the diseases of women, as gonorrhœal pelvi-peritonitis does not differ from that due to other causes.

Diagnosis.—Before the application of the speculum to the study of venereal diseases, the diagnosis of gonorrhœa in women was often difficult and sometimes impossible; and the discharges of vaginitis and of various syphilitic lesions within the vulva were confounded together. To a surgeon of the present day, acquainted with modern methods of investigation, such mistakes are not likely to occur. With the recognition of the disease, however, our power, so far as diagnosis is concerned, ceases. It is impossible to go farther and determine its origin. Many authors have attempted to give diagnostic signs as between gonorrhœa originating in contagion and that produced by other causes, but they have all most signally failed to produce any which are at all satisfactory, simply for the

[1] Notes to Hunter, p. 107.

[2] Clinique méd. sur les mal. d. femmes, Paris, 1862, t. ii, p. 140.

reason that none such exist. "The microscope fails to furnish us with a means of distinguishing between gonorrhœal and simple vaginitis, and no symptom or combination of symptoms is absolutely conclusive on this point."[1] Acute inflammation and the presence of urethritis may render impure intercourse probable, but cannot be regarded as decisive; and what is wanting in the physical diagnosis must be sought for in the history of the case.

TREATMENT.—The treatment of the different forms of gonorrhœa in women varies but little in the acute stage of the disease. It is chiefly during the chronic stage that any variation is required to meet special indications, presented by inflammation of particular portions of the mucous membrane. Moreover, nature does not always, nor indeed in most instances, follow the classification which we have found it convenient to adopt; several of the genito-urinary organs are generally involved together —more commonly the vagina and vulva—and the treatment of this most numerous class of cases will first claim our attention.

The chief remedies adapted to the acute stage are rest, cathartics, hot baths, lotions, and a general antiphlogistic regimen. Zeissl recommends cold applications over the genitals, which should be changed as soon as they become warm. It is of the first importance that the patient should abstain from exercise of all kinds, and, if possible, be confined to her bed; indeed, in most cases her own sensations demand this, without the order of the surgeon. Meats and stimulants should be forbidden, and the diet restricted to weak tea, toast, a decoction of flaxseed, rice- or barley-water, gruel, etc., unless the symptoms are subacute from the first, or the patient debilitated. In selecting a cathartic at the outset of the disease, preference should be given to a mercurial, for the purpose of unloading the abdominal and pelvic vessels, and the bowels should afterwards be freely opened every day, by small doses of Epsom salts, citrate of magnesia, and other salines. Aloes, and the numerous preparations which contain it, should be avoided, on account of its tendency to produce congestion of the hæmorrhoidal vessels.

Blood-letting.—Bleeding from the arm and even the application of leeches in the neighborhood of the genital organs, may be said to be things of the past; although the latter may possibly be required in rare instances. If used, they should be applied to the groins, where their bites will not be smeared with the discharge.

Baths and Lotions.—A hot bath, repeated once or twice a day during the acute stage, is very grateful to the feelings of the patient, and beneficial in equalizing the circulation and relieving the local inflammation; and immersion of the whole body is to be preferred to hip-baths.

Meanwhile, the external genital organs should be frequently bathed with some emollient lotion, and a piece of lint soaked in the same be inserted between the labia, in order to separate the inflamed surfaces and

[1] West, op. cit., p. 628.

absorb the discharge. The following is an excellent formula for this purpose :—

℞. Decocti Papaveris 3 pts.
Liquoris Plumbi Subacetat. dilut. 1 pt.
M.

Diday recommends the introduction at night of pledgets of cotton, smeared with the following ointment :—

℞.	Cucumber Ointment ℥j	30
	Alum ʒj	4
	Tannin ℈ij	2
M.		60

These should be removed in the morning, and the following wash be applied or injected :—

℞.	Decoction of White Oak Bark Oj . .	500
	Borax ℥ss	15
M.		

Sedatives, of which Dover's powder is perhaps the best, should be administered at night to induce sleep, and also at intervals during the day, if the pain is severe, or the patient nervous and irritable.

Injections.—The above measures are the only ones admissible during the acute stage of the disease, especially if the vulva is involved ; in which case the insertion of an enema tube is too painful to admit of injections. When, however, the inflammation is chiefly confined to the vagina, the lotion just mentioned may be injected into this canal every few hours, and in many cases of a subacute type, injections may be used from the very commencement. As soon as the sensibility of the parts will permit, it is also desirable to introduce a speculum, and ascertain if any ulcer be present.

The kind of syringe used, and the mode of injecting, are matters of no little importance. The small metallic or glass instruments in common use are entirely inadequate for the removal of the discharge. The astringent ingredients of the first portion of fluid injected are spent in coagulating the purulent matter collected in the vagina. To wash away the coagula thus formed, and exert a medicinal effect upon the mucous membrane, the quantity of the injection should not be less than a pint ; indeed, it is better to precede any medicated injection by a copious one of plain water, so as to cleanse the vaginal walls as freely as possible. A pump-syringe, or better still, one of Davidson's or Mattson's syringes, made of India rubber, and provided with metallic valves, will enable the patient to inject any desired quantity with one introduction of the tube. While using the injection, the patient should lie on her back, with the pelvis elevated ; if she merely stoop down, the fluid escapes as fast as it is injected, and fails to reach the deeper portions of the canal. With a bed-pan under her the wetting of the floor and clothes will be avoided. Farther, I must not forget to mention the excellent vaginal douche, depicted below, the invention of Dr. Frank P. Foster, of this city.

The well-known "fountain syringe" may also be employed.

As a general rule, injections of greater strength may be used for women than for men, and for the sake of cheapness and convenience, they are commonly made more simple in their composition. The patient may be supplied with the solid ingredients, and allowed to mix them as required,

Fig. 45.

Foster's vaginal douche

and in order to avoid the expense of having them put up by the druggist in divided portions ready for use, it is desirable, among the poor, to supply them in bulk. A little instruction from the surgeon will enable the patient to measure them out with sufficient accuracy. A heaping teaspoonful, or, in other words, as much as can possibly be taken up by a teaspoon, of the more common ingredients of injections, is nearly as follows:—

Alum ʒij	8
Sulphate of zinc ʒij	8
Acetate of zinc ʒiss	6
Subacetate of lead ʒiij	12
Tannin ʒss	2

From one to two drachms of either of these salts to the pint of water, is the average strength employed, but the ratio should always be proportioned to the effect produced, and the sensibility of the parts. Whenever severe or long-continued pain is induced, the strength of the solution should be at once diminished, and afterwards increased as the tenderness

becomes less. I would repeat what I have said with reference to injections for men, that young practitioners often lose time, to the neglect of more important matters, in frequently changing from one form to another; cases, however, occur, in which one injection appears to lose its effect, and another may be substituted with advantage, but no change should be made, unless it is evident that the unsatisfactory result is not due to a faulty method of using the syringe, or to constitutional causes, or again, unless the solution, however diluted, excites pain and uneasiness.

When the subsidence of the more acute symptoms first permits the introduction of an enema-tube, a drachm of alum may be dissolved in a pint of flaxseed tea, and injected warm, but the temperature should be gradually lowered, and the injection ultimately used cold. Injections of cold water alone, during the chronic stage of vaginitis, are of great value. They not only cleanse the parts, but exert a tonic influence upon the vagina and neighboring organs. Their effect, however, is increased by the addition of alum, or the other salts above mentioned. They should be employed from two to three times a day, but must be omitted, for obvious reasons, during the menstrual periods.

A combination of tannin and alum, as recommended by Dr. Tyler Smith,[1] is also an excellent form of injection, and one which I have prescribed with much success. The proportions are ℥ss–j of tannin, and ʒij of alum to the pint of water. Tannate of alumina is formed by chemical decomposition. It should be recollected, however, that tannin, and the salts which contain it, stain the linen almost as indelibly as nitrate of silver, which is a serious objection with many women to its use. I have also employed injections of the sulphate and acetate of zinc, and subacetate of lead, with satisfactory results. Labarraque's solution of chlorinated soda, diluted with from eight to twelve parts of water, may be injected, when the discharge is very offensive. A solution of chloride of zinc, of the strength of from one to three grains to the ounce of water, is a favorite injection with some surgeons.

The following formula, intended as a substitute for the aromatic wine of the French Pharmacopœia, is one of the best injections for general use :—

R.	Claret Wine,		
	Compound Spirits of Lavender, āā ℥v	150	
	Tincture of Opium ℥ss	15	
	Water ℥iijss	105	
	Tannin ʒj—ʒj	4	—30
M.			

I usually direct the patient to add two tablespoonfuls of this mixture to a tumblerful of water, and to gradually increase the strength.

I rarely prescribe a solution of nitrate of silver for the patient's own employment, but frequently myself apply it to the vaginal walls, by first introducing a glass speculum as far as the cervix uteri, and then pouring a few drachms through the instrument. If the speculum be slowly with-

[1] Pathology and Treatment of Leucorrhœa, p. 183.

drawn, the fluid will come in contact with the whole extent of the vagina. I regard this method as one of special value, for if the patient lie on her back with the pelvis well elevated, and if the speculum be as large as the parts will admit, the force of gravity carries the solution into every recess of the dilated vagina, and insures its thorough application to this canal, and also, in a measure, to the cavity of the cervix. The parts should be thoroughly cleansed with copious injections of simple water, before the speculum is introduced. In this manner, a solution of nitrate of silver, containing ℈j–iij to the ounce, may be applied by the surgeon every third or fourth day, and the patient at the same time use some mild astringent injection twice a day.

An application of the solid nitrate of silver crayon, a favorite method of treatment among French surgeons, is requisite in some cases which do not improve under a solution of the same salt. The deepest folds of the vagina should be exposed by means of a bivalve speculum, and the caustic applied to the mucous membrane covering the cervix, and to that of the vaginal walls, as they are brought into view by the gradual withdrawal of the instrument. The compound tincture of iodine, pencilled over the surface with a camel's-hair brush attached to a long handle, is sometimes preferable to the lunar caustic.

The contact of purulent matter with the mucous membrane of the genital organs is doubtless a constant source of irritation, and is probably sufficient to account for some of the superficial abrasions and other lesions, revealed by a specular examination. The collection and retention of pus upon the external integument will soon excoriate the surface, and, with still greater reason, may it be supposed to act thus upon the more delicate mucous membrane. The abrasions, once formed, increase the quantity of the discharge by their own secretion, and thus the two react upon each other, and prolong the disease. The evil is easily remedied in balanitis and vulvitis by interposing between the inflamed surfaces some porous material, capable of absorbing the discharge as fast as it is secreted, and wet, if desired, with an astringent lotion, which will exert a constant medicinal effect upon the mucous membrane. The same result may be attained in vaginitis, and has even been attempted in gonorrhœa of the cervix.[1] For this purpose a folded piece of lint is sometimes used, but a plumasseau of charpie or carded cotton is preferable, since it retains its elasticity to a greater degree, and is a better absorbent. It may first be rolled in the following powder:—

℞.	Powdered Starch ℥j	30
	Tannin ℥v	20
	Powdered Alum ℥iss	6
M.	(Diday.)	

To facilitate its withdrawal, a small string may be previously attached to it. The size of this tampon must be proportioned to the dimensions of

[1] Hourmann. Tamponnement, comme méthode de traitement des écoulements utéro-vaginaux. J. d. conn. méd.-chir., Paris, mars, 1841, p. 89.

the vagina in each case, and will vary in diameter from half an inch to two inches. In some instances it is medicated; in others, not. In the former case, the medicinal substance may be an absorbent or astringent powder, as prepared chalk, subnitrate of bismuth, calamine, tannin, powdered alum, etc.; or, it may consist of any of the lotions which have been recommended for the purposes of injections either in the male or female. Calamine and powdered alum are the best dry preparations, and a solution of tannin in glycerine (℥j–ij ad ℥j) an excellent fluid astringent. The plug may be inserted by the surgeon through a speculum, or the patient may be taught to introduce it with her finger, or by means of a stylet. It should be withdrawn at the end of twelve hours, the vagina washed out with a copious injection, and a fresh plug introduced, or the latter may be deferred till the following day.

Scanzoni employs a plug of cotton wool, sprinkled with alum powder, either pure or mixed with one or two parts of sugar. Pure alum is liable, on the second or third application, to excite a very disagreeable sensation of heat and constriction in the vagina, rendering it necessary to suspend the treatment for a week or two; hence it is not to be used undiluted, unless the parts are quite insensible; and on this account, therefore, it will be best to try, in the majority of cases, a mixture of alum and sugar. The plug, thus prepared, should not be used oftener than every second or third day, nor be allowed to remain in longer than two or three hours, since it soon becomes soaked with the vaginal secretion, and lukewarm or cold water should be injected immediately on its withdrawal. If these precautions be neglected, acute inflammation of a troublesome character may be excited, and the discharge augmented instead of diminished.[1]

Simpson, of Edinburgh, has proposed an efficacious mode of keeping an astringent in constant contact with the vaginal walls, by means of pessaries, prepared according to the following formulæ:—

℞.	Acidi Tannici ℈ij	2	60
	Ceræ Albæ ℈v	6	50
	Axungiæ ℥vi	24	

Misce, et divide in Pessos quatuor.

℞.	Aluminis ℥j	4	
	Pulveris Catechu ℥j	4	
	Ceræ Flavæ ℥j	4	
	Axungiæ ℥vss	22	

Misce, et divide in Pessos quatuor.[2]

Hip-baths, taken every morning on rising or in the early part of the day, are valuable adjuvants in the treatment of chronic vaginitis. The temperature of the bath should be determined in part by the season of the year, and in part by the strength and habits of the patient. It is well to commence with lukewarm water, and gradually lower the temperature as the system becomes accustomed to them; but they should never be so cold

[1] Op. cit., p. 456.

[2] Edinburgh Monthly Journal, June, 1848, and Obstetric Works, p. 98.

nor continued so long that the patient feels chilly for some time after their employment, and reaction should be promoted by friction with a coarse towel, flesh-brush, or hair-mitten. These baths may be rendered still more effectual by the addition of a handful of coarse salt to each bucket of water used. Astringents, as alum, in the proportion of half a pound to each bath, are also recommended by some authors.

The *hygienic management* of the case should always receive special attention in chronic vaginitis. As the inflammatory symptoms of the acute stage subside, the patient may be allowed a more generous diet and greater freedom of motion, but she should still avoid violent or prolonged exercise, and especially all sexual excitement. Walking and even standing for any length of time should be but moderately practised at this stage of the affection. No absolute rules can be laid down for diet, which should be adapted to each individual case. In general, the food should be plain and simple, and yet sufficiently nourishing, and the meals should be taken at regular hours. Highly seasoned dishes, pastry, and meats, cheese, and strong tea and coffee, should be forbidden; and bread, eggs, fresh meat once a day, vegetables, and simple puddings, recommended. Regularity of the bowels should be secured, if necessary, by small doses of saline cathartics, taken on rising in the morning; and, in brief, all such measures should be adopted as are calculated to bring the general health to the best possible condition. The latter rule implies that the system should neither be stimulated above, nor depressed below, the happy mean; yet, at the same time, there are but few cases of chronic vaginitis which do not require some support, and in which either mineral acids, preparations of iron, vegetable tonics, quinine, or even stimulants, are not, at some period, indicated.

The formulæ for various tonics, already given when treating of this disease in the male sex, are equally applicable to the female. The only one which I would add at present is the following old but excellent combination of a tonic, cathartic, and astringent. Its cheapness recommends it especially for the poorer class of patients, while for those in better circumstances a more palatable substitute may be found in Seidlitz powders or citrate of magnesia, taken on rising from bed, and in the French *dragées* of iron administered just before or after meals.

℞. Magnesiæ Sulphatis ℥iss . . 45
Ferri Sulphatis ℈ij 2 60
Acidi Sulphurici gtt. x . . . 65
Infusionis Gentianæ Comp. Oj 500
M.

A tablespoonful three times a day.

In *gonorrhœa of the vulva* lotions may be applied with great facility, and the parts separated by the interposition of lint or charpie. Cauterization with the solid nitrate of silver or a solution of this salt is often beneficial. Resolution of a commencing abscess of the vulvo-vaginal gland or duct may sometimes be obtained by rest, cathartics, an antiphlogistic regimen, and the application of ice, assisted, in some cases, by the application of leeches to some adjacent part. If suppuration takes place, the

abscess should be opened without delay. Ricord, Vidal, Zeissl, and others advise making the incision upon the external surface of the labium, to avoid the admission of the urine and discharges, which would irritate the cavity of the abscess and prevent its healing. An incision in this situation, however, often fails to prevent a spontaneous opening on the mucous surface, where the abscess naturally tends to point.[1] By making a small incision on the internal and inferior aspect of the tumor, and directing the knife somewhat upwards so that the cut shall be valvular, and also by allowing the abscess to evacuate itself by the contraction of its walls without the exercise of pressure, the entrance of foreign matter may generally be prevented. In case the abscess repeatedly recurs, its exact seat should be carefully ascertained. If it occupy the duct, it should be laid open by a free incision, and the cavity filled up with lint. If it be seated in the gland, this must be dissected out. I have tried, in several instances, to cure these abscesses by the introduction of a seton, but have always failed.

Whenever, after an attack of vulvitis, there still remains a purulent discharge from the vulvo-vaginal duct, and also in the cases described by Dr. Salmon in which this part is primarily affected, a solution of nitrate of silver may be injected by means of Anel's syringe.

In *gonorrhœa of the uterus*, the os should be dilated if necessary by means of sponge tents, and the cavity of the cervix and body of the uterus be freely cauterized with the solid nitrate of silver. A crayon of this salt may be passed up with forceps into the uterine cavity; or the extremity of a uterine sound or Lente's probe[2] may be coated with the nitrate melted over a spirit-lamp, and be made to sweep over the whole affected surface. No danger need be feared even if the crayon of the nitrate should break, and a portion be left within the uterus. The application should be repeated every third or fourth day, and astringent vaginal injections be still continued. *Intra-uterine injections are never admissible*, as they have repeatedly proved fatal.

Whenever, in gonorrhœa of the vagina or uterus, the cervix is found enlarged and congested, from four to six leeches may be applied. They are especially applicable at the outset of the treatment, and may require to be repeated once or twice at intervals of a week; but the patient should not be debilitated by their frequent use. The surgeon should apply them himself, taking care to plug the cervix beforehand, that they may not fasten upon the sensitive membrane of its internal surface. If the flow of blood is excessive, it may be arrested by cold injections of a solution of alum.

The acute stage of *urethritis* is of so short duration as to demand but little special treatment. In most cases, the measures adopted for the concomitant inflammation of the vulva, vagina, or uterus, aided, perhaps, by

[1] Hnguier, op. cit., p. 343.

Diday also recommends the incision to be made on the mucous surface. Diday and Doyon, Mal. vén. et cutanées, 1876, p. 119.

[2] A new Uterine Porte-Caustique, by Fred. D. Lente, M.D.; American Med. Times, Sept. 26, 1863.

the administration of alkalies, neutral salts, or sedatives, are sufficient to effect a decided amelioration, and often the entire disappearance of the disease. When this result fails to be attained, I do not hesitate to resort to injections, as in urethral gonorrhœa in men; but as they cannot be used by the patient, it is necessary for the surgeon to administer them himself. Their active principle may be one of the salts of lead or zinc, or tannin; or from one to two drachms of a solution of nitrate of silver, containing ten or twenty grains to the ounce, may be thrown in. If, in this case, we carefully guard against having the bladder entirely empty, no evil result need be feared. Cullerier, in gonorrhœa of the female urethra, does not hesitate to cauterize the whole length of the canal by means of a crayon of nitrate of silver sufficiently large to distend the passage.[1]

Copaiba and cubebs may also be employed in this affection, administered in the manner directed for men. Ricord's experiments have shown that their effect in gonorrhœa of any portion of the genital organs not traversed by the urine is so slight that they are not to be recommended in vaginitis or vulvitis. Indeed, they can readily be dispensed with in all forms of gonorrhœa in women.

"LATENT GONORRHŒA IN WOMEN."—A remarkable pamphlet was published in the German language, at Bonn, in 1872, by Dr. Emil Noeggerath, of New York, and has been supplemented by an article in the first volume of the Transactions of the Am. Gynæcological Soc. (1876).

In these articles Dr. N. advocates the existence of a so-called latent gonorrhœa in both sexes; in other words, he claims that gonorrhœa in both man and woman is *never* cured, even if all appreciable signs of its existence have disappeared; that in man the inflammation always extends into the spermatic ducts, vas deferens and epididymis, and in woman into the uterus and Fallopian tubes; that, though it may be cured in those portions of the genital track which can be reached by local applications, it still lingers in the inaccessible portions just mentioned, preserving its contagious property, and ready to break out again in an acute form upon slight provocation; that in this way may be explained the cases in which men contract gonorrhœa from apparently healthy women; and finally, that this latent disease in men is communicated by them to their wives after marriage in some latent way—*latent*, because the women show at the time no sign of infection—and manifests itself at some time or other in one of those troublesome, tedious, and even fatal affections to which women are subject, and among which Dr. N. mentions acute perimetritis, recurrent perimetritis, chronic perimetritis, ovaritis, and puerperal fever; such women are said also to be commonly sterile.[2] All this in consequence "of the gradual infection (?) of the woman by repeated contact with minute quantities of the poison"

[1] Des affections blennorrhagiques, p. 58.

[2] "The wives of men who at any time of their lives have had gonorrhœa, are, as a rule, sterile." These words constitute one of Dr. N.'s conclusions. Again he says: "About ninety per cent. of sterile women are married to husbands who have suffered from gonorrhœa either previous to or during married life."

Dr. Noeggerath founds his conclusions upon the cases of the above-mentioned diseases and the cases of sterility which have come under his treatment, and in which inquiry into the history of the husbands has shown in nearly every instance that they had had at some time in their lives one or more attacks of gonorrhœa, of which perhaps they had not perceived the slightest trace for months or years.

It is a little singular that Dr. N. did not perceive the fallacy of reasoning on the principle of *post hoc ergo propter hoc* in these cases. He explicitly states that he believes with Ricord that 800 out of every 1000 men have had gonorrhœa. Let us then apply the same reasoning to 1000 women, who have remained healthy after their marriage, and who have "replenished the earth" with many quiverfuls of offspring. Eight hundred of their husbands must have had gonorrhœa at some time in their lives; hence gonorrhœa is greatly conducive to fecundity! *Post hoc ergo propter hoc.*

At a recent meeting of the British Medical Association it was announced by one of the speakers that Dr. N.'s views were so generally known and accepted in America that one of the first questions asked by the parents of every young lady to whom marriage was proposed by a gentleman, was whether he had ever had the clap!

Let any specialist in diseases of the male genital organs inquire of married men coming to his office whether they ever had the clap, and, if so, if their wives have since been healthy and borne children, and he will find the answers not corroborative of Dr. N.'s views. In short, even if 800 out of 1000 men have had the clap, the human race did not die out long ago, but still exists, and shows no tendency, so far as I know, to diminution.

CHAPTER XIX.

GONORRHŒA OF THE RECTUM, MOUTH, NOSE, AND UMBILICUS.

These extra-genital forms of gonorrhœa are rarely, if ever, met with, and the existence even of the last three may well be called in question. With the exception of the ocular conjunctiva all other mucous membranes external to the genital organs show a very great inaptitude to take on inflammation from contact with gonorrhœal matter.

M. Diday[1] details some experiments on this point. He says: "Wishing to assure myself of the existence of these affections, I have often (certainly more than thirty times) conveyed on the end of my finger the urethral discharge of patients to their noses, lips, and the folds within the anus, and rubbed it in! They, not suspecting what I had done, took no precautions to avert the consequences, and yet I have never seen any effect produced."

The one of the above forms of gonorrhœa whose existence is best established is

Gonorrhœa of the Rectum.

I have never met with an instance of this affection, and I must therefore rely upon other authors for an account of its symptoms and treatment.

Gonorrhœal inflammation of the rectum may arise either from the act of Sodomy, or from the inoculation of the rectal mucous membrane by means of a gonorrhœal discharge flowing from the genital organs.

The existence of this affection appears now to be well authenticated, but its occurrence is extremely rare even in those countries, as South America, where unnatural modes of coitus abound.

Both sexes are equally exposed to it in the mode of its origin first mentioned, viz.: Sodomy; in the second mode, extension of a gonorrhœal discharge from the genital organs, it is evident that women run a much greater risk than men, on account of the facility with which secretions flowing from the vulva may extend to the perinæum and the margin of the anus. It is also evident that the presence of protruding piles or eversion of the rectal walls will greatly favor contagion.

In cases of this kind, the patient complains of a constant burning and itching sensation about the anus, and a frequent call to stool; decided pain is experienced only on the passage of the feces. The discharge is puru-

[1] Diday and Doyon (op. cit.), p. 129.

lent, offensive, and often bloody, and tends to ooze constantly from the anal orifice, but it appears in larger quantities before defecation or on passing flatus; the margin of the anus and the skin of the perinæum are irritated and excoriated by its contact. In severe cases the mucous membrane of the bowel becomes much swollen and protrudes from the orifice; and fissures and excoriations may occur in the rectal and anal folds. Vegetations are another unpleasant sequela, and may attain such a size as to interfere with the passage of the stools.

So far as known, gonorrhœa of the rectum does not run into a chronic form corresponding to gleet of the urethra; chronic inflammation of this gut, attended by a foul, muco-purulent discharge and uneasy sensations in the part is commonly due to piles.

TREATMENT.—In the treatment of this affection, the patient should be confined to the house, and, if possible, to the recumbent posture; enemata of some strong astringent lotion, as of alum, should be administered several times a day; sitz-baths or baths with full immersion of the body may prove grateful and beneficial. The insertion into the rectum of pledgets of lint, either medicated or not, between the stools, has been recommended on theoretical grounds, but must for evident reasons be put in practice with great difficulty. The frequency of the discharges from the bowels should be regulated by opium in accordance with the general condition of the patient, and the condition of the diseased parts as affected by the passage of the feces; local rest being of course desirable, unless contraindicated.

Fissures and excoriations of the anus produced by gonorrhœa of the rectum may be pencilled if necessary with a solution of nitrate of silver; vegetations are likely to persist and are subject to the treatment elsewhere described.

Mr. Allingham, in his most excellent work on the diseases of the rectum, thus speaks of this affection:—

"I have had under my care three cases of undoubted gonorrhœa of the rectum. There was great heat and burning pain experienced, with a copious discharge of pure pus; the mucous membrane, as seen through the speculum, was intensely inflamed; the cases occurred in prostitutes, who all confessed the manner in which they got so affected. The cure was not difficult; lead-lotion and opium was used in two cases, and answered very well; the third was treated by sulphate of zinc and warm water injected three times daily; in neither case was there any ulceration of the lining membrane of the bowel, nor did any thickening or contraction result; the inflammation did not appear to affect the submucous areolar tissue." (Allingham on Diseases of the Rectum, 1871, p. 237.)

GONORRHŒA OF THE MOUTH.

Hölder[1] states that this affection may arise from direct contact of the mouth with the genital organs, and says that Petrasie, of Kiel, had

[1] Lehrbuch der venerischen Krankheiten, Stuttgart, 1851, p. 288.

recently reported the case of a young man who confessed having exposed himself in this manner. On the following day he had pain in the lips and gums. On the fourth day the mucous membrane of the lips and buccal cavity became intensely red; motion of the mouth was painful; the gums were spongy, inclined to bleed, and a little receding from the teeth, and the buccal secretion was increased in quantity. Other authors speak of a copious puriform secretion and aphthous exudations. Potrasie's case is said to have been cured in a week by means of an alum gargle.

Gonorrhœa of the Nose.

A case of this kind is reported by Mr. Edwards.[1] Hölder (op. cit., p. 288) also speaks of it. It is said that it may arise either from the matter of gonorrhœal ophthalmia flowing down upon the nares or from the use of a napkin, or the fingers soiled with the same; that generally only one nostril is affected; that the symptoms are about the same as a very severe "cold in the head;" that there is but little pain; and that it is readily cured by cold applications, snuffing up cold water, pencillings with a solution of nitrate of silver and afterwards the use of an alum or borax lotion.

Umbilical Gonorrhœa.

A young man, aged 19, was found by Morrison[2] to have urethral gonorrhœa and at the same time a similar discharge from the umbilicus, which was relieved by solutions of acetate of lead and sulphate of zinc.

[1] London Lancet, Am. reprint, June, 1857.
[2] Bull. méd. du Nord, Lisle. No. 10, 1874.

CHAPTER XX.

GONORRHŒAL OPHTHALMIA.

Gonorrhœal ophthalmia has been supposed to originate in three ways—from inoculation, from metastasis, and from sympathy, each of which has from time to time been received by certain authors as its exclusive mode of origin.

The occurrence of gonorrhœal ophthalmia from inoculation or contagion, cannot, at the present day, be called in question. Numerous cases reported by Mackenzie, by Lawrence, and by nearly every modern writer on diseases of the eye, leave no room to doubt that the discharge of gonorrhœa applied to the ocular conjunctiva, may set up a severe and destructive form of inflammation, similar to if not identical with purulent conjunctivitis. But, besides these reports of cases in which the inoculation has been the result of accident, further proof is to be found in the treatment of pannus, employed of late years chiefly by French and German surgeons, in which the eyes have been intentionally inoculated with the pus of gonorrhœa. Discharges from the genital organs have been transferred to eyes affected with pannus, with the express design of exciting acute inflammation, which, it was hoped, might cure the chronic disease; and, however questionable may have been the results of this practice, so far as the accomplishment of the latter purpose is concerned, there has been, at all events, no difficulty in producing acute inflammation by such inoculation. With these facts before us, therefore, no further doubt of gonorrhœal ophthalmia from contagion is admissible; indeed, direct inoculation is now regarded by all surgeons, with but few exceptions, as the only mode in which originates that destructive form of conjunctivitis which sometimes attends gonorrhœa.

The old idea of a metastatic origin of gonorrhœal ophthalmia, first advanced by St. Yves,[1] is now completely abandoned, and the same is true of "sympathy" as a supposed cause.

Frequency.—Gonorrhœal ophthalmia, compared with the frequency of gonorrhœa, is a rare affection. The following table exhibits the number of cases received at the N. Y. Eye Infirmary during a period of fifteen consecutive years, and the proportion which these cases bear to the whole number of patients.

[1] A New Treatise of the Diseases of the Eyes, by M. De St. Yves, Surgeon Oculist of the Company of Paris, translated from the original French by J. Stockton, M.D., London, 1741, p. 168.

Year.	Whole Number of Patients.	Cases of Gonorrhœal Ophthalmia.
1845	1366	2
1846	1245	3
1847	1485	2
1848	1815	5
1849	1902	3
1850	2082	3
1851	2472	6
1852	2732	7
1853	2719	5
1854	2635	6
1855	2652	5
1856	2634	4
1857	3216	3
1858	3908	2
1859	4171	3
Total	37,034	59

It thus appears that, compared with the whole number of diseases of the eye treated at this institution, cases of gonorrhœal ophthalmia are only as 1 to 628. We have no statistics by which to determine the exact ratio of this disease to the whole number of cases of gonorrhœa; yet I think the experience of every physician would lead him to infer that it is not much greater than to diseases of the eye, since gonorrhœa must be nearly as frequent as all ocular affections combined.

Causes.—The contagious matter which has produced acute inflammation of the conjunctiva in a given case, may have been derived from the genital organs or from the opposite eye—already affected with gonorrhœal ophthalmia—of the same, or from those of another person. In many of the reported cases of this disease, the ophthalmia has been produced by patients washing their eyes in their own urine, with which gonorrhœal pus was mixed, or by otherwise applying the discharges from their own persons.

The personal habits of those affected with gonorrhœa, and the degree of intimacy existing between members of the same household, will, in a great measure, determine the frequency of infection. Among the poor and squalid, where cleanliness is neglected and the same vessels and towels are used in common, gonorrhœal ophthalmia may readily be communicated from one individual to another, until it has attacked all the members of the same family.

Ricord states that he has never seen gonorrhœal ophthalmia produced by discharges from any portion of the genital organs except the urethra; and that he has never known it to be caused by the pus of balanitis or vaginitis. There is reason to believe, however, that a simply vaginal discharge is capable of exciting the disease under consideration.

It is a well established fact that "ophthalmia neonatorum" which, like gonorrhœal ophthalmia, is but a form of purulent ophthalmia, is frequently caused by inoculation of the infant's eyes with leucorrhœal discharges from

the mother. I have repeatedly seen severe purulent conjunctivitis in very young girls, who were affected with that form of vaginitis which sometimes attacks children, independently of contagion, and which has been so ably treated of by Mr. Wilde, of Dublin. Analogous cases are reported in treatises on diseases of the eye, and Dr. Jüngken mentions one instance, in which the ophthalmia, originating in this manner, spread to seven members of a family.[1]

I know of no authentic case of gonorrhœal ophthalmia occasioned by the pus of balanitis. Matter from a venereal or ordinary abscess must also be regarded as generally innocuous. Yet it is, perhaps, impossible to determine with accuracy the limits within which purulent matter is capable of exciting severe inflammation of the conjunctiva. The predisposition of the person exposed will doubtless have no small influence upon the effect produced. Still, so far as at present known, these limits are confined to the urethra and vagina.

The inoculations which have been employed in the treatment of pannus, will throw some light upon the conditions under which contagion may be supposed to take place. The puriform matter used in these inoculations has been derived either from the genital organs, or from an eye affected with gonorrhœal ophthalmia, or ophthalmia neonatorum. When such matter is kept from contact with the air, it is found to retain its contagious property for about sixty hours. If exposed to the air, and allowed to dry, it soon becomes innocuous. In the experiments of M. Piringer, of Gratz, a piece of linen was moistened with gonorrhœal matter, and allowed to dry; the cloth was then rubbed upon the eyes of several persons, and no inoculation ensued. The dried matter scraped from the cloth, and applied directly upon the conjunctiva, took effect within about thirty-six hours after it was first obtained. Matter, once dried and immediately moistened again, either by the addition of water or by contact with the secretions of the eye, was found to be contagious. Fresh matter was contagious, even when diluted with one hundred parts of water.

Van Roosbroeck experimented with the pus of a common abscess, and found that it was innocuous when applied to the eye. This surgeon was also led to the conclusion that the discharge from an eye affected with purulent ophthalmia, diluted with water, retains its power of contagion until decomposition has begun to take place, as shown by its evolving the odor of putrefaction.

When the inoculation is successful, no disagreeable sensation is at first excited by the application of the matter; and no effect is perceived until after the lapse of from six to thirty hours, when the eye begins to feel hot, and there is an increase in the ocular secretions, which are at first entirely mucous, but soon become muco-purulent.

Gonorrhœal ophthalmia is much more common in men than in women. Ricord ascribes this difference to the greater frequency of urethritis in the male, this being the only form of gonorrhœa, capable, as he supposes, of

[1] Ann. d'oeul., Brux., 8e série, t. 1er, p. 355.

occasioning gonorrhœal ophthalmia. I have already dissented from this opinion of Ricord, and I believe that so far as any explanation can be given of the difference in the relative frequency of its occurrence in the two sexes, it must be based upon their different habits.

Symptoms.—Gonorrhœal ophthalmia may occur at any stage of an attack of gonorrhœa, although it is said to be more frequent during the decline. The urethral or vaginal discharge is doubtless most contagious when most purulent, which is during the acute stage, but the short duration of this stage affords less opportunity for it to be applied to the eye than the longer stage of decline. At first, the disease usually attacks one eye alone. It may remain confined to this eye, but not unfrequently, after the lapse of a few days, the opposite eye becomes implicated.

The symptoms of gonorrhœal ophthalmia are, in the main, identical with those of purulent conjunctivitis. The former disease, however, is more rapid in its development, and even more destructive to sight than the latter.

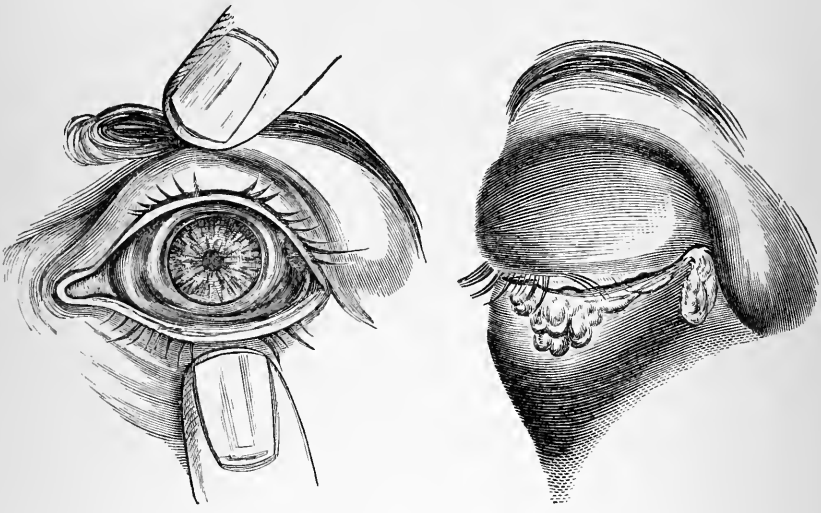
The earliest indications of an attack of this disease are an itching sensation just within or on the margins of the lids, a feeling as if some foreign body were in the eye, and an increase in the ocular secretions. The latter retain at the outset their normal transparency, although they appear unusually viscid; the ciliæ become adherent and glued together, and a collection of dried mucus may be seen at the inner canthus. As the disease progresses, the vessels underlying the conjunctiva become distended with blood. They may at first be distinguished from each other as in simple conjunctivitis, but they are soon lost in a uniform red appearance of the globe, extending as far as the cornea; which retains its normal transparency. The conjunctiva is also found to be somewhat elevated above the sclerotica by an effusion of serum, and its surface is roughened by swelling of its papillæ. Meanwhile, the discharge has become purulent, and is secreted abundantly from the inflamed surfaces.

An attack of gonorrhœal ophthalmia is so rapid in its progress, that the early symptoms just now described may have passed away before the first visit of the surgeon, who is often called to see his patient only after the full development of the disease. He probably finds him sitting up, his head bent forwards, his chin resting on his breast, and his handkerchief applied to his cheek to absorb the discharge, which irritates the surface upon which it flows. The eyelids are swollen, especially the upper, which slightly overlaps the lower, and is of a reddish or even dusky hue. The patient states that he is unable to open the eye. His inability to do so is caused less by an intolerance of light, than by the mechanical obstruction which the swelling of the lids occasions, and by the pain which is excited by any friction of the inflamed surfaces upon each other.

The surgeon now moistens the edges of the lids with a rag dipped in warm water in order to facilitate their separation, and proceeds with his examination. In his attempt to open the eye, he is careful not to make pressure upon the globe, in order to avoid giving unnecessary pain, and also, lest the cornea, if already ulcerated, may be ruptured, and the con-

tents of the globe escape. With one finger placed just below the eye, he slides the integument downwards over the malar bone, and thus everts the lower lid, the upper lid being elevated by a similar manœuvre with the other finger of the same hand applied below the edge of the orbit; or,

Fig. 46. Fig. 47.



Ophthalmic gonorrhœa. (Dalrymple.)

again, he may expose the globe by seizing the lashes and margin of the upper lid with the thumb and finger and drawing the lid forwards and upwards. All this may be accomplished with the left hand, the right being left free to wipe away the discharge, or to make applications to the eye.

As soon as the lids are separated, a quantity of thick, yellowish pus wells up between them and partially obstructs the view; the swollen palpebral conjunctiva, compressed by the spasmodic action of the orbicularis muscle, may also project in folds. The collection of matter is now removed with a soft, moist sponge or rag, and the surface of the ocular conjunctiva exposed. This membrane is found to be of a uniform red color, with the vessels undistinguishable from each other, and elevated above the sclerotica by an effusion of serum and fibrin in the cellular tissue beneath it. This swelling of the conjunctiva is seen to terminate at the margin of a central depression occupying the position of the cornea, and filled with a collection of the less fluid constituents of the puriform discharge, which may at first sight be mistaken for the *débris* of a disorganized cornea. On removing this matter, however, the latter structure may still be found clear and transparent, at the bottom of the depression, where it is overlapped by the swollen conjunctiva. In less fortunate cases, it may have become hazy from the infiltration of pus between its layers, or ulceration may have already commenced. If an ulcer is not evident on first inspection, it may often be discovered at the margin of the cornea by

gently pushing to one side the overlapping fold of conjunctiva. Meanwhile, the secretion of pus is constantly going on and requires repeated removal. It is astonishing to observe how large a quantity of this fluid can be secreted by so limited a surface. It has been estimated at more than three ounces per day in some cases.

The amount of pain, occasioned by this disease, varies in different cases. During the development and acme of the inflammation, it is generally severe. It is described by the patient as a sensation of burning heat and tension in the eyeball, radiating to the brow and temple. The system at large sympathizes with the local disease. For a time there may be general febrile excitement, but symptoms of depression soon appear; the pulse becomes rapid and irritable, the skin cold and clammy, and the patient anxious and nervous. This depression of the vital powers is not invariably met with, but is the most frequent condition of the patient, after the disease has continued for a few days; and it may occur even at an earlier period when the health has been previously impaired by any cause.

Notwithstanding the severity of the symptoms, resolution is still possible. Under proper care and treatment, the inflammatory action may abate, and the tissues recover their normal condition, leaving the eye as sound as before the attack. So fortunate a result, however, is more to be hoped for than confidently anticipated. The chances of success are greater when the case is seen at an early period, before the effusion beneath the conjunctiva has been rendered firm by a deposit of fibrin, or before ulceration of the cornea has commenced. The latter is the chief danger to be feared. Ulceration usually commences at the margin of the cornea, and may extend around its circumference, or advance towards its centre. It is in some cases superficial; in others, it penetrates through the whole thickness of the cornea, and prolapse of the iris ensues, or more or less of the contents of the globe escapes. Sometimes a portion or the whole of the corneal membrane becomes disorganized, and comes away *en masse*. The eye has been known to be destroyed in this manner within twenty-four hours after the first symptoms of the disease were observed, and this catastrophe is said to have occurred in a single night, in a case at the New York Hospital. The escape of the aqueous humor, and other contents of the globe, is usually followed by an amelioration of the pain, and the patient often entertains the hope that he is improving, while the surgeon knows that the sight is irretrievably lost.

The amount of permanent injury inflicted upon the eye will depend upon the extent and situation of the ulceration. When the latter has been superficial, and situated near the margin of the cornea, the resulting opacity will not interfere with vision, and even when the leucoma is central, an operation for artificial pupil is still practicable, if any portion of the cornea remain clear. Perforation of the anterior chamber and prolapse of the iris, when partial, may also be remedied by art; but when the whole, or the larger portion of the cornea has sloughed away, and the prolapsed iris has become covered with a dense layer of fibrin, forming an extensive staphyloma, the case is hopeless.

Diagnosis.—Independently of the history of the case, we have no means of distinguishing gonorrhœal ophthalmia from severe purulent conjunctivitis. It has been asserted that the former commences in inflammation of the ocular conjunctiva, while the latter first affects the lining membrane of the lids. Even if this were true, it would afford but little assistance in the diagnosis, since we are rarely enabled to watch the early symptoms.

Treatment.—In undertaking the treatment of a case of gonorrhœal ophthalmia, it is of the first importance that the patient be intrusted to the care of an intelligent, careful, and faithful nurse, whose whole time and attention can be devoted to carrying out the surgeon's directions. This disease is so rapid in its progress, that neglect for a few hours only may prove fatal to vision; if the eye be saved, a large share of the credit will be due to the faithfulness of the attendant. It hardly need be said that the light touch and gentle hand of a devoted woman should be secured, if possible.

The directions of the surgeon should vary according to the stage of the disease. If the inflammation has commenced within a few hours only, and has not as yet attained its height, from four to six leeches may be applied near the external canthus of the affected eye, or a number of them be made to attach themselves to the mucous membrane of the corresponding nostril. If leeches are not at hand, cups to the temples will suffice. Such local depletion may generally be repeated with benefit, for a day or two, once or twice in the twenty-four hours, especially if the patient be of full habit. If, however, the disease progresses unchecked, and especially if there be any symptoms of general depression of the system, even this slight abstraction of blood should be avoided. It is adapted only to the early stage of the inflammation, and, at a later period, is useless, if not positively injurious.

In the early stage of this affection, we often derive great benefit from the constant application of cold. A *single thickness* of linen or thin cotton should be torn into strips of convenient size and shape, and laid upon or between pieces of ice. When thoroughly chilled, one should be laid over the eye, and be replaced by a fresh one every three to five minutes. We would recommend these applications to be kept up during the whole of the first night following the commencement of the attack. We can the next day decide on their continuance or suspension from the symptoms and the effect produced.

If the inflammation tend to increase, a free purge should be administered, as, for example, five grains of calomel followed by half an ounce of castor oil, a full dose of Epsom salts, or three "compound cathartic pills." With regard to the diet of the patient, much will depend upon his general condition. As a general rule at this early stage, it should be light, consisting of gruel, broths, etc.; at the same time it is important to recollect the tendency in this disease to depression of the vital powers, and to be governed by the indications of each individual case.

Lastly, but by no means of least importance, the directions which will presently be given for the frequent cleansing of the eye, should be insisted on, and the attendant be duly instructed in doing it.

The treatment above recommended is intended for the early stage of gonorrhœal ophthalmia, before much chemosis, swelling of the lids, or other severe symptoms have set in. In most cases, however, as already stated, the surgeon does not see his patient till the disease has attained its height, when some modification of the above treatment is required.

Leeches and cups can now rarely be used to advantage. At the best, they will be impotent to stay the progress of the inflammation. Cathartics should be given as in the first stage,[1] and one or two free evacuations from the bowels secured each day. Here again the general condition of the patient will in a measure determine the diet to be recommended; but in the great majority of cases nourishment should be administered as freely as the appetite will admit, and may consist of bread, milk, beef-tea, steaks, mutton, eggs, etc. When the patient is unable to eat, and especially if his skin is found to be cool and his pulse irritable, or again, if ulceration of the cornea has already commenced, we must resort to stimulants and tonics. These are almost always required in this stage of the disease in hospital practice, where patients are generally more or less cachectic, and even in private practice the subjects of gonorrhœal ophthalmia are often run down by an irregular course of life. Nothing will so much contribute to hasten destructive ulceration of the cornea as a low state of the vital powers. The least indication of this condition should be met by quinine, ale, porter, wine, or milk-punch, freely administered.

The room occupied by the patient should, if possible, be spacious, dry, and well ventilated. The eyes may be protected from a glare of light by the position of the patient, or by a pasteboard shade, or by curtains; but the room should not be entirely darkened, as the complete exclusion of light favors congestion of the eye. With still stronger reason, should the eyes be uncovered and kept free from poultices, alum-curds, tea-leaves, raw oysters, or similar applications, which are often recommended by some officious acquaintance. No surer way of destroying the sight could be devised than the use of these articles.

When chemosis has already taken place, no time should be lost in dividing the ocular conjunctiva and the subjacent cellular tissue by means of a scarificator, bistoury, or scissors, and the operation should be repeated once or more frequently during the twenty-four hours, so long as the chemosis continues. The late Mr. Tyrrell advised radiated incisions between the courses of the recti muscles, on the supposition that ulceration of the cornea was due to constriction of the conjunctival vessels exercised by the chemosis, which it was desirable to relieve without cutting off the vascular supply by dividing the larger vessels. Experience, however, has shown that his theory was incorrect, and that as much benefit accrues from

[1] When the disease has already made considerable progress before the surgeon is called, an active cathartic, as croton oil, should be selected.

simply snipping the conjunctiva and underlying cellular tissue wherever it is puffed up by infiltration, and promoting the flow of blood by the application of warm water. Within half an hour after the blood has ceased to flow, the whole inflamed surface should be freed from pus and brushed over with a camel's-hair pencil dipped in a solution of nitrate of silver containing forty to sixty grains to the ounce, or the solid crayon may be applied, taking care to remove the residue by a free application of tepid water afterwards.

In saying that the "whole inflamed surface" should receive this application, we, of course, include the palpebral as well as the ocular conjunctiva, and the former can only be reached by everting both the upper and under lid. Now, if any difficulty is met with in accomplishing this eversion, *the palpebral opening should be enlarged by dividing the external canthus with a pair of blunt-pointed scissors.*

The "mitigated lapis" (crayons of the nitrate diluted with the chloride of silver to different strengths) is excellent for these applications. The inflamed surface is left covered with a superficial whitish eschar, and its secretion is for a time arrested. No further application need be made while this eschar remains, but when it falls off spontaneously and the surface again commences to suppurate, the application should be repeated.

Instillations of a solution of the nitrate, which were formerly much in use, are not to be recommended, for the reason that they naturally fall on the cornea, where they are not wanted and where they cause great pain, and that they fail to reach thoroughly the conjunctiva, for which they are intended.

At the first visit the attendant, who is to take charge of the case, should be instructed as to her duties, and the importance of her faithfully performing them. She should be made to look on while the surgeon goes through the process of opening and cleansing the eye, and be taught to follow his example. A syringe is sometimes recommended for the purpose of removing the pus. There are, however, two objections to the employment of this instrument: in the first place, unless used with gentleness, the force of the stream irritates the inflamed and sensitive conjunctiva; and, again, the injected fluid, mixed with contagious matter, may be reflected back, and strike the eye of the attendant or fall upon the opposite eye of the patient. Several cases are recorded in which this accident has occurred. For these reasons a soft rag is to be preferred, and this, again, is better than a sponge, because it is more cleanly and may be frequently changed. By squeezing the fluid from the rag upon the adherent portions of the discharge, or by gently touching them with a free fold of the cloth projecting beyond the fingers, they can readily be detached. Simple tepid water may be used for these ablutions, but I prefer a solution of alum, of the strength of a drachm to the pint. The nurse should be directed to repeat them every hour or every half hour, according to the severity of the case, and the patient may be furnished with a cupful of the solution to bathe the external surface of the eye and wash away the discharge, still more frequently. Cleanliness may be still further promoted by smear-

ing the edges of the lids and ciliæ with simple cerate, so as to prevent their becoming incrusted with matter.

The strong solution of nitrate of silver, already mentioned, may be re-applied by the surgeon twice a day when he makes his visits. The frequency, however, of the application should depend upon the condition of the parts and the effect produced. No routine practice is admissible. The patient must not be deprived of sleep by too frequent repetition of these measures during the night, but he should be provided with a watcher, who will cleanse the eye and apply the solution of nitrate of silver every few hours. If necessary, sleep must be promoted by the administration of an opiate.

The time has gone by, when mercurials were thought requisite in this disease, on account of its supposed syphilitic origin. The only circumstances which can justify their employment is the presence of a firm, fleshy chemosis, which, owing to its consistency, cannot be relieved by incisions. In such cases, mercurials may perhaps hasten the absorption of the fibrinous deposit: but they should be used with great caution, especially when ulceration of the cornea has already commenced, and should never be pushed to salivation. An excellent formula, combining the "gray powder" with quinine, is the following:—

℞. Hydrarg. cum Cretâ gr. ij . . . | 12
Quiniæ Sulphatis gr. j–iv. . . . | 06—25
Misce et ft. pulv.
One to be taken morning and night.

When only one eye is affected, the greatest care should be taken to avoid inoculation of the other by allowing the discharge to come in contact with it. On the slightest indication of inflammation in the latter, a weaker solution of nitrate of silver should be applied to it, as frequently as to the eye first affected.

When there is excessive œdema of the lids, it may interfere with opening the eye and cause pressure upon the globe; in which case relief may be given by puncturing the skin in several places with a lancet. Division of the external canthus, already mentioned, in order to facilitate the exposure of the inflamed conjunctiva, was first recommended by Mr. France.[1]

As the symptoms improve, the stronger solution of nitrate of silver may be omitted, and the weaker applied less frequently. When the chief danger is passed, the collyrium may often be changed with benefit, and one of the following substituted:—

℞.	Zinci Sulphatis gr ij	0 12
	Glycerinæ ℥ij	10 00
	Vini Opii ℥j	4 00
	Aquæ ℥v.	20 00
M.		
℞.	Acidi Gallici gr. x	0 60
	Glycerinæ ℥iij	15 70
	Vini Opii ℥ij	8 00
	Aquæ Camphoræ q. s. ad ℥iv . . .	125 00
M.		

[1] Guy's Hospital Reports, third series, vol. iii.

By far the most convenient way of applying collyria to the eye, either in the affection under consideration or in iritis when instillations of a solution of atropine are required, is by means of a very simple instrument, consisting of a glass tube with a piece of closed India-rubber tubing attached. Compression of the India-rubber tubing enables the operator to take up a few drops of the wash, and in a similar manner to inject it into the eye. With children and timid persons this is specially of value.

Fig. 48.

A simple instrument for applying drops to the eye.

I have met with cases in which a solution of nitrate of silver appeared to irritate the eye, and in which the above collyria were found preferable even in the acute stage of the disease.

The occurrence of an ulcer upon the cornea is of serious moment, and the friends of the patient should be informed of the danger to vision.

The pupil should be dilated by dropping a solution of atropine upon the globe several times a day, or by smearing extract of belladonna, moistened with glycerine, around the orbit. The former is much more cleanly. The usual strength of the solution employed is from two to four grains to the ounce. The object of thus dilating the pupil is to diminish the prolapse of the iris if the ulcer should penetrate through the cornea, and, if possible, to prevent the pupil's becoming involved in the resulting synechia. The chances of accomplishing this are not very great, for a pupil dilated by mydriatics contracts as soon as the aqueous humor escapes, as is seen during the operation of extraction for cataract; still as the evacuation of the contents of the anterior chamber in perforating ulcer of the cornea is often sudden, some hope may be entertained of limiting the prolapse. I would again remind the reader of the importance of avoiding antiphlogistic remedies and of the necessity of supporting the strength, when the cornea, a tissue of low vitality, is attacked by the ulcerative process. Cupping, leeching, low diet, and mercurialization will be sure to hasten destruction of the eye, which can only be saved, if saved at all, by generous living, stimulants, and tonics.

A granular condition of the palpebral conjunctiva is frequently left after an attack of gonorrhœal ophthalmia, and may keep up a slight discharge and irritation of the eye for a considerable time. The best means for its removal consists in the application of a crystal of sulphate of copper to the everted lids every second or third day; and the general system should, at the same time, be supported.

When a staphyloma has formed, its friction against the lids is often a source of irritation to the affected eye, and, through sympathy, to its fellow. If it is small, there may be hope of its contracting and being less prominent, as the fibrin covering it becomes more firmly organized; and it may be pencilled over daily with a strong solution of nitrate of silver

with a view of favoring this result. When, however, it has already attained considerable size, and covers so large a portion of the cornea that there is no chance of the eye serving as an organ of vision in future, it is useless to make any further attempts to save the eye, especially as its inflamed condition endangers the integrity of its fellow, and the intraocular pressure will probably still further increase the size of the staphyloma, until it bursts of itself or is relieved by art. Two operations are available under these circumstances: one, the ordinary excision of the staphylomatous projection and sinking of the eye; the other, enucleation of the globe by the modern or Bonnet's method.

The former is to be preferred, as a general rule, in cases of staphylomata following gonorrhœal ophthalmia, because the staphyloma is usually limited to the cornea, and the deeper tissues of the eye are commonly, though not always, sound. Moreover, the mobility of an artificial eye is greater when worn upon a sunken globe, than when the latter is removed; and, again, patients, through ignorance of the simple modern operation for extirpation, are very averse to its performance. At the same time, it should be recollected that a sunken eye, especially when irritated by wearing a glass substitute, may at any future period become inflamed and endanger the integrity of its fellow through sympathy. After the removal of a staphyloma, therefore, patients should always be warned of this danger, and cautioned to seek advice at once, if ever the stump should become inflamed, or the sight of the fellow eye should begin to fail.[1]

The operation for removing a staphyloma is too well known to require description here. There is only one point to which I desire to call attention. After the operation, the lids should be closed by strips of isinglass plaster and remain so until the wound has entirely healed; otherwise the friction of the lids and the exposure of the hyaloid membrane to the air, will be likely to set up inflammation in the deeper tissues of the eye and cause much suffering.

Enucleation of the globe should be preferred, when internal or general ophthalmia has supervened; when the staphyloma includes not only the cornea but a portion of the sclerotica; or when hemorrhage has taken place from the bottom of the eye, either on the perforation of the anterior chamber, on the bursting of the staphyloma, or during an operation for its removal. The blood, in these cases, comes chiefly from the choroidal vessels; its flow may be arrested, but the clot can only be eliminated by the slow and tedious process of suppuration, and it is better to remove the eye at once.

The modern operation for enucleation of the globe is exceedingly simple. The ball of the eye is alone removed, while the remaining contents of the orbit are left. The instruments required are a pair of toothed forceps,

[1] Calcareous deposit is very liable to take place in sunken globes which have become the seat of chronic inflammation, and in such cases it is impossible to relieve the irritation except by extirpation. I have removed the stump of an eye, destroyed by granular conjunctivitis, in a boy aged 16, in which I found a plate of calcareous matter the size of a three-cent piece.

blunt-pointed straight scissors, and a strabismus hook. The eye should be kept open with a wire speculum. The conjunctiva and underlying fascia are divided close around the margin of the cornea, and the tendons of the four recti muscles hooked up and severed as in an operation for strabismus. The scissors are then passed in behind the globe and the optic nerve cut at its point of entrance, when the ball may readily be removed, after dividing the oblique muscles and any remaining points of attachment. There is no danger of subsequent hemorrhage. The lids may be allowed to close, and the clot which forms within them is the best hemostatic for such cases. If the operation has been well performed, without extending the incisions beyond the ocular fascia, the wound will heal with great rapidity. I have frequently been able to insert an artificial eye on the third or fourth day after the operation.[1]

The remedies recommended in the preceding pages for gonorrhœal ophthalmia may be recapitulated as follows: cleanliness, frequent application of an astringent solution, nourishment, and, in most cases, stimulants and tonics, incisions of the chemosed conjunctiva, cathartics, and local depletion. This plan of treatment differs widely from the copious and repeated venesections, the low diet, and the free administration of mercurials and tartar emetic, prescribed by nearly all writers on this affection until within a few years.

In the words of Mr. Dixon: "The student ought constantly to bear in mind that, although the disease termed purulent ophthalmia has received its name from that symptom which readily attracts notice, namely, the profuse conjunctival discharge, the real source of danger lies in the *cornea;* and that, even if it were possible so to drain the patient of blood as materially to lessen or even wholly arrest the discharge, we might still fail to save the eye. It is not the flow of pus or mucus, however abundant, that should make us anxious, but the uncertainty as to whether the vitality of the cornea be sufficient to resist the changes which threaten its transparency. These changes are twofold—*rapid ulceration* and *sloughing.* Now, has any sound surgeon ever recommended excessive general bleeding and salivation as a means of averting these morbid changes from any other part of the body except the eye? And if not, why are all the principles which guide our treatment of other organs to be thrown aside as soon as it attacks the organ of vision?"

[1] It would be out of place in this work to enter more fully into the details of this and other operations which may be required after gonorrhœal ophthalmia. For further particulars with reference to extirpation of the globe, the reader is referred to an essay by Mr. Critchett, in the London Lancet (Am. ed.), Jan. 1856; also to papers by Dr. C. R. Agnew and by the author, in the N. Y. Journal of Med., Jan. and May, 1859.

CHAPTER XXI.

GONORRHŒAL RHEUMATISM.

The question, Who was the first discoverer of a relationship between gonorrhœa and rheumatism? is not of much importance, but has attracted considerable attention. The first mention of such connection, that I am aware of, is to be found in the "Antonii Störck Libellus, quo demonstratur," etc. etc., Viennæ, 1769. Swediaur (1781) described this affection under the name of "Arthrocele, Gonocele, or Blennorrhagic Swelling of the Knee."[1] Hunter,[2] in 1786, said: "I knew one gentleman who never had a gonorrhœa but that he was immediately seized universally with rheumatic pains; this had happened to him several times. The blood at such times is generally free from the inflammatory appearance, and therefore we may suppose that the constitution is but little affected." Since that time, this disease has received particular attention from various writers on venereal diseases and diseases of the joints, among whom Sir Benjamin Brodie,[3] Sir Astley Cooper,[4] Ricord,[5] Bonnet, of Lyon,[6] Foucart,[7] Brandes,[8] Rollet,[9] and Fournier,[10] are especially worthy of mention. It has been the subject of lively discussion at the meetings of many learned societies, and notably before the *Soc. méd. des hôpitaux de Paris*, in 1866, a full account of which may be found in the *Gaz. hebdomadaire* and the *Union médicale* for 1866 and 1867. It has by no means been allowed to retain its place in the nosological system undisturbed, and there have been many who have attempted to explain it away, on various hypotheses. Its claims to be considered a distinct complication of gonorrhœa will appear in the course of this chapter.

To an observer who had never heard of the connection between gonorrhœa and rheumatism, it might indeed appear a mere coincidence, if a

[1] A Complete Treatise on the Symptoms, etc., of Syphilis, by F. Swediaur, M.D. Translated from the fourth French edition, by Thomas T. Hewson. Phila., 1815, p. 108.

[2] Ricord and Hunter on Venereal, Bumstead's 2d ed., p. 88.

[3] Brodie's Select Surgical Works: Diseases of the Joints. Phila., 1847.

[4] Lectures on the Principles and Practice of Surgery. London, 1835, p. 482.

[5] Notes to Hunter, 2d ed. Phila., 1859, p. 275.

[6] Traité des maladies articulaires. Paris, 1853, t. i, p. 376.

[7] Quelques considerations pour servir à l'histoire de l'arthrite blennorrhagique; in 8vo., pp. 45. Bordeaux, 1846.

[8] Arch. gén. de méd., Sept., 1854.

[9] Annuaire de la syphilis; année 1858, Lyon.

[10] Union méd., Paris, Nos. 9 and 10, 1867; also N. Dict. de méd. et de chir. prat., Paris, tome v, p. 224.

patient suffering from gonorrhœa should suddenly be seized with inflammation of the joints; but should this same patient, after entirely recovering from both affections, and after several years of perfect health, again contract gonorrhœa, and again be seized with articular rheumatism, the occurrence would be sufficiently remarkable to excite a suspicion in the mind of the most careless observer that there was some connection between the two. Let this second attack be followed by a third, fourth, and fifth, and the suspicion would be converted into a very strong probability. Suppose that numerous other patients were met with in whom these two affections thus repeatedly coexisted, an attack of gonorrhœa in each of them being followed by one of rheumatism, with such certainty that the latter might be predicted immediately on the appearance of the former, and a manifest relation between the two diseases could no longer be doubted. Now, this repetition of these two diseases in the same person is not merely hypothetical—it is a reality; and it is observed in subjects entirely free from any rheumatic diathesis, who have inflammation of the joints at no other time than when they have gonorrhœa. Among the many cases which might be cited, none perhaps will better illustrate this point than the following, which I quote from the lectures of Sir Astley Cooper:—

"I will give you," says this distinguished surgeon, "the history of the first case I ever met with; it made a strong impression on my mind. An American gentleman came to me with a gonorrhœa, and after he had told me his story, I smiled, and said: do so and so (particularizing the treatment), and that he would soon be better; but the gentleman stopped me, and said, 'Not so fast, sir; a gonorrhœa with me is not to be made so light of—it is no trifle; for, in a short time you will find me with inflammation of the eyes, and in a few days, I shall have rheumatism in the joints; I do not say this from the experience of one gonorrhœa only, but from that of two, and on each occasion I was affected in the same manner.' I begged him to be careful to prevent any gonorrhœal matter coming in contact with the eyes, which he said he would. Three days after this I called on him, and he said, 'Now you may observe what I told you a day or two ago is true.' He had a green shade on and had ophthalmia in each eye; I desired him to keep in a dark room, to take active aperients, and apply leeches to the temples. In three days more he sent for me, rather earlier than usual, for a pain in one of his knees; it was stiff and inflamed; I ordered some applications, and soon after the other knee became inflamed in a similar manner. The ophthalmia was with great difficulty cured, and the rheumatism continued many weeks afterwards."

Similar cases are related by nearly every author who has written on this affection, and, further on, many are given in a table of the diseases of the eye which accompany gonorrhœal rheumatism. M. Rollet relates in detail five such instances occurring in his own practice, and this repetition took place in eight of thirty-four cases reported by Brandes, of Copenhagen, and in three of eight cases observed by M. Diday. According to Rollet's researches, this repetition has been noted in nearly one-quarter of the total number of cases of gonorrhœal rheumatism which have been published.

The frequency of cases like these can leave no doubt in the mind that a close relation exists between these two affections, and additional evidence is found in the fact that the rheumatism attendant upon gonorrhœa presents certain peculiarities, which, in general, are sufficient to distinguish it from the ordinary forms of rheumatism.

CAUSES.—In comparison with the great frequency of gonorrhœa, gonorrhœal rheumatism is exceedingly rare. Very little is known of the causes which occasion it in the few, while the many affected with gonorrhœa escape. Its occurrence might naturally be attributed to a rheumatic diathesis, especially as the fact is well established that persons subject to rheumatism are particularly prone to contract gonorrhœa; and it is distinctly asserted by several writers that a constitutional tendency to rheumatism is a predisposing cause of inflammation of the joints during an attack of gonorrhœa. There is reason to believe, however, that the plausibility of this opinion, founded on *à priori* reasoning, has given it greater weight than it deserves. Those who have expressed it, have failed to produce any evidence in its support; and if we examine the published cases of this disease, we frequently find it noted that the patient never suffered from rheumatism except when he had gonorrhœa. M. Rollet has made this point a special subject of inquiry, and states that in the great majority of cases of gonorrhœal rheumatism which have come under his observation, there was no rheumatic diathesis either in the patients or in their parents. He also states that he has had under treatment many patients with gonorrhœa who were predisposed to rheumatism, and yet in them, urethritis has not been attended by any inflammation of the joints; and this fact derives additional weight from the frequency with which gonorrhœal rheumatism, after having once occurred, is re-excited by a subsequent clap. These statements of M. Rollet go far to show that a rheumatic diathesis has no part in the production of gonorrhœal rheumatism; and the contrary opinion is now generally abandoned.[1]

In earlier times, when gonorrhœa was regarded as identical with syphilis, an evident explanation of the occurrence of rheumatism in the course of a urethritis was readily found, but the same is untenable with our present knowledge. The same is true of the "gonorrhœal diathesis," which some authors have maintained to exist, since gonorrhœa is a local disease, and does not affect the system at large.

It should be observed that this form of rheumatism does not accompany inflammation of all portions of the genital organs, but only that of the urethra. No attack of balanitis in the male, or of vulvitis or vaginitis in

[1] M. Rollet weakens his position by asserting an antagonism between a rheumatic diathesis and gonorrhœa, in virtue of which, he believes that a clap sometimes cures a patient of a tendency to rheumatism, from which he has previously suffered for years! He says that he has observed one such case, and quotes another in detail which occurred in the practice of M. Diday: but surely it is more reasonable to suppose that the disappearance of the rheumatism in these two cases was a mere coincidence.

the female, has ever been known to be attended by it. It appears only in cases of urethritis. Hence the impropriety of the name "genital rheumatism" given to it by Lorain; and hence also (perhaps) its rarity in women whose attacks of gonorrhœa are usually limited to the vagina and vulva.

It may be remarked *en passant*, that the most appropriate name for this affection is that applied to it by Fournier, viz., "urethral rheumatism," since it is not necessarily connected with gonorrhœa, but may be produced by the simple passage of a sound or other cause of *urethral* irritation.

The idea, advanced by some authors, that urethral rheumatism is due to a mild form of purulent infection, is a mere supposition, unsupported by any evidence. In short, the mode of connection between the disease of the joints and the urethritis is at present entirely unknown.

The exciting cause of gonorrhœal rheumatism cannot be found in the use of copaiba and cubebs, as has been sometimes asserted, or in exposure to cold and sudden changes of temperature. Inflammation of the joints has frequently been known to occur in patients who have taken neither of these drugs, and who have been confined to the wards of a hospital during the whole course of their attack of gonorrhœa. On the other hand, how frequently are copaiba and cubebs administered for gonorrhœa, and how often must the subjects of clap be exposed to cold and moisture, and yet how rare is gonorrhœal rheumatism!

The phenomena of gonorrhœal rheumatism are also inconsistent with the idea of a metastasis from the urethra to the joints, since in most cases there is an exacerbation of the urethral discharge preceding the articular inflammation. This is especially noticeable in chronic cases of gleet, in which gonorrhœal rheumatism supervenes.

Gonorrhœal rheumatism is comparatively rare in women, indeed, its existence in this sex was formerly denied. Further observation has, however, shown that women are not exempt from it, and no small number of cases have been reported by various authors, as Ricord, Vidal, Cullerier, de Meric,[1] Mr. Hardy,[2] Dr. Angelo Scarenzio,[3] Langlebert,[4] and Fournier. The last named author saw seven cases in women within about two years' time.

Frequency.—This is a rare affection if compared with the frequency of gonorrhœa. Thus Fournier states that in 1912 cases of gonorrhœa which have come under his observation, he has met with 31 cases of rheumatism, or about one in 62 cases; but, as Fournier remarks, this proportion must be above the truth, when we consider what a large number of cases of gonorrhœa are neglected or treated by the patients themselves without surgical advice.

[1] British Med. Journ., 1867, vol. ii, p. 335.
[2] Dublin Quart. Journ., vol. xlvi, p. 241.
[3] Giornale Italiano, Miliano, 1874, vol. ii, p. 129.
[4] Gaz. méd. de Lyon, 1865, p. 484.

SEAT.—None of the joints are exempt from an attack of gonorrhœal rheumatism, but this disease affects the knee far more frequently than any other joint. The following table exhibits the order of frequency with which the various joints were affected in 81 cases observed by MM. Foucart, Brandes, and Rollet:—

Articulation of the knee	64
" " ankle	30
" " hips	15
" " fingers and toes	15
" " shoulder	10
" " wrist	10
" " elbow	8
" " sternum and clavicle	3
" " tarsal bones	2
" " sacrum and ilium	2
" " lower jaw	1
" " tibia and fibula	1
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Fournier gives the following table of his observations:—

Synovial membranes of the joints	51
" " " tendons	10
Muscles	10
The bursæ	6
The sciatic nerve	5

And nine cases in which it was impossible to determine the exact seat of the pain complained of by the patients.

Besides the joints, gonorrhœal rheumatism frequently affects the ocular tunics; also the bursæ connected with the muscular tendons, especially the tendo-Achillis; and sometimes the sheaths of the muscles, as in muscular rheumatism. Again, Ricord states that he has met with several patients who suffered from severe pain in the plantar region, apparently seated in the fasciæ. Dr. Liebermann[1] reports a case of supposed gonorrhœal rheumatic inflammation of the crico-arytenoid joint of the larynx.

The knee-joint, therefore, is the favorite seat of gonorrhœal rheumatism, though all the joints of the body are liable to its attacks. This disease, however, is less prone to change its seat from one joint to another than ordinary articular rheumatism. This fact is evident from an examination of the above table, which shows that there were but 161 joints affected in 81 cases; an average of about two joints to each case. I know of no similar table exhibiting the number of articulations affected in a given number of cases of ordinary rheumatism, but the proportion is undoubtedly much greater. Again, in 10 of the 19 cases in the above table, furnished by M. Foucart, only one joint was affected; of the 34 cases of M. Brandes's, the rheumatism was mono-articular in 5, and also in 10 of the 28 cases

[1] Med.-Chir. Centralblatt, No. 41, 1874, as quoted in the N. Y. Med. Jour., Sept., 1878, p. 327.

collected by M. Rollet. These facts, therefore, would give us a ratio of about one-third, in which gonorrhœal rheumatism attacks but a single joint, but more extended statistics are required before this proportion is received as accurate.

Even when gonorrhœal rheumatism does not remain confined to one joint, but extends to others, the articulation first affected does not recover its normal condition, as it often does in ordinary articular rheumatism, but generally continues in a state of inflammation after the disease is lighted up in other joints. In this respect, gonorrhœal rheumatism again differs from acute rheumatism, but approximates to the character of rheumatic gout.

There can be no question, I think, that gonorrhœal rheumatism sometimes attacks the heart, but it is equally certain that this complication is much less frequently met with than in ordinary acute articular rheumatism.[1] Ricord states that in several clearly marked cases of gonorrhœal rheumatism, he has observed symptoms of endocarditis, and also of effusion within the pericardium, but it is to be regretted that he has not given these cases in detail. The rarity of any mention of heart disease, however, in the reported cases of gonorrhœal rheumatism, proves the correctness of the above assertion that this disease is usually free from such complication. The following case is reported by Mr. Brandes:—

A man, 50 years of age, had had five attacks of gonorrhœa within ten years; each attack being attended with disease of the joints. In a sixth attack he was seized with violent pain and swelling of several joints, especially the knee. A few days after, inflammation of the eye and pericardium ensued. The friction sound was well marked; and the pulsations of the heart were irregular. There was dulness on percussion over a considerable space, with palpitation and pain in the precordial region. The symptoms improved under venesection and mercurials. Meanwhile the iris became inflamed in the right eye, and a week after this eye recovered, the left was attacked. The patient finally recovered, but suffered from weakness of the lower extremities for a long time, so that he was obliged to walk with crutches for several months.

Dr. Marty reports a case of gonorrhœa in a man 22 years of age, which was complicated by acute endocarditis located at the aortic valves. There was no rheumatism or metastatic articular affection. He has collected nine other cases in which a disease of the heart or pericardium developed itself four or five weeks after the commencement of a gonorrhœa. Of the ten (including the above), seven were endocarditis and three pericarditis. In eight of the cases the cardiac affection was preceded by gonorrhœal rheumatism; in the other two, there was none. The urethral discharge was re-established when the acute symptoms disappeared. Dr. Marty concludes that any serous membrane may be attacked during the existence

[1] "I am induced to think that, under ordinary circumstances, some heart affection arises in about half of all cases of acute rheumatism." (*Fuller on Rheumatism.*)

of gonorrhœa, and that this inflammation is due to the disease of the urethra. (*Med. Record.* Aug. 11, 1877, from the *Archives gén.*)

M. Desnos[1] read a case of this affection before the Paris Hospital Society. At the autopsy a small ulcer was found on the mitral valve, together with a considerable vegetant endocarditis of the aortic valves and the whole of the interior of the heart.

Ricord is the only authority, so far as I am aware, who has seen any affection of the nervous centres in gonorrhœal rheumatism. This surgeon states that he has met with symptoms of compression of the spinal marrow and of the brain, such as paraplegia and hemiplegia, which appeared to be produced by increased effusion within the serous membranes of the brain and spine, and which followed the same course as the affection of the joints.

No affection of the lungs or pleura has ever been observed in gonorrhœal rheumatism.

Gonorrhœal rheumatism is essentially an hydrarthrosis, and in many instances the inflammation is confined to the synovial membrane of the joint during the whole course of the affection. The predilection of this disease for serous membranes is shown by its attacking the bursæ connected with the tendons, especially about the wrist and ankle. Rollet states that he has seen one case in which the seat of the disease appeared to be a bursa accidentally developed over the acromion process, and Cullerier has met with the same in the bursa in front of the patella.

Symptoms.—In describing the symptoms of gonorrhœal rheumatism, it is desirable to take those of ordinary articular rheumatism as a standard of comparison. Proceeding in this manner, we find that gonorrhœal rheumatism is generally ushered in with less febrile disturbance than its more frequent congener. In some cases there is an entire absence of premonitory symptoms, and the patient's attention is not attracted to the joints until effusion has taken place and motion has thereby been rendered painful and difficult. In other instances, a slight chill and wandering pains have been experienced, before the morbid action has become settled in any one joint; and those cases are exceptional in which the inflammatory symptoms at the outset are comparable in violence to those of acute rheumatism.

When the articular disease is fairly established, the pain is increased and is often severe; but here, also, we find the symptoms less acute, as a general rule, than in ordinary rheumatism. Even in those cases in which the local pain is great, there is much less general febrile excitement; and an examination of the blood drawn in five cases by M. Rollet and in one by M. Foucart, failed to show that buffed and cupped condition of the clot which is so frequently met with in acute rheumatism.

Sweating, which is so abundant in ordinary rheumatism, is absent in the form of the disease accompanying gonorrhœa.

[1] Gaz. hebd., Paris, Nov. 16, 1877, quoted in the Monthly Abstract of Med. Sci., vol. v, p. 23.

The integument covering the affected joint generally retains its normal color though it sometimes puts on the blush of inflammation. When the knee-joint is the seat of the disease, as is frequently the case, the symptoms of a serous effusion within the capsule are readily detected. The patella is elevated above the femur and is freely movable; the joint has the form of a cube, the usual depression on either side of the patella being replaced by swellings, and fluctuation can be detected without difficulty. It is evident that the inflammatory process is confined to the synovial membrane, and that the fibrous and osseous tissues are unaffected. The collection of serum necessarily impairs the mobility of the joint, and pain is excited by pressure or by any attempt at motion. If the disease do not yield readily to treatment, other tissues about the joint become involved, and we may then find redness of the skin, together with fulness of the vessels and a corresponding increase of the pain and general febrile disturbance, assimilating the case to one of acute rheumatism.

Those cases of gonorrhœal rheumatism which commence with the most decided inflammatory symptoms are generally the most amenable to treatment; those, on the contrary, in which the febrile action is but slight, and in which there is but little more than a passive effusion into the synovial sac, are more obstinate.

Recovery, in any case of this disease, can rarely be expected in less than a month or six weeks, and is often delayed for several months or even years, especially when the patient is debilitated and when the affection of the urethra is allowed to run on or does not yield to treatment.

Fournier[1] has called attention to an interesting and comparatively rare symptom of gonorrhœal rheumatism, viz., sciatica. He states that he has observed seven instances, and that an eighth is reported by Tixier.[2]

It is unnecessary to describe the symptoms of the cardiac affection which sometimes complicates a case of gonorrhœal rheumatism, since these do not differ from those of endocarditis and pericarditis attendant upon ordinary acute rheumatism. The inflammation of the eye which frequently precedes or accompanies—or sometimes alternates with the disease of the joints, and which is evidently dependent upon the same condition of the general system, will presently receive special mention.

Most cases of gonorrhœal rheumatism terminate sooner or later in complete resolution, although they may render the patient a cripple for a long period. Suppuration within the bursa very rarely occurs. It is admitted by Ricord, who says, however, that it is always due to some accessory cause of inflammation; and Vidal mentions one case occurring under his charge in which it was necessary to open the joint and evacuate the purulent collection. Zeissl mentions an interesting case communicated to him by Dr. Eisenmann in which death ensued. Again Dr. Prichard[3] reports two cases, in one of which an abscess communicating with the joint formed

[1] Note pour servir à l'histoire du rhumatisme uréthral, Paris, 1866.

[2] Thèse, considerations sur les accidents a forme rhumatismale de la blennorrhagie. Paris, 1866.

[3] British Medical Jour., Apr. 6, 1867.

on the thigh just above the knee, and another in the popliteal space. Amputation of the thigh was resorted to, and an examination of the joint showed extensive ulceration of the cartilages, with marked increase of vascularity of the neighboring parts. Anchylosis, especially of the smaller joints, is a more frequent termination of gonorrhœal rheumatism, and in scrofulous subjects, this disease has not unfrequently been followed by that strumous affection of the joints known as "white swelling;" here, as in other well-known instances, a constitutional cachexia selects the weakest part of the body as the seat of its manifestation.

Dr. Holscher[1] reports a case in which death is said to have occurred from gonorrhœal rheumatism. An abscess formed in the affected joint, and purulent infection ensued, terminating fatally.

The period at which rheumatism makes its appearance in the course of gonorrhœa appears to be more variable than that of epididymitis. Some cases are met with in which the affection of the joints occurs during the acute stage, or first week or two of the duration of the clap; indeed it may occur coincidentally with, or even before the appearance of any discharge from the urethra, and it is worthy of notice that such early cases are generally more acute in their character than later ones. Yet in the majority of cases we find that the rheumatism manifests itself at a later period, when the urethral discharge has passed its climax. Generally, we find that the running has been more copious for a few days preceding the outbreak of the rheumatism, and this is especially noticeable in long-standing cases of clap which have been accompanied by several repetitions of the articular affection, each of which has followed an exacerbation of the discharge. Cases in which the running suddenly diminishes or entirely dries up before the rheumatism appears, must be regarded—in spite of the opposite opinion so frequently expressed—as rare and exceptional, and not sufficient for the basis of a theory of metastasis. In deciding this point—to which much importance has been attached—it should be recollected that if the rheumatism occurs several weeks after contagion, the discharge will probably have somewhat diminished, following the course which it usually pursues in cases entirely free from any complication. After the disease of the joints is established, the running sensibly decreases in most cases, as a consequence of revulsive action. In other instances—estimated by Rollet at about one-third—it remains without much change. It rarely disappears entirely, except as the result of treatment.

Gonorrhœal rheumatism, unlike acute rheumatism, but like rheumatic gout, frequently attacks the eye.[2] The ocular affection in these cases, is

[1] Annales de Holscher, 1844.

[2] "In true rheumatism, the eye seldom suffers; so seldom, that I find no record of any affection of that organ in more than 4 out of the 379 cases of acute and subacute rheumatism admitted into St. George's Hospital, during the time I held the office of Medical Registrar. But in rheumatic gout, the eye is not unfrequently implicated. It was inflamed in 11 out of the 130 cases of rheumatic gout admitted during the same period; and it has suffered more or less severely in five out of 75 cases, which have fallen under my own care at the hospital." (Fuller.)

that form of "gonorrhœal ophthalmia" which has been described by authors as "metastatic or sympathetic;" but the difference in the mode of origin, symptoms, prognosis, and treatment, between this form of ophthalmia and purulent conjunctivitis arising from contagion, is so great, that it would be desirable to distinguish the two by different names, and to drop altogether the term *gonorrhœal ophthalmia*, as applied to that ocular affection which accompanies gonorrhœal rheumatism.

In the first two editions of this work I published a *résumé* of twenty-seven cases which I had been able to collect from various sources of so-called "metastatic gonorrhœal ophthalmia," and from which I drew the following conclusions:—

In all the cases the eye-disease was preceded, attended, or followed by rheumatism. In a majority of the attacks the ophthalmia preceded the rheumatism.

In about two-thirds of the cases of which we have sufficient details to enable us to determine the seat of the ophthalmia, the sclerotica and iris were chiefly affected; in the remaining third, the conjunctiva. In the latter class, it is sometimes noted that there was purulent discharge and chemosis; but the inflammation does not appear to have assumed the severity of gonorrhœal ophthalmia from contagion, since only one case terminated in ulceration of the cornea, and most of the cases yielded readily to treatment.

We may conclude, therefore, that gonorrhœal rheumatism, like rheumatic gout, may attack any of the ocular tunics, though it most frequently involves the sclerotica, from which it may extend to the conjunctiva, iris, or other tissues.[1] It must be borne in mind that the vascular connection of all the tissues of the eye is very intimate, and that the inflammatory process is never wholly confined to one portion of the globe. It is highly probable, I think, that many cases of gonorrhœal rheumatic ophthalmia, which have been described as conjunctivitis, have in reality been instances of conjunctivo-sclerotitis, in which the injection of the conjunctival vessels has masked that of the sclerotica. The orbital and circumorbital pains, which are often mentioned, would indicate this. At the same time, it must be confessed, that in some instances the chief seat of the disease has been the conjunctiva, and that the presence of a muco-purulent discharge and a certain degree of chemosis, have rendered these cases readily mistakable for gonorrhœal ophthalmia from contagion. The milder character of the disease, the history and habits of the patient, and the existence of rheumatism, are, in such instances, the chief elements on which to found a diagnosis. When a patient has had an affection of the eyes and joints in previous attacks of gonorrhœa, or when gonorrhœal rheumatism coexists with an ophthalmia which does not present the severe symptoms of purulent conjunctivitis, there is a strong probability that it is of the rheumatic form, even though the conjunctiva appears to be chiefly affected. Not

[1] These cases do not confirm ROLLET's statement, that gonorrhœal rheumatic ophthalmia is always a kerato-iritis.

unfrequently, also, rheumatic ophthalmia, after entirely disappearing from one eye, involves the opposite eye or returns a second time to the one first affected, a course never pursued by gonorrhœal ophthalmia from contagion.

In by far the larger proportion of cases, however, the symptoms of gonorrhœal rheumatic ophthalmia are those of sclerotitis, iritis, or kerato-iritis, either separate or combined. I shall not attempt to describe the characteristic features of these different forms, since they are identical with those of the same affections arising from other causes.

I will merely remark that when the iris is involved, it generally appears to be so secondarily, and that the inflammation affects it to a less extent and more superficially than in other forms of iritis; hence that there is less danger of adhesions to the capsule of the lens and of atresia iridis, and that tubercular excrescences are probably never seen upon its surface.

DIAGNOSIS.—The admission of gonorrhœal rheumatism as a distinct disease, is by no means dependent upon the question whether it presents any symptoms different from those of ordinary rheumatism. Inflammation of the epididymis, identical with swelling of the testicle attendant upon gonorrhœa, may be excited by other causes; and even if no diagnostic signs of the rheumatism caused by urethritis be admitted, we should still be warranted in using the term "gonorrhœal rheumatism" as indicating the connection between the two diseases.

It is evident, however, that the disease now under consideration differs in some respects both from acute rheumatism and rheumatic gout, though much more closely allied to the latter than to the former.

It differs from acute rheumatism in the absence or slightly marked character of its premonitory symptoms; in the less degree of constitutional disturbance which attends it; in being limited to a few joints; in its predilection for the synovial membranes; in rarely attacking the heart, but frequently the eye; in its persistency; and in seldom affecting women. It differs from rheumatic gout in the fact that hereditary influences, so far as at present proved, have no part in its production; also in the frequency with which it attacks the knee-joint; in its preference for the male sex; and in its rarely leaving any permanent traces of its invasion.

In a given case of this kind, therefore, it may at times be extremely difficult to determine whether our patient has an affection of the joints dependent upon his urethritis, or whether his rheumatism is simply a coincidence; if, however, there be but little constitutional disturbance; if only a few joints, and particularly the knee, be affected; if the disease be chiefly confined to the synovial membrane—as shown by the articular effusion, and the slight degree of heat and redness externally—and if it exhibit but slight tendency to migrate from one joint to another, then there can be little question that the gonorrhœa and rheumatism bear to each other the relation of cause and effect. The probability will be still further strengthened, if the patient has never been subject to rheumatism; or, *à fortiori*, if he has had it only in conjunction with previous attacks of gonorrhœa.

Nature.—The power of exciting rheumatism, exercised by gonorrhœa in certain cases, has often been advanced as an argument to prove that the latter disease is a modified form of syphilis; and it has been asserted that the rheumatism is due to the absorption of a specific poison from the urethra. This idea has probably derived additional weight from the supposition that no other satisfactory explanation could be given of the connection between these two diseases, and before such was found, the theory of a syphilitic or gonorrhœal virus was thought to be the only alternative. The question has been asked: If the rheumatism is not produced by the absorption of a specific poison, how is it produced? But such a process of reasoning is founded on a gross over-estimate of our knowledge of cause and effect in disease. The connection between gonorrhœa and rheumatism is only one of many instances, in which the link which binds two diseases together escapes us, although the union is plain and unquestionable. Who, for instance, can account for the intermittent fever which is sometimes occasioned by a stricture of the urethra; or explain the connection between chorea and rheumatism—a connection so intimate that a large proportion of children who have the one will have the other; or the reason that disease of the supra-renal capsules causes bronzing of the skin? And so throughout the etiology of all diseases, if for a moment we endeavor to divest our minds of the familiarity which daily observation has given to the connection between them and the causes which produce them, in how few instances do we really understand the mechanism of the process!

Facts which occur but rarely, excite wonder; if frequent or coinciding with other known phenomena, the mind receives them without distrust. Is it then an isolated fact that a local affection, entirely destitute of specific properties, is capable of exciting rheumatism? By no means. Dr. Fuller, who believes that the proximate cause of rheumatism is a poison generated in the system (not absorbed from without) as the result of faulty metamorphic action, thus speaks of the influence of local disease: "One part of the animal economy hinges so closely on the other, that local mischief occasions general disturbance, and under certain circumstances appears to induce a state of system favorable to the generation of the rheumatic poison; a state of system arising, be it observed, not as a direct and immediate consequence of suspended secretion, but as a sequel of perverted function gradually taken on by the system generally, in consequence of imperfect or morbid local action. Excessive venery and long-continued debauchery are frequently productive of rheumatism, and so is immoderately protracted lactation. The phenomena of gonorrhœa afford an admirable example of how local diseases gradually give rise to general derangement of the system, and so to the production of the peccant matter of rheumatism."[1] This connection between local diseases in general and inflammation of the joints is also fully recognized by other observers; it need not therefore surprise us, nor is there any necessity to suppose the

[1] Fuller on Rheumatism, p. 35.

absorption of a specific poison, when we find that rheumatism can be excited by inflammation of the urethra.

Moreover, evidence is not wanting to show that the phenomena of gonorrhœal rheumatism cannot be explained on the ground that the syphilitic or any other specific poison has been taken into the system from without. In order not to extend this subject to too great length, I will merely enumerate the chief points of this evidence:—

1. If gonorrhœal rheumatism were due to the absorption of a virus, it ought to be a very frequent disease, considering the multitude of patients affected with gonorrhœa; it is, however, quite infrequent.

2. On the same supposition, it ought to run a regular and definite course, like specific diseases in general.

3. One attack, also, should afford immunity from, or at least partial protection against, subsequent attacks in the same person.

4. No evidence of the absorption of a virus is found in an examination of the lymphatic vessels or ganglia in gonorrhœa, as in syphilis. Even in cases of gonorrhœal rheumatism, the absorbents in the neighborhood of the genital organs retain their normal condition.

5. Urethral rheumatism has repeatedly been known to occur in connection with urethritis which had been excited by the use of bougies, or by intercourse with women during the menstrual period. If it can thus be caused by a simple urethritis, why is it ever necessary to attribute it to a "virulent gonorrhœa?"

6. None of the known symptoms of syphilis bear any more than the slightest resemblance to gonorrhœa.

Treatment.—It is evident that we cannot deduce the treatment of gonorrhœal rheumatism from that of acute rheumatism, as has sometimes been done by writers on this subject; nor, again, entirely from that of rheumatic gout, although here it is not improbable that a somewhat similar line of treatment may be found applicable. But if we recognize a special cause and certain peculiarities in the symptoms of gonorrhœal rheumatism, the treatment of this disease demands investigation independent of any preconceived notions derived from our experience with kindred affections.

The amount of constitutional disturbance attending the commencement of an attack of gonorrhœal rheumatism is rarely sufficient to require active antiphlogistic measures. The administration of an emetic, or a free purge, as from five to ten grains of calomel, followed by castor oil or Epsom salts, is commonly sufficient to allay the febrile excitement, and has the additional advantage of correcting the condition of the digestive organs, which are usually at fault. Rest is of the first importance, and the diet should be proportioned to the severity of the febrile action. The chief means of combating the local inflammation is to be found in the abstraction of blood from the neighborhood of the joints. Cups or leeches may be applied, and repeated as often as the case requires. They afford marked relief to the pain, often arrest the progress of the disease, and hasten its resolution.

After the more acute symptoms have been subdued, or even at the out-

set, when the disease is from the first of a subacute character, the greatest benefit will be derived from blisters. These are especially applicable, when a large joint, like the knee, is attacked, and when an effusion within the capsule is a prominent symptom. The vesicated surface may be dressed with simple cerate with the addition of five grains of morphine to each ounce, and so soon as the surface heals a fresh blister may be applied. If strangury ensue, the daily application of strong tincture of iodine may be substituted for the unguentum lyttæ. Velpeau recommends that the joint be kept constantly smeared with mercurial ointment, to which some preparation of opium has been added.

Dieulafoy[1] has employed aspiration in cases of effusion into the knee-joint from gonorrhœal rheumatism, but states that such cases are peculiar and more obstinate than those in which the effusion is dependent upon other causes. The puncture of the knee gives relief, but the liquid soon forms again.

Ricord and some other writers advise the internal administration of colchicum, alkalies, and the salts of potash, as in rheumatism dependent upon other causes, but the reports of cases in which these remedies have been employed are far from proving their efficacy.

Prof. Hardy[2] has employed the salicylate of soda, now so much in vogue for articular diseases, and reports that under its influence the spontaneous pains have diminished, but those felt on walking were just as severe. In short, the salicylate does not seem to exert the same beneficial effect as in ordinary articular rheumatism.

The occasional use of an emetic or purge has in the hands of several surgeons been found to be of decided advantage. Rollet speaks highly of vapor baths. Copaiba and cubebs have no effect upon the rheumatism, and can only be required for the urethritis, which, in most cases, however, is more satisfactorily treated by local measures.

Meanwhile the treatment of the urethral discharge on which the rheumatism depends should not be neglected. Unless this be entirely arrested, there is always danger of a relapse. In many of the cases reported, the rheumatism has repeatedly returned at intervals of several months, so long as the exciting cause continued. The measures already recommended for the treatment of gonorrhœa and gleet should, therefore, be actively employed, at the same time that attention is paid to the affection of the joints.

When gonorrhœal rheumatism occurs in persons of broken-down constitution, or when the general health becomes impaired by the continuance of the urethral and articular disease, it is necessary to resort to hygienic measures, and frequently to the administration of tonics, as preparations of iron, iodine, cod-liver oil, bark, etc. These remedies, together with fresh air and good diet, should by no means be neglected as soon as the patient is found to be debilitated. Barwell believes that gonorrhœal rheu-

[1] Gaz. hebd. de méd., Paris, Feb. 22, 1878.

[2] Gaz. d. hôp., Paris, No. 149, 1877.

matism depends upon slight purulent infection, and recommends large doses of quinine.

A very efficacious method of treating the swelling, which often remains after the acute symptoms have subsided, is by means of strips of adhesive plaster so applied as to exercise compression and at the same time render the joint immovable. Supposing the knee to be affected, the limb should be bandaged from the toes up to the point where the plaster is to commence, or just below the swelling. The strips should be of about two fingers' breadth, and each one, first passed behind the limb, be brought round in front, and its ends made to cross like the letter X. One strip after another is applied, each overlapping the preceding for about one-third its width, until the whole joint is covered, when four or five additional layers are superposed in the same manner in order to insure a sufficient degree of stiffness, and the whole enveloped in a bandage. I can speak very decidedly of the good effects of this application in this and other chronic affections of the joints.

Mr. Milton,[1] whose accurate and systematic observations are always worthy of quotation, formerly employed in the acute stage the hydrochlorate of ammonia in half drachm doses every two or three hours, and, if this failed, the nitrate of potassa in scruple or half-drachm doses every three or four hours. After the severity of the disorder was checked, he resorted to the iodide of potassium and the wine of colchicum, the latter to be given in no less doses than a couple of drachms daily, and the affected joint was to be blistered.

More recently, however, Mr. Milton, "doubting whether I (he) was not searching in a wrong direction," has tried in one or two cases in debilitated subjects a mode of treatment which, he says, has proved highly successful and which is so agreeable as to lead any patient suffering with this disease to place himself under his care. This treatment consists in the administration of a bottle of Burgundy daily, a large glass of good milk and the best rum at bedtime, a restorative diet including plenty of fat ham and bacon, quinine in five-grain doses three times a day, an aperient pill containing colchicum to keep the bowels open, the bimeconate of morphia if a sedative is required, and a sulphur fume bath occasionally, to be followed by a vapor bath!

When the eye becomes inflamed, local depletion by means of leeches or cups to the temples may be called for. If the conjunctiva be involved, the strictest cleanliness should be maintained by frequent bathing with tepid water. Astringent collyria are less frequently called for than in conjunctivitis independent of any rheumatic taint; if used, their effect should be carefully watched, and if they fail to afford relief, they should be omitted. When the iris is implicated, the pupil must be dilated by atropine, and mercurials administered as in other forms of iritis.

[1] Pathology and Treatment of Gon., 4th ed., 1876, p. 273.

CHAPTER XXII.

VEGETATIONS.

Vegetations are papillary growths springing from the skin or mucous membrane, chiefly in the neighborhood of the genital organs, and identical in their nature with the warts which are so common upon the hands. They are not, strictly speaking, venereal, since they are not necessarily connected with either of the diseases originating in sexual intercourse. It is true that they are most frequently observed in men and women who have been affected with gonorrhœa, balanitis, chancroids, or syphilis; but this is simply because the skin or mucous membrane has for a time been moistened with an acrid secretion which has favored the abnormal development of its papillæ. They are found in young children, with regard to whose purity there can be no suspicion; and also in adults who have never suffered from any venereal disease whatsoever. Again, they are not unfrequently met with during pregnancy; the increased secretion from the vagina and the determination of the blood to the pelvis at this time being highly favorable to their development.

The importance of these growths has been very much exaggerated. Thus, they have been regarded as syphilitic and as an indication of the necessity for specific remedies; and this, too, in spite of the generally recognized fact that mercury has no effect whatever in their removal. Their only connection with syphilis is when they spring from the surface of a chancre, mucous patch, or other general lesion, upon which they are a merely accidental formation. The sore which serves as their base may require a mercurial course, but the superadded vegetation in itself presents no such indication.

Again, it is often said that they are contagious; and some semblance of truth for this supposition has been found in the fact that when situated upon one of two opposed surfaces, as the labia or upper and inner parts of the thighs, similar growths not unfrequently spring up upon the opposite; and somewhat doubtful cases have been reported in which, as alleged, vegetations have appeared upon men after connection with women who were similarly affected.[1] But such instances are readily explained on the

[1] Thus, long since the above was written, we read in Zeissl (op. cit., 3d ed., 1875, T. I., p. 150), that he has frequently observed the development of vegetations in persons who had for some time had intercourse with the opposite sex affected in the same manner. He also quotes Dr. Lindwurm, of Munich, as having successfully inoculated vegetations. Yet Zeissl does not believe that there is anything specific in these excrescences.

ground that the acrid secretion from vegetations, when applied to neighboring parts, and possibly, when transferred to another individual, acts in the manner already explained, and gives rise to others. The very fact that their supposed contagion takes place upon the person affected, is sufficient to prove that they are not dependent upon the virus of true syphilis, the lesions of which are not auto-inoculable; and there is no reason whatever for ascribing them to the poison of the chancroid. Moreover, they present the same aspect, follow the same course, and are amenable to the same treatment, when occurring in young children and pregnant women who are otherwise healthy, as in persons affected with venereal diseases.

Several varieties of vegetations have been admitted, especially by the French, founded upon their resemblance to various objects in nature. Thus, Alibert, who believed that vegetations were syphilitic, admitted them as one of three principal forms of the syphilodermata; and divided them into six varieties: "La syphilis végétante framboisée;" "en choux fleurs;" "en crêtes;" "en poireaux;" and "en verrues;" to which he added the truly syphilitic lesion, mucous patches, under the head of "condylomes."

No useful purpose, however, is attained by this classification, which serves only to confuse the mind; since the form of vegetations is solely dependent upon accidental circumstances, as their position and the pressure of neighboring parts. It is sufficient to know that they are sometimes flat and but little elevated above the surface; while at others they are attached by means of a pedicle of variable diameter: and that they are chiefly developed in whatever direction they meet with the least resistance. When exposed to the air they are often dry and hard; when protected by an opposed surface, they are soft and smeared with a highly offensive secretion.

Their microscopical appearances are thus described by Lebert: "A feeble power shows their internal vascular structure and numerous sebaceous follicles about their base. With a high power, the papillæ appear to be composed of an outer rind consisting of concentric layers, and of an internal substance; the two differ from each other only in density; for, besides their vascular element, they consist only of epidermic cells. In the outer layers, these cells are more densely packed and present a longer and narrower outline, which, at first sight, gives them a fibrous appearance. The internal portion is also composed of epidermic cells in close juxtaposition, but round and finely dotted on their surface. Vegetations are nothing else than a development of the papillæ of the cutis, and, in their anatomical composition, do not differ much from certain papilliform warts."

Vegetations are most frequently met with upon the internal surface of the prepuce directly back of the furrow at the base of the glans; they are also found upon the margin of the meatus, or within this orifice upon the walls of the fossa navicularis; upon the vulva in women, and especially in the neighborhood of the caruncule myrtiformes; and, in both sexes, around the anus, upon the tongue, velum palati, and even within the larynx.

Treatment.—The treatment of vegetations consists simply in their removal by the knife, scissors, Wolkmann's spoon, caustic, or ligature, and the destruction of the base from which they spring. With the vegetations upon the internal surface of the prepuce, I have found it most convenient to touch them with glacial acetic acid or with fuming nitric acid, and repeat the application upon the fall of the eschar as often as may be necessary; or, when prominent and pedunculated, they may be snipped off with scissors, and their base thoroughly cauterized, although, when cutting instruments are used, the hemorrhage is sometimes a little troublesome; hence, when practicable, a ligature is to be preferred. A small Wolkmann's spoon with a cutting edge is also useful in the removal of vegetations whether prominent or flat, and has the advantage of not being formidable to the patient. It, however, removes only the outgrowth and does not attack the root, which will still require the application of caustic. As soon as the tenderness produced by the application of caustic has subsided, it is desirable to keep the glans uncovered in order to harden the internal layer of the prepuce by exposure to the air and friction; and, unless the preputial orifice is very narrow, this may generally be accomplished by wearing for a few days a narrow bandage round the penis posterior to the glans. Special attention should also be paid to removing any collection of the *smegma præputii*, and keeping the parts perfectly clean.

The above acids act so favorably, that I have seldom resorted to other caustics, with the exception of chromic acid, which has come into favor within a few years.[1] A solution of this acid (one hundred grains to the ounce of water) is a powerful escharotic, and is especially useful in those obstinate cases in which the vegetation repeatedly returns after removal; but it should be applied with caution, simply moistening the surface of the morbid growth and sparing the healthy tissues in the neighborhood, or otherwise it is apt to induce severe pain and inflammation.

Again, a solution of corrosive sublimate in collodion (℥j ad ℥j) may be applied over the whole surface of the growth.

In vegetations of considerable size, it has been suggested to inject into the substance of the tumor by means of a hypodermic syringe from half a drop to several drops of strong acetic acid.

The perchloride or persulphate of iron is often of service. It is sufficient in many cases to give the patient a prescription for the liquor ferri persulphatis and direct him to apply it once or twice a day to the growth, which soon shrivels up and falls off, when a few further applications to the base will prevent its return.

The tincture of thuja occidentalis as a local application has been recommended especially by Dr. J. R. Leaming, of New York. The homœopaths administer the same internally in doses of one drop while using it locally.

[1] See Dublin Quarterly Journal of Med. Science, vol. xiii, p. 250; Ranking's Abstract, vol. xxv, p. 149; New Orleans Med. News, Nov. 1857.

For the removal of flat, horny vegetations Zeissl advises an ointment of arsenious acid or of the iodide of arsenic, as in the following formulæ:—

℞. Acidi Arseniosi gr. ij 12
Unguenti Hydrarg. ʒj 4
M.

℞. Arsenici Iodidi gr. ij. 12
Unguenti Hydrarg. ʒj 4
M.

The same author confirms the statement made by Dr. Peters, of Prague, that vegetations which have resisted all forms of cauterization and even excision will sometimes disappear under the simple application of cold poultices.

Vegetations about the vulva may be treated in the same way as those upon the prepuce. When situated around the margin of the anus, they are generally of considerable size, and require to be snipped off with scissors before the application of acid to the base.

Vegetations during pregnancy may appear at quite an early period; they grow very rapidly, and often attain an immense size. I have seen a mass as large as a man's arm, extending from the mons veneris to the sacrum, and surrounding the vulva and anus. During gestation no operative procedure is admissible; but the pain, itching, and offensive odor may be palliated by careful attention to cleanliness and lotions of diluted Labarraque's solution, followed by the application of calomel or of some astringent powder, as equal parts of savin and burnt alum. After delivery, they often disappear spontaneously, or may be removed by the knife or caustic; but when the mass is very large, only a portion should be attacked at a time.[1]

Vegetations situated upon a chancre or mucous patch cannot always be distinguished from those upon the sound integument; but the history of the case, and especially the coexisting symptoms, will determine when mercury is required to combat syphilitic infection of the general system.

[1] A résumé of the articles which have appeared upon vegetations in pregnant women may be found in the Gaz. hebd. de méd., Paris, Feb. 8, 1861.

CHAPTER XXIII.

HERPES PROGENITALIS.

We apply the term herpes progenitalis to an inflammatory vesicular affection, which occurs upon various portions of the genitals of both sexes, and which has incorrectly been called herpes preputialis. In the male it occurs most commonly on the inner layer of the prepuce, and less frequently on the glans and on the integument of the penis. In the female, the inner surface of the labia majora, both surfaces of the labia minora and the integument around the vulva are its favorite seats.

The number of vesicles varies; frequently there is but one, and again they are quite numerous and grouped together often in a circle or arc of a circle. The eruption may or may not be attended by any unpleasant sensation; usually, however, a slight burning heat and itching are felt at the outset. A small, red, inflamed spot appears, upon which the vesicles rapidly form. In some cases there is a marked inflammatory areola, which in other instances, is a mere rim of redness. The vesicles vary in size from a pin's head to half a pea. When unruptured, we find a rounded, translucent vesicle containing clear serum. Usually, however, owing to the thinness of the epidermal covering and the moist condition of the membrane, rupture takes place very early. Exceptionally, and especially when seated on the integument, the vesicles remain for several days, and their contents, gradually becoming turbid and drying, form a small brownish scab. Rupture of the vesicle leaves a shallow exulceration, corresponding in size to the vesicle. Its floor is at first of a deep rosy red, with a finely uneven surface. Its edges are sharply cut as if punched out, and sometimes a little undermined, but never to the same extent as seen in the chancroid. There is usually no tendency of the ulceration to progress, nor do the sores fuse together. In exceptional instances, however, the contrary is true, and more or less troublesome ulcerations occur. This is not unfrequently seen in the early stage of syphilis, when the exulcerations of herpes may take on all the characteristics of chancroids and run a similar course. They may even be found to be auto-inoculable, and also give rise to a bubo. When they are seated upon an inflamed prepuce and when irritated by contact with gonorrhœal pus, more or less destructive tendency is also apt to show itself.

The amount of inflammation accompanying these vesicles varies; in some cases there is but little heat, redness, and swelling, while in others these are well marked. We have sometimes observed the vesicles to be preceded and accompanied by severe pain, limited sharply to their area.

Again, we have found the exulcerations covered with a very thin, yellowish-white film, which remains for a considerable time in an indolent condition, interfering with healing. The duration of herpes varies from a few days to two weeks.

Under the name of neuralgic herpes, Mauriac[1] has described an affection of considerable gravity, in which, besides the herpetic eruption, there is an accompanying neuralgia of various branches of the sacral plexus of nerves. In one case related by this author, a patient, who for eleven days previously had felt a slight sensation of heat in the prepuce, was suddenly attacked by a severe prickling and intense itching in the part. Mere pressure of the clothes became insupportable, and the patient could not sleep at night, so great was the suffering. Four or five days later he was attacked by darting pains down the leg, and in the perinæum, buttocks, and scrotum. There was perversion of sensibility in the same parts, anæsthesia passing into hyperæsthesia and the reverse, which was almost unbearable. Two years later the patient had another attack, only one vesicle being present. He, at this time suffered from boring pains, neuralgia of the urethra, and disturbances of sensibility.

In a second case observed by Mauriac, there were, for forty-eight hours before the appearance of a single vesicle, paroxysmal pains radiating through the penis and perinæum, and subsequently darting up and down the leg. A short time after, a vesicle appeared at the orifice of the meatus, accompanied by hyperæsthesia of the urethra, painful micturition, and pain in the bladder. We have also seen several cases of vesicles on either lip of the meatus, attended by neuralgia of the bladder and urethra. The canal itself was of a deep red color, was somewhat swollen and bathed with a copious mucous secretion in which no pus-cells could be detected. The affection lasted about a week and was for the first few days very painful.

The following is a well-marked case of neuralgic herpes, occurring in our own practice:—

The patient was a man 35 years old, thin and pale, but of average general health. His father and his sisters had for years been subject to sciatica and other forms of neuralgia. When 15 years old our patient was attacked with sciatica, which has returned as often as four times a year for the last twenty years. The attacks are sometimes preceded by gastric disturbance. The pain begins just above the knee and extends upwards to the gluteal region. Generally about the fourth day, he has a sensation of heat and burning on the side of the penis corresponding to the sciatica, and very soon a group of vesicles appears which is quite painful. He also suffers from burning in the urethra, and mild strangury and pain on the same side of the scrotum as the sciatica. The herpes coexists with the sciatica in seven out of ten of the attacks.

Herpes progenitalis is very prone to relapse at longer or shorter intervals, sometimes with distinct periodicity. It is usually unattended by any

[1] Leçons sur l'herpès névralgique des organes génitaux, Paris, 1878.

change in the inguinal ganglia, but in some severe cases the latter are slightly swollen and painful for a few days. In a few instances, when the vesicles become ulcerated, suppurating buboes occur. We have seen these several times, especially in syphilitic subjects, and we think that most authors are too positive as to the immunity of these glands in herpes progenitalis.

This affection must be regarded as neurotic in its nature, and its exciting cause peripheral irritation of the nerves of the penis. Thus it is often developed for the first time after the cure of a chancroid, and some think especially in those cases which have been treated by active cauterization. A long prepuce and the low grade of balanitis, which so often accompanies that condition, are quite common causes, while frequent sexual intercourse, excessive alcoholic indulgence and rich food are known to produce relapses. The vaginal secretion of some women has been known to cause outbreaks of this eruption. We can recall the case of a gentleman, who, prior to his marriage, had had intercourse with many women with impunity, but who was attacked by herpes after each act of coitus with his wife. We know little of the influence of a rheumatic or gouty diathesis as causes of this eruption, although they are recognized by some physicians as such. The neuralgic form of herpes is undoubtedly of central origin and merely an accompaniment of the neuralgia occurring in persons of a neurotic tendency.

The diagnosis of herpes in most cases is readily made, yet the exulcerated vesicles sometimes closely resemble either a chancroid or chancre. In general, the burning and itching sensation attending the invasion of herpes, the superficial character of the ulcer, its less profuse secretion and less undermined edges will establish the diagnosis, while, in many cases, the history of frequent relapses will point directly to it.

The syphilitic chancre may resemble exulcerated herpes very closely, not only in its solitary but multiple form. Fournier very aptly says that herpes will rarely be mistaken for a chancre, but that the latter may be mistaken for herpes, and we are convinced that this is frequently the case. The chancrous erosion is an exulceration, but its color is of a deeper and duller red, sometimes even coppery; its surface is smooth and shining without any unevenness or granulations. There is no undermining of its edges, and the surrounding areola is very slight and of a deep, dull-red color; in short, there is a characteristic absence of inflammation. Although in chancre there may be but slight œdema of the base for a few days resembling herpes, distinct induration is soon felt. Any subjacent hardness of herpes disappears day by day, while that of the chancre increases. Then too in syphilis we soon have induration of the inguinal ganglia. The heat and burning felt either prior to or during the evolution of herpetic vesicles is also a valuable diagnostic sign.

As its name denotes, the "multiple herpetiform chancre" presents features resembling those of exulcerated herpes in groups. The distinguishing signs of the two will be given in the chapter on chancre.

TREATMENT.—The first indication is to remove any peripheral irritation which may exist. Hence, in cases of a long and tight prepuce circumcision is necessary, and we have often seen a permanent cure from this operation. Even in the absence of a long and tight prepuce, there may be such an abundant irritating secretion in the balano-preputial fold as to require careful attention to cleanliness, and the interposition of lint either dry, which we prefer, or wet with a mildly astringent wash. When herpes follows sexual intercourse, immediate ablution and immersion of the penis in an astringent liquid will be of service. In all cases of a gouty and rheumatic tendency, and in cases of dyspepsia, appropriate remedies should be used. For the local treatment of the exulcerations we would recommend the interposition of dry lint or the application of dry calomel or some other absorbent powder. As washes we sometimes use the following:—

℞. Argenti Nitrat. gr. v 30
Aquæ ℥j 30
M.

℞. Zinci Sulphat. gr. vj 36
Spt. Lavandulæ Comp. ʒss 2
Aquæ ℥ij 60
M.

℞. Acidi Carbolici gtt. xx 1 30
Glycerinæ ʒiij 12
Aquam ad ℥ij 60
M.

CHAPTER XXIV.

STRICTURE OF THE URETHRA.

Having considered the complications of gonorrhœa, it remains to speak of one of the most frequent and important results of the same disease, urethral stricture.

Anatomical Considerations.

An acquaintance with the anatomy of the urethra—including the character of its lining membrane, the fibrous, muscular, elastic, and erectile tissues which surround it, its dimensions and direction—is essential to a proper appreciation of the pathology of stricture and the skilful exetion of operative procedures requisite in its treatment.

The male urethra is naturally divided into three portions, viz., the prostatic, membranous, and spongy.

The *prostatic urethra* is the portion included in the prostate gland, and generally, but not always, traverses this body at the union of its middle and upper thirds. Its length in the adult is about one inch and a quarter; its posterior boundary is a prominence of the mucous membrane, called the *uvula vesicæ;* its cavity is fusiform, largest in the centre, and somewhat contracted towards either extremity. Upon its floor, a short distance in front of the uvula is an abrupt elevation of the mucous membrane and subjacent tissue, which forms a ridge three-fourths of an inch in length, and which gradually subsides as it approaches the membranous urethra. This prominence is known as the *veru montanum*, *crista urethræ*, or *caput gallinaginis.* It contains erectile tissue, connected with that of the corpus spongiosum, and is adapted to assist in the closure of the urethra at this point, and prevent the passage backwards of the semen during coitus. Directly in front of the summit of the veru montanum, is a small sac or pouch, three or four lines in depth, which is called the "sinus pocularis," and also, from its probable homology to the womb, the "uterus masculinus."[1] The ejaculatory ducts traverse the walls of this cavity and open upon its margin. On each side of the veru is a depression called the "prostatic sinus," in which are found the orifices of the prostatic ducts from twenty to thirty in number.

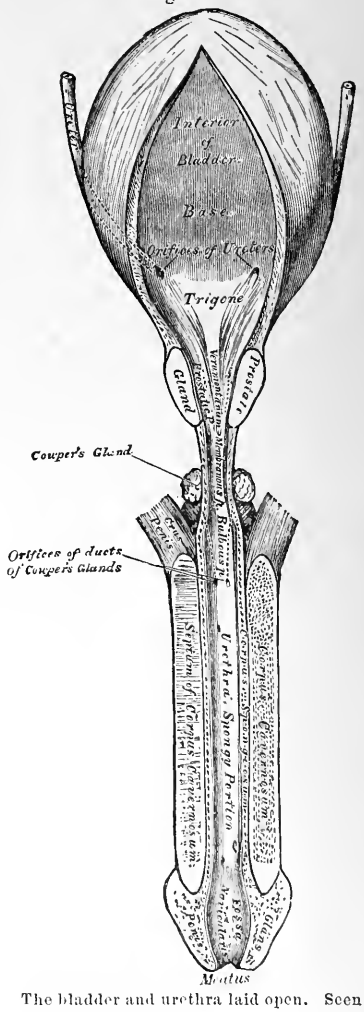
The *membranous urethra* extends from the apex of the prostate to the

[1] The most recent philosophical anatomists confirm the homology between the prostatic vesicle and the uterus. For an able résumé of this subject, see Simpson, Obstetric Memoirs and Contributions, vol. ii, p. 294. Philadelphia, 1856.

bulb, and is nearly or wholly included within the two layers of the deep perineal fascia. It is about three-fourths of an inch in length on its upper, but is shorter on its lower surface, owing to the encroachment of the bulb upon the latter. It is narrower than any other part of the urethra, except the meatus, and in consequence of the greater development and number of muscular tissues surrounding it, possesses in a higher degree the power of contraction. This characteristic has led some authors to give it the name of the "muscular region" of the urethra.

The *spongy urethra*, inclosed in the erectile tissue of the corpus spongiosum, varies in length according to the degree of turgescence of the penis; in a state of relaxation, it usually measures about five inches; during erection it may attain seven or eight. The posterior portion of this region is somewhat dilated, especially on its inferior aspect, and has received the name of "the sinus of the bulb." The term "bulbous portion" is also applied to the posterior inch of the spongy urethra. The ducts of Cowper's glands open near its centre. Besides being somewhat dilated, the sinus of the bulb is extremely dilatable. This may be shown by two casts of the urethra in fusible metal, the one taken while the canal is simply filled, the other while it is forcibly distended by the metal. The difference in the size of the part corresponding to the bulb will exhibit the dilatability of which it is susceptible. Anterior to its sinus, the spongy portion maintains a nearly uniform diameter until within about an inch of the meatus, where it again enlarges and forms the "fossa navicularis." Lastly, the external orifice or "meatus" is a narrow vertical slit, which is generally the most contracted part of the whole canal. In some instances, however, the smallest diameter is found about a quarter of an inch within the meatus, where it can of course be seen.

Fig. 49.

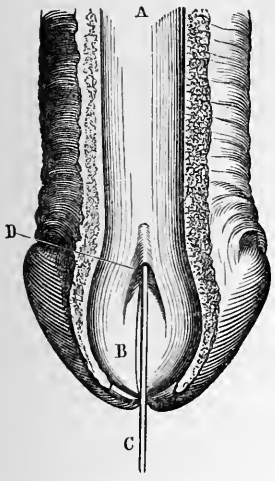


The bladder and urethra laid open. Seen from above. (After GRAY.)

The mucous membrane lining these various regions is continuous posteriorly with that of the bladder, and anteriorly with the covering of the

glans penis. It is very delicate in its structure, and abundantly supplied with bloodvessels and nerves, which render it highly vascular and sensitive. Numerous glands ("glands of Littre") racemose in their structure,[1] are found in the spongy and membranous, and mucous follicles in the prostatic region, the secretion from all of which constantly lubricates the passage. Fossæ or lacunæ of the mucous membrane, apparently destitute of glandular structure, are also found upon the upper, and more numerously upon the lower surface of the urethra. They may sometimes be traced for nearly half an inch beneath the lining membrane, and their mouths are commonly directed forwards. One, larger than the rest, and called the "lacuna magna," is situated on the upper aspect of the canal, from half an inch to an inch posterior to the meatus. These lacunæ, especially when dilated by long-continued inflammation, may obstruct the passage of a sound and lead to the formation of false passages. The urethral mucous membrane is covered with the cylindrical form of epithelium. Except in the prostatic region, this membrane is arranged in longitudinal folds, which are generally in contact and close the canal, the latter appearing on a transverse section of the penis as a mere star or split.

Fig. 50.



Lacuna magna.

According to Mr. Thompson, the rugæ of the mucous membrane "appear to be connected with the existence of numerous long and slender bands of fibrous tissue, which are seen lying immediately beneath the mucous membrane, for the most part in a longitudinal direction. In the bulbous and membranous portions they are extremely delicate, constituting these the weakest parts of the urethral wall, a fact worthy of remembrance in connection with the use of instruments." In the bulbous region the danger of doing violence is increased by the dilatability of the passage, and by the presence of the firm anterior layer of perineal fascia just beyond it.

The dimensions and direction of the urethra, taken as a whole, will be better appreciated after considering other tissues which surround it.

The urethra is invested by "unstriped, organic or involuntary" muscular fibres, which vary very much in their abundance and their arrangement in different parts of the canal. These fibres in the prostatic urethra are both longitudinal and circular, the latter layer being nearly half an inch thick near the neck of the bladder, and gradually diminishing towards the apex of the prostate. It has been called by Henle the *sphincter vesicæ*

[1] Kölliker, Manual of Human Histology, published by the Sydenham Soc., vol. ii, p. 236.

internus. External to this layer is another, called the *sphincter vesicæ externus*, which is most developed near the apex of the prostate, where it is continuous with the compressor urethræ muscle.

In the membranous urethra is found a layer of unstriped fibres arranged circularly, and this portion of the canal is also invested by the striated fibres of the compressor urethræ muscle.

In the spongy urethra, there are no circular fibres except in the posterior portion of the bulb. There are a few unstriped longitudinal fibres, which are either scattered or which form only a broken layer. It thus appears, on anatomical grounds, that spasmodic stricture cannot exist anteriorly to the deepest portion of the bulb.

The *corpus spongiosum* is dilated at its posterior extremity where it forms the bulb. It terminates anteriorly in an expansion, called the "glans penis;" while a thin layer of erectile tissue is continued backwards around the membranous portion of the urethra and extends into the veru montanum of the prostate.

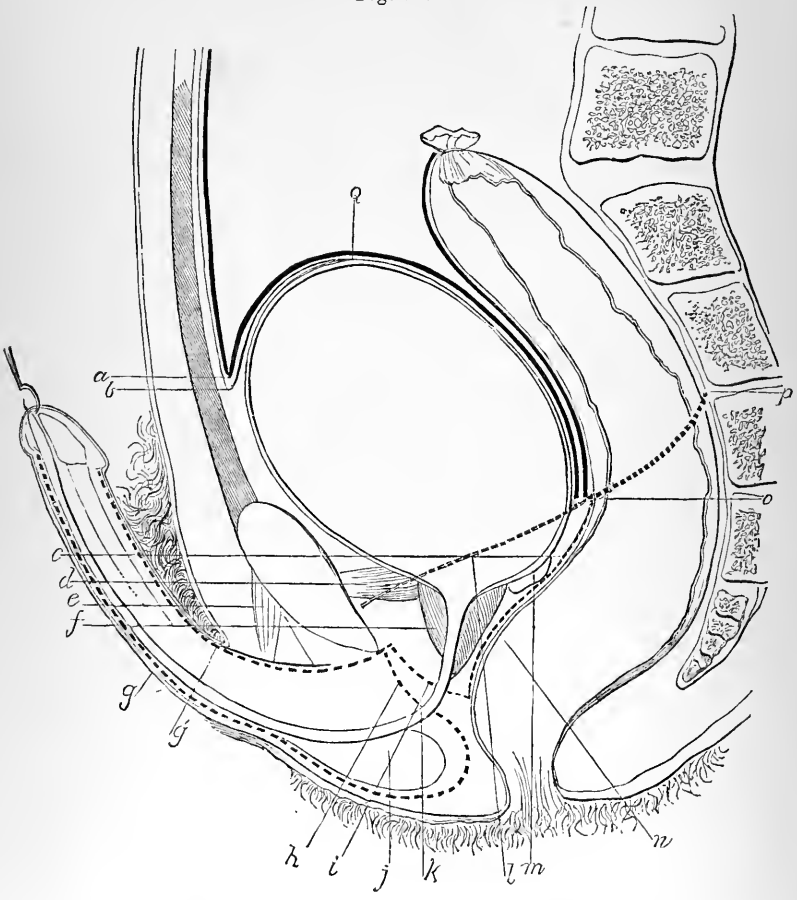
The corpus spongiosum consists of a vast number of venous sinuses, communicating with each other in all directions. Its great vascularity explains the hemorrhage which is liable to ensue, when the spongy portion of the urethra is divided by the knife of the surgeon or accidentally wounded. This occurrence, however, is less likely to take place, when an incision is confined to the mesial line and made in an upward direction, since the amount of vascular tissue is much less above than below the urethra. This will be shown by diagrammatic sections of the penis, when we come to speak of internal urethrotomy.

The *corpora cavernosa* are two in number. Arising in front of the tuber ischii, and intimately united to the periosteum covering the rami of the ischium and pubis, the two unite in front of the symphysis, to which they are connected by the suspensory ligament and are continued forwards as far as the corona glandis, where their common extremity is capped by the expansion of the corpus spongiosum forming the glans. The vascular connection between these bodies is free, though little, if any, exists between them and the corpus spongiosum, which lies in a groove upon their under surface.

Deep Perineal Fascia.—The triangular space, seen in the bony pelvis to intervene between the pubic and ischiatic rami, is occupied by a tense, fibrous septum, constituting one of the chief supports of the pelvic viscera above, and known by the various names of "deep perineal fascia," "triangular ligament of the urethra," "Camper's ligament," "middle perineal fascia," "ano-pubic aponeurosis," etc. This septum is composed of two layers, an inferior and a superior, separated by an interval in which are found the membranous portion of the urethra, which necessarily passes through the deep perineal fascia to arrive at the surface, the compressor urethræ muscle, Cowper's glands and ducts, the arteries of the bulb, and the dorsal vein, nerve, and artery of the penis. We might familiarly liken his septum to a double window, through which a funnel, representing the

urethra, passes; in which case the portion of the funnel contained between the sashes would correspond to the membranous region.

Fig. 51.



Vertical, antero-posterior section in the median line, showing fasciæ. (After Tillaux.) *a*, anterior, or pubio-vesical cul-de-sac of the peritoneum *b*, urachus. *c*, posterior, or recto-vesical cul-de-sac of the peritoneum. *d*, pubio-prostatic ligament. *e*, suspensory ligament of the penis. *f*, prostate. *g*, superficial perineal fascia. *g'*, superficial perineal fascia on the dorsum of the penis. *h*, inferior layer of the deep perineal fascia, or triangular ligament. *i*, superior layer of the deep perineal fascia, or triangular ligament. *j*, bulb of the urethra. *k*, membranous portion of urethra. *l*, pelvic fascia. *m*, vesicula seminalis. *n*, prostato-peritoneal aponeurosis. *o*, posterior, or recto-vesical cul-de-sac of the peritoneum. *p*, point at which the peritoneum is reflected on the posterior face of the rectum. *q*, summit of the bladder.

At their apex, the two layers of the deep perineal fascia are thin and firmly attached to the sub-pubic ligament and pubic bones, they then pass downwards and backwards, and are stretched between the pubic and ischiatic rami. The space between them containing the important parts already mentioned, is from half to three-fourths of an inch in depth. The vena dorsalis penis pierces the fascia half an inch, and the urethra usually

at about three-fourths of an inch below the symphysis; but, according to measurements made by Mr. Thompson, the latter distance may vary from seven-eighths to an inch and a quarter; a difference of some importance as affecting the sub-pubic curve of the urethra.

The superior (or deeper) layer of the triangular ligament is continuous with the aponeurosis underlying the prostate gland (the prostato-perineal fascia). The inferior (or more external) layer, winding round the posterior edge of the superficial transversus perinæi muscle, advances forwards and becomes continuous with the superficial perineal fascia (Buck's fascia), which invests the penis.

Fig. 52.

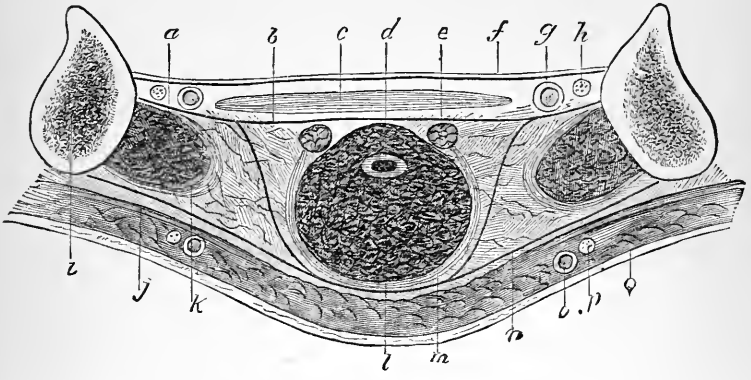


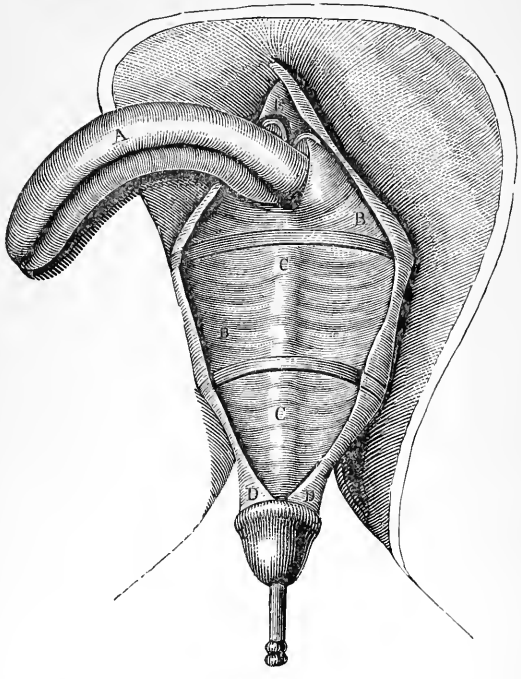
Diagram representing a horizontal section of the perinæum, designed especially to show the arrangement of the deep perineal fascia. (After Tillaux.) *a*, corpus cavernosum. *b*, inferior layer of deep perineal fascia. *c*, deep transverse perineal or Guthrie's muscle. *d*, section of urethra. *e*, Cowper's glands. *f*, superior layer of deep perineal fascia. *g*, internal pudic artery. *h*, internal pudic nerve. *i*, descending branch of the ischium. *j*, superficial fascia. *k*, erector penis or ischio-cavernosus muscle. *l*, bulb of the urethra. *m*, accelerator uriæ or bulbo-cavernosus muscle. *n*, superficial fascia. *o*, superficial perineal artery. *p*, superficial perineal nerve. *q*, skin.

Superficial Perineal Fascia.—Strictly speaking, there are two layers of this fascia, the superficial and deep. The former consists of cellulo-adipose tissue, belonging to the general integument of the body. The latter is aponeurotic in its structure, and is chiefly important in its relation to the present subject. In accordance with frequent usage, it alone is intended by the term "superficial fascia of the perinæum." This fibrous structure corresponds in its general direction with the deep perineal fascia just described, but is situated upon a more external plane; behind the transversus perinæi muscle it is reflected upon itself and, as already stated, becomes continuous with the anterior layer of the triangular ligament.

This reflection of the fascia, corresponding to the bi-ischiatic line, forms a line of demarcation between the anal portion of the perinæum behind and the urethral portion in front. Purulent collections generally respect this limit, so that, in the absence of other data, we may know with great certainty whether a perineal fistula proceeds from one or the other of these portions. Anal and rectal fistulæ are situated behind the line and urethral fistulæ in front. (Tillaux.)

At the sides the superficial perineal fascia is attached to the rami of the pubic and ischiatic bones. In front it is continued on to the penis and sending off a layer which separates the corpora cavernosa from the corpus spongiosum completely surrounds this organ up to the base of the glans.

Fig. 53.



Buck's fascia. (After Buck.) *A*. The corpus cavernosum, enucleated from the sheath. *B*. The sheath, split up to the suspensory ligament, of whose anterior layer it is a continuation. *C*. The relations of the sheath to the corpus spongiosum urethræ, one layer of the fascia passing above it, and the other below it. *D*. Its relations to the glans penis, to which the sheath adheres inseparably by its outer surface, while by its inner surface it caps the corpus cavernosum. *E*. The dorsal arteries, veins, and nerves, raised with the sheath.

These relations of the superficial fascia to the penis were first fully described in the first volume of the *Transactions of the American Medical Association*, by the late Dr. Gurdon Buck of New York. As this paper is not generally accessible, and deserves to be preserved in memory of the distinguished surgeon who wrote it, I shall quote the greater part of it:—

"The anatomical structure in question consists of a distinct membranous sheath investing the penis in the manner to be described, and forming a continuation of the suspensory ligament above, and of the perineal fascia below, and will be best understood by a description of the mode of dissecting it.

"The penis and scrotum are to be circumscribed by an incision at the distance of three fingers' breadth all around, and crossing the perinæum at the anterior margin of the sphincter.

"The dissection of the skin and subjacent cellular and adipose tissues is to be made towards the penis, on the level of the fascia lata laterally, and of the perineal fascia posteriorly, and carefully continued to the body of the penis, as far as the corona glandis. By this means, the penis, as well as the suspensory ligament, is denuded of its loose movable investments.

"An incision is then to be made along the dorsum of the penis exactly in the median line, splitting through the suspensory ligament, and extending forward to the corona, between the dorsal vessels and nerves that run parallel on either side. The adhesions of the sheath along the dorsum are firm, and require careful dissection; the bloodvessels and nerves being raised with it, serve as a guide to show the line of adhesion.

"The dissection being prosecuted laterally as well as inferiorly and at the extremity, the entire corpus cavernosum is enucleated, the muscles of the perinæum being raised with the sheath. It is now clearly seen that the suspensory ligament from above, and the perineal fascia from below and laterally, form one continuous membrane with the sheath, inclosing the corpus cavernosum in its cavity, and embracing the corpus spongiosum urethræ between two layers, one of which passes above and the other below it. The excavated base of the glans adheres inseparably to the outer surface of the sheath, while by means of its inner surface, it caps the summit of the corpus cavernosum.

"Its adhesions are most firm at the extremity of the corpus cavernosum, along its dorsal surface, and at the insertions of the erector and accelerator muscles. It is thickest around the corona, along the dorsal surface, and where it forms the suspensory ligament. Zones of vessels run at regular intervals in the direction of the circumference of the penis, from the dorsal trunks to the corpus spongiosum, between the layers of the sheath. The cavity formed by the sheath, and occupied by the corpus cavernosum, is limited posteriorly by the triangular ligament (deep perineal fascia).

"That portion which covers the perineal muscles, and has been described by authors under the names of the superficial fascia of the perinæum, inferior fascia and ano-penic fascia, arises laterally from the ascending rami of the ischium, and descending of the pubis, as far forward as the inferior edge of the symphysis, where the two layers meet and form the suspensory ligament. Posteriorly, it is continued over the transverse muscle, and folding around its edges is prolonged upwards into the ischio-rectal fossa.

"It also sends off from its upper surface membranous septa between the accelerator muscles in the middle, and the erectors on either side, to join the triangular ligament, and thus forms the three distinct and independent sheaths that are confounded anteriorly with the common sheath investing the corpus cavernosum."

M. Jarjavay afterwards confirmed Dr. Buck's observations, and gave full credit to the "Chirurgien de l'Amérique" for the originality of his discovery.[1]

[1] Jarjavay, Traité d'anatomie chirurgicale, Paris, 1854, t. ii, p. 576.

Richet,[1] while agreeing with Dr. Buck in the main, differs from him in some particulars. He states that the posterior portion of this fascia is quite loose and areolar upon the dorsum, where it cannot be distinguished from that covering the pubes; and that thus a communication is opened by which infiltrations of urine may gain the sub-integumental cellular tissue of the penis and abdomen without perforating the fascia.

Pelvic Fascia.—The pelvic fascia is, in reality, the superior aponeurosis of the elevator ani muscle—a muscle which is lined with an aponeurosis on either side of it. This fascia is lost on the sides of the pelvis with the fascia of the obturator internus; within, it is attached to the rectum and the lateral fascia of the prostate. Although thin in structure, it is generally sufficient to prevent purulent collections formed above it from pointing in the perinæum and *vice versâ*. (Tillaux.)

A knowledge of these fasciæ, which may be facilitated by a study of the accompanying figures from Tillaux,[2] is essential to every surgeon who operates upon the genito-urinary organs. Their practical bearing is so clearly set forth by Tillaux, that I shall give it in his own words:—

The three fasciæ above described, the superficial and deep perineal fascia and the pelvic fascia, circumscribe between them two chambers or reservoirs, viz., one inferior and the other superior. The first contains the spongy portion of the urethra and the corpora cavernosa, the second the membranous and prostatic portions of the canal.

Inferior Penile Chamber.—This chamber is bounded by the superficial fascia of the perinæum below and the deep fascia above. We have seen that these two fasciæ are continuous with each other at the posterior edge of the transverse muscle. Its shape has been compared to that of a pistol, the but-end of which is below at the bulb.

This chamber contains the bulb of the urethra, Cowper's glands, the spongy portion of the urethra, and the corpora cavernosa. It is covered by the skin, the superficial fascia, and the subcutaneous layer of cellulo-fatty tissue.

It is generally in this compartment that ruptures of the urethra take place in consequence of strictures; hence the infiltration does not extend, in the direction of the rectum, into the ischio-rectal fossa. It first invades the penis, but does not remain confined there for a long time; it extends to the scrotum, escapes from the chamber on a level with the suspensory ligament, and reaches the pubis and the walls of the abdomen, which are sometimes undermined in their totality.

In this compartment, also, urinary tumors and urinary abscesses are developed, which are so often the consequence of strictures of the urethra. This accident should be carefully distinguished from infiltration of urine. The latter takes place suddenly in consequence of rupture of the urethra; the urine immediately invades the inferior chamber without any obstacle

[1] Richet, Traité d'anatomie medico-chirurgicale, 2e ed., Paris, 1860.
[2] Traité d'anatomie topographique, etc., Paris, 1877.

to its passage, passes beyond its limits, extends to a distance, and causes mortification of the tissues wherever it extends.

Urinary abscesses and tumors occur in quite a different way. The inflammation of the urethra, which always exists behind a stricture, extends slowly to the neighboring tissues. There is thus gradually formed on the inferior wall of the canal, a nodule, varying in size (possibly as large as a large hen's egg), and of extreme hardness. This is a urinary tumor. These tumors are also immovable, and in case they fill the space between the two ischia, no line of demarcation separates them from the osseous walls. They occupy exactly the median line, which serves to distinguish them from chronic inflammation of one of Cowper's glands.

If the urethra breaks after this preparatory work has taken place, the urine finds before it an insurmountable barrier and cannot become infiltrated; then we have a urinary abscess.

If pus forms within this indurated mass, its envelope is so thick and resistent, that we can never feel fluctuation at the outset. These abscesses should be opened early, for fear that the envelope may become perforated and urinary infiltration follow. It is often necessary to cut through several centimètres of indurated tissue before reaching the cavity.

Superior or Prostatic Chamber.—The prostate is circumscribed by a series of aponeurotic planes which isolate it on all sides. They are above and in front, the pubio-vesical ligaments or tendons of the vesical muscle, which run into the pelvic fascia; behind and below, the prostato-peritoneal fascia and the superior layer of the triangular ligament; on the sides, the lateral aponeurosis of the prostate.

The pubio-vesical ligaments are very resistent, but they do not form a continuous plane. Between their fibres exist spaces traversed by large veins coming from the penis; the urine may follow the same road, and infiltration is then the more easy, since, in front of the ligaments, exists a layer of lax pre-vesical cellular tissue.

The prostato-peritoneal aponeurosis (Fig. 51, *n*) extends from the cul-de-sac of the peritonæum to the posterior edge of the triangular ligament. It is continuous below with the superior layer of this ligament, just as the superficial fascia is continuous with the inferior. Its adherence with the peritonæum prevents this membrane from ascending into the pelvic cavity as the bladder becomes distended, and, on the contrary, makes it form a very deep cul-de-sac. It covers all the posterior surface of the prostate, which it thus separates from the rectum. But this layer, composed almost exclusively of smooth muscular fibres, generally presents only feeble resistance. It is easily destroyed and perforated by pus, as, for instance, in suppurative prostatitis, and thus a urethro-rectal fistula may form.

It is evident that, if the posterior wall of the prostatic chamber gives way, before any barrier has been formed against infiltration, the urine at once extends into the anal portion of the perinæum, invades the ischio-rectal fossa, completely isolates the rectum, and extends upwards into the pelvic cavity. The penis, the scrotum, and the abdominal wall are abso-

lutely intact. This dangerous form of infiltration is insidious, and at the outset often recognized with difficulty. It is happily rare, and follows most frequently false passages in the prostatic urethra in persons with a middle lobe so enlarged as to obstruct the entrance of a catheter.

The lateral aponeurosis completes the prostatic chamber. It is a fibrous plane nearly quadrilateral, placed directly on each side of the prostate in such a manner as to present an internal and an external face, a superior and an inferior border. It extends from before backwards, from the pubis, where it is continuous with the pubio-prostatic ligaments and the triangular ligament, to the rectum, to the lateral walls of which it is attached, whence the name of *pubio-rectal*, which has been given it. From above downwards, it occupies the space comprised between the superior perineal fascia and the prostato-peritoneal aponeurosis, to which it is attached. Besides the prostate, the prostatic chamber contains Wilson's muscle, and especially a large number of veins.

It is very exceptional to find that the lateral aponeuroses of the prostate give way in consequence of organic lesions of the urethra, or the violent use of a catheter; but they are readily cut in the operation of lithotomy, especially in the lateral operation. This condition is favorable to infiltration of urine, which then takes place in the anal portion of the perinæum; and the sub-peritoneal cellular tissue is likewise invaded.

The perinæum, as we have said, is divided into two distinct portions; one anterior, the genito-urinary; the other posterior, the recto-anal. This division is justified by the course of infiltrations of urine. Two great forms of infiltration may occur; one has for its starting point the portion of the urethra included in the penile or inferior chamber, when the urine invades the penis, the scrotum, and, if not arrested in time, the abdominal wall; the other proceeds from the part of the canal inclosed in the superior or prostatic chamber; the urine extends into the rectal portion of the perinæum, fills the ischio-rectal fossa, gains the pelvic and often the abdominal cavity. This is in accordance with fact and with our knowledge of anatomy.

Dimensions, Mobility, and Direction of the Urethra.—Having considered the separate portions of the urethra and the various tissues which surround it, we may now regard it as a unit; and more especially with reference to the size and form of instruments required in the treatment of stricture.

The statements of authors relative to the length of the male urethra represent it to be from five and a half to twelve inches. This discrepancy may be accounted for by the different methods employed in taking measurements; whether upon the living or dead subject; by the amount of traction exercised upon the parts; and, also, to a certain extent, by an actual variation in different persons. The size of the penis appears to have no influence upon the length of the urethra; the latter, as shown by Sappey's observations,[1] often being in an inverse ratio to the former. The greatest source of variation is found in the length of the anterior or ascending portion of

[1] Recherches sur la conformation extérieure et la structure de l'urètre de l'homme, Paris, 1854.

the subpubic curvature. Without seeking for any absolute standard, it is desirable to obtain an average which may assist in determining the situation of strictures, and afford useful information in their treatment; and after all that has been said by authors of the variable length of the urethra in different individuals, the results of measurements are found to be nearly identical, provided the method of making them be always the same.

The length of the urethra may be estimated during life by means of a graduated catheter, the flow of urine indicating when the eye near its point has reached the vesical extremity of the canal, and care being taken that the penis is not stretched upon the instrument. After death, the urethra and bladder may be removed from the body, slit open superiorly, gently extended upon some smooth surface, allowed to contract by their own elasticity, and then measured with a tape. Attempts have also been made to ascertain the length of the urethra by casts of the canal in fusible metal; but the two methods just mentioned are far more reliable.

According to the careful and minute observations of Mr. Thompson and Mr. Briggs, the results of measurements thus taken during life and after death are not identical; by the former, the average length is found to be seven and one-half inches;[1] by the latter, eight and one-half. This difference is constant, and may readily be accounted for by the different conditions under which the measurements are taken. It is worthy of remembrance, "since all accurate researches into the pathological anatomy of stricture are, of necessity, confined to an observation of the parts *after death*, while, in relation to treatment, the measurement *during life* is that which alone must be remembered."[2]

The urethra cannot be said to have any fixed and absolute diameter, since its walls admit of greater or less expansion according to the amount of force exerted upon them. A No. 12 catheter or sound of the English scale rarely fails to pass with ease, if the parts be healthy; and not unfrequently No. 15 will pass without difficulty.

It is more important to be familiar with the relative than with the actual diameters of the different portions of the canal. The external orifice or meatus is almost invariably the most contracted part; so that whatever instrument fairly enters the urethra will pass through it, if no obstruction exists. Another important inference from this fact is, that to restore to its original calibre by dilatation one of the deeper portions of the urethra contracted by stricture, the meatus must be enlarged, which can generally be effected only by incision. The next narrowest point of the canal is at the junction of the bulbous and membranous regions; while the middle of the prostatic portion, and the sinus of the bulb are the widest.

The degree of *mobility* of different portions of the urethra is chiefly influenced by the attachments of the neighboring fasciæ. The anterior part

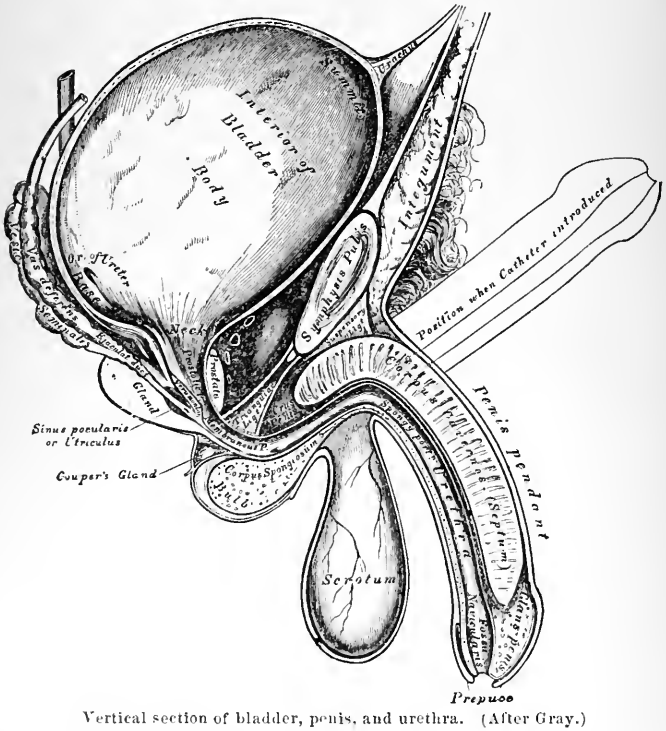
[1] Leroy d'Etiolles obtained an average of eight inches from one hundred measurements during life, by means of a graduated gum-elastic sound. (*Des rétrécissement de l'urètre, etc.*, Paris, p. 5.)

[2] Thompson, op. cit., p. 4.

of the penis is free, and capable, in a flaccid condition, of assuming almost any position; in its posterior third, however, this organ is connected with the symphysis, by means of the suspensory ligament; with the ischiatic and pubic rami, by the crura of the corpora cavernosa, and with the anterior layer of the deep perineal fascia, by means of the bulb; the spongy urethra may, therefore, be said to be fixed in proportion as it approaches the membranous region. The membranous region is the least movable of all, owing to its firm connection with the pelvis by means of the two layers of deep perineal fascia. The prostatic urethra is susceptible of some slight change of position, dependent upon the action of the anterior fibres of the levator ani, and the amount of urine in the bladder.

In a flaccid condition of the penis, the urethra has two curves: the first confined to the anterior, the second to the deeper portion of the canal. The former is simply due to the dependent position of the anterior part of the organ, and is effaced in a state of erection or when the penis is elevated to an angle of about 60° with the body. The latter may be called

Fig. 54.



Vertical section of bladder, penis, and urethra. (After Gray.)

the sub-pubic curve, from its position beneath the symphysis. Unless some degree of force be used to straighten the canal, this curve is permanent, and a knowledge of its direction is essential in determining the proper form of instruments and the manner of their introduction.

The sub-pubic curve commences an inch and a half anterior to the bulb, attains its lowest point, when the body is in the upright position, nearly opposite the anterior layer of the deep perineal fascia, and finally ascends through the membranous and prostatic regions. According to the observations of Mr. Thompson and Mr. Briggs, it "forms an arc of a circle three inches and a quarter in diameter; the chord of the arc being two inches and three-quarters, or rather less than one-third of the circumference." Mr. Thompson states that he has often found it more acute in spare men; and in the corpulent, more obtuse; that traction of the abdominal muscles exercised through the suspensory ligament may also render it more abrupt, whence the advantage of raising the shoulders when performing catheterization upon patients in the recumbent posture. The elevation of the bladder above the pubes in children, and the enlargement of the prostate so common in old men, also effect a change in the direction of the sub-pubic curve from its usual adult standard, and require therefore a corresponding variation in the form of instruments. Swellings and abscesses about the lower extremity of the rectum, large hemorrhoidal tumors, and various other circumstances may also operate in a greater or less degree to cause some change in the direction of this curve.

Strictures.

Strictures may be briefly classified as Spasmodic and Permanent or Organic.

Spasmodic Stricture.—The chief element of a spasmodic stricture is *muscular spasm*, with which is usually associated more or less *congestion*. Either of these may exist alone; commonly both are combined.

Many of the older writers on venereal diseases, as Charles Bell, denied the influence of spasm, except perhaps in the membranous region, to which their knowledge of any muscular tissue surrounding the urethra was mainly confined. The subsequent discovery by Kölliker and Hancock of organic muscular fibres about the canal has shown the possibility, and, reasoning from analogy, the probability, that spasmodic contraction may take place in any part of the urethra, where these fibres are circular; in other words, within the limits already defined. (See page 253.)

The exciting cause of spasm is some impression upon the sentient nerves, transmitted to a nervous centre, and returned through motor fibres, terminating in either voluntary or involuntary muscles. In the urethra, spasmodic action, sufficient to produce stricture, may take place in the submucous layer of organic fibres; or, in the membranous region, in the striped fibres of the compressor urethræ; and, *perhaps*, to a less extent, in those of the accelerators in the spongy region.

While performing catheterization upon irritable subjects, it has occasionally been observed by nearly every surgeon, that the instrument is grasped and temporarily held by the urethral walls, even when the canal is free from permanent obstruction. In this case, the sound, or catheter, acts as

a foreign body, and the irritation which it produces is followed by contraction in accordance with the familiar laws of reflex action.

In other cases, the eccentric irritation is caused by laceration, abrasion, or a wound of the lining membrane, such as may ensue from the rough use of a catheter, or other surgical instrument. This, of itself, may excite spasm; or the same may be induced by contact of urine with the raw surface.

Striking examples of spasmodic stricture are also met with as the result of irritation about the rectum, excited by the presence of a tapeworm, ascarides, hæmorrhoids, fissure of the anus, fecal accumulation; or by operations upon this part, especially the ligature of piles. Sir Benjamin Brodie[1] met with a case of spasmodic stricture, in which the spasm was intermittent, recurring every twenty-four or forty-eight hours, and which was finally cured by quinine after the failure of other means.

Among other causes of spasm, are the presence of a stone in the bladder, or urethra; organic stricture of this canal; immoderate sexual intercourse; the free use of alcoholic stimulants; long retention of the urine; horseback exercise; digestive derangements; exposure to sudden changes of temperature, and mental emotion.

A spasmodic stricture is characterized by its short duration. It appears suddenly in persons of delicate habit, especially in those who have committed some imprudence in diet, and as suddenly disappears. Exploration of the canal by means of a sound after the spasm has passed, and frequently during its continuance, shows that there is no organic obstruction. Mr. Smith[2] details a case in which a patient, who had suffered from a violent attack of retention a short time before, suddenly died; and, at the post-mortem examination, not the slightest contraction was found.

Prof. Otis believes that a spasmodic stricture due to reflex irritation may exist continuously for years, even fifteen or twenty years, during which time it is nearly or wholly impassable to any instrument, although at any moment it may be made to entirely disappear by the removal of the source of irritation. He says: "Deep organic urethral stricture is often simulated by muscular spasm, the result of irritation caused by slight anterior strictures, even by a slight contraction of the meatus urinarius alone. *The great proportion of cases treated by gradual dilatation are treated for deep stricture which does not exist.*"[3] (The italics are in the original.) So far as I know, such long-continued spasm is never met with in other muscular tissues. Moreover, I believe that any spasmodic stricture can be passed with patience and suitable instruments, and until I meet with a case of the kind described by Dr. Otis, as I never yet have done, I cannot admit of spasm lasting through years.

I shall presently have occasion, when speaking of the seat of strictures, to mention Verneuil's views regarding spasmodic stricture at the bulbo-

[1] Lond. M. Gaz., vol. i, p. 507.

[2] Henry Smith, Stricture of the Urethra, London, 1857, p. 23.

[3] Stricture of the Male Urethra, 1878, p. 301.

membranous junction, which are of interest in this connection, and are quite similar to those recently set forth by Dr. Otis.

In the great majority of cases which come under the observation of the surgeon, inflammation and spasm are combined, and to these is added some degree of permanent contraction. A patient has an organic stricture which has given him but little annoyance, and offered no serious obstacle to the complete evacuation of the bladder; suddenly, after freely indulging in spirits, or coitus, and retaining his urine for several hours, he finds himself utterly unable to pass water. The urethra, partially contracted by organized deposit in and around its walls, is entirely closed by the supervention of congestion and spasm, and complete retention is the result. Under appropriate treatment, the congestion and spasm may be subdued, though the organic stricture remains after their disappearance.

Permanent or Organic Stricture.—The albuminous fluid which infiltrates the tissues in acute urethritis, and which may contribute to the formation of congestive stricture, is, in most cases, eventually absorbed, and the canal recovers its normal calibre. But under other circumstances, and especially as a consequence of chronic inflammation, products of a more plastic nature are thrown out, which become organized, exhibit the same tendency to contract as adventitious deposits in other parts of the body, and give rise to permanent contractions of the canal.

According to the more recent views of pathologists, stricture is due to a proliferation of the elements of the submucous cellular tissue and not to the organization of any effused fluid. It is evident that the diminution in the calibre of the urethra is but one of the bad effects of stricture; the normal elasticity of the canal is lost, and the exercise of its function seriously interfered with.

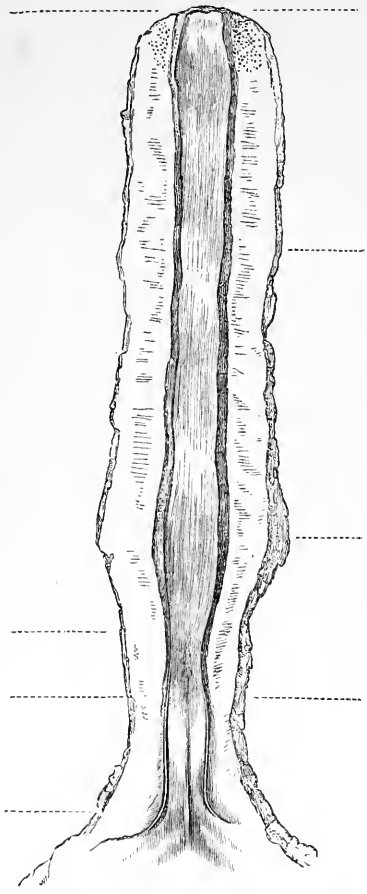
Organic stricture may be due to traumatism, as a fall upon the perinæum, in which case it is peculiarly obstinate and not generally amenable to treatment by dilatation. In the anterior portion of the canal, it may also have arisen from the cicatrization of a chancroid, or from the specific induration surrounding a chancre. Masturbation has also been enumerated among the causes of stricture, but, as it appears to me, without sufficient evidence.[1]

Seat.—There are several sources of error which should be avoided in attempts to determine the anatomical seat of strictures during life. These are the mobility of the stricture itself, which may often be thrust back to a considerable distance on the point of an instrument; the liability of the penis to be elongated by traction at the time of taking the measurement; and the actual elongation which often ensues as a consequence of the frequent handling which this organ receives from persons suffering under stricture. The great discrepancy in the statements of authors as to the most frequent seat of this complaint shows that these, and perhaps other sources of error have not been sufficiently guarded against; and the tendency has almost

[1] See a paper by Dr. Samuel W. Gross, On sexual debility and impotence, with special reference to masturbation as an exciting cause of stricture, Med. and Surg. Reporter, Phila., May 5, 1877.

invariably been, as shown by recent investigations, to assign to stricture a seat posterior to its true situation.

Fig. 55.



"A healthy urethra, eight inches and a half in length, slit up from the upper part, accurately reduced on scale from a drawing made from the original while fresh, to half the natural size. On the left-hand side are indicated the anatomical divisions of the urethra, and on the right the boundaries of the regions referred to in relation to the locality of stricture." (After Thompson.)

Sir Henry Thompson made a careful and laborious examination of over three hundred preparations of stricture contained in the chief museums of Paris, London, and Edinburgh, and arrived at the following conclusions as to its site. He premises by dividing the urethra for the sake of convenience into these three regions:—

I. The Sub-pubic Curvature, which comprises an inch of the canal before, and three-quarters of an inch behind, the junction between the spongy and membranous regions, thus including the whole of the membranous portion.

II. The Centre of the Spongy Portion, a region extending from the anterior limit of the preceding, to within two inches and a half of the external meatus, and measuring therefore about two and a half to three inches in length.

III. The External Orifice, including a distance of two inches and a half behind it.

Of 270 preparations, embracing 320 distinct strictures, Mr. Thompson found

In region I	. . .	216 or 67 per cent.
" " II	. . .	51 " 16 " "
" " III	. . .	54 " 17 " "
		320

According to this eminent authority, the largest number of strictures are therefore situated at the sub-pubic curvature; and he would still further limit the most frequent locality to the anterior portion of this region, since he says "that part of the urethra which is most frequently affected with stricture is the portion comprised in the inch anterior to the junction, that is, the posterior or bulbous part of the spongy portion. The liability of this part to stricture appears to diminish as it approaches the junction, where it is less common; while behind, it is very rare. Most rarely is a stricture found so far back as the posterior part of the membranous portion."[1] The next most frequent situation of stricture is stated to be the external two and a half inches, and the least frequent the middle portion of the spongy region, although the difference between the two is not very great; while both are of but small importance compared with the anterior portion of the bulb.

Mr. Walsh[2] and M. Mercier[3] arrived at results very similar to the above.

On the other hand, in 1866, M. Verneuil read a paper before the Anatomical Society of Paris,[4] in which he denied the frequency of *organic* stricture at the bulb and at the commencement of the membranous portion; or rather he maintained that in cases of stricture a *fibrous* contraction is almost always met with at about two and one-half inches from the meatus, and that beyond this, at the depth of five inches, *i. e.*, at the bulbo membranous junction, there is constantly a second contraction, but only *spasmodic* and symptomatic of the former. "Whenever there is irritation of the anterior portion of the urethra, the membranous portion contracts and arrests a sound." "Whenever a patient shows symptoms of urethral stricture, one contraction exists in the spongy portion, a second in the membranous portion. The first alone is fibrous; the second spasmodic and

[1] Op. cit., p. 83.

[2] Med. Press, Dubl., Jan. 23, 1856, p. 51.

[3] Recherches sur le traitement d. mal. d. voies urinaires, 1856, p. 377. Also Bull. Soc. anat. de Paris, 1858, p. 441.

[4] Bull. Soc. anat. de Paris, avril, 1866, p. 170.

symptomatic of the first." Verneuil's views are still further developed in an able article by M. H. Folet,[1] in which an extensive bibliography of the opinions of different authors on the seat of stricture is given and the following conclusions are arrived at:—

1. Fibrous, organic stricture is frequent in the spongy portion of the urethra, where it is often overlooked.

2. Organic stricture of the bulbo-membranous region, although said to be frequent, is rare.

3. In *all* cases of stricture of the spongy urethra, there exists a second obstruction five inches from the meatus, at the commencement of the membranous region. This obstruction is due to muscular spasm, and is only a symptom of the penile stricture. The latter (penile) is often slight and incapable in itself of notably impeding micturition. The secondary spasm is the efficient cause of the dysuria, and constitutes a serious and sometimes invincible obstacle to catheterization.

4. The calibre of the penile stricture is constant, and can be only slowly and regularly dilated. That of the spasmodic stricture is subject to the most sudden and capricious variations; it may perhaps be easily passed in the morning, and in the evening, under the influence of some irritation, be completely impassable.

5. In those rare cases in which the organic stricture is seated at the bulb, a secondary spasmodic stricture exists none the less, immediately behind it.

Dr. Otis,[2] whose views on spasmodic stricture have already been referred to, is also a firm believer in the greater frequency of organic strictures in the spongy portion of the urethra. He states that out of 258 strictures under his care, 52 were in the first quarter inch of the urethra; 63 in the following inch, viz., from $\frac{1}{4}$ to $1\frac{1}{4}$; 48 from $1\frac{1}{4}$ to $2\frac{1}{4}$; 48 from $2\frac{1}{4}$ to $3\frac{1}{4}$; 19 from $3\frac{1}{4}$ to $4\frac{1}{4}$; 14 from $4\frac{1}{4}$ to $5\frac{1}{4}$; 8 from $5\frac{1}{4}$ to $6\frac{1}{4}$; 6 from $6\frac{1}{4}$ to $7\frac{1}{4}$.

These discrepancies may, perhaps, be explained, when we consider the two methods by which the results have been obtained: Sir Henry Thompson and others founding their observations upon post-mortem specimens, and enumerating only such cases of stricture as are apparent after death; Verneuil and Dr. Otis making their examinations during life, and counting in a large number of slight contractions, even of the meatus, which their opponents would not admit to be strictures at all. Further and *unbiased* investigation is, however, necessary before this question can be regarded as settled.

Stricture never occurs in the prostatic region of the urethra, at least no unquestionable instance of the same is to be found recorded.

Number.—Thompson states that in most cases there is only one stricture in the same subject. Of 267 preparations examined by him, the stricture was single in 226. Others have reported several distinct contractions. Hunter[3] met with six; Colot with eight; and Ducamp with

[1] Arch. gén. de méd., Paris, avril, 1857, p. 401.

[2] Op. cit., p. 97.

[3] Ricord and Hunter, op. cit., p. 168.

Fig. 56.

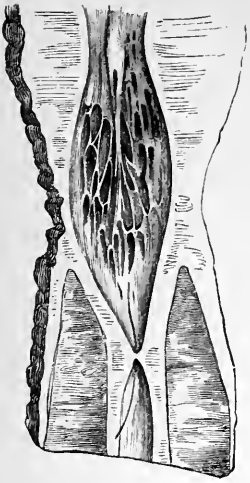


Fig. 57.

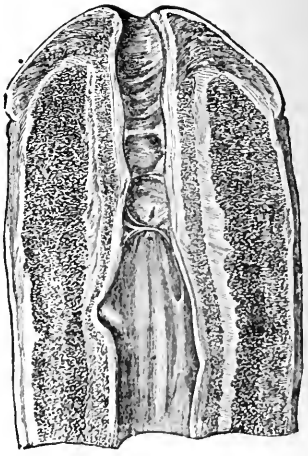
Fig. 56. Annular stricture.

Fig. 57. Irregular, or tortuous stricture. Posterior to the stricture in each figure are seen pouches of the mucous membrane, formed by dilatation of the lacunæ and ducts, and capable of entangling the point of an instrument. (After Thompson.)

five; but Boyer never found more than three, and Mr. Thompson[1] never more than "three, or at the most four." Civiale[2] says that when there are several, one of them is almost always situated in the sub-pubic curve, and the others between it and the meatus. Here again Otis, with a different method of examination, is at variance with other authorities, regarding multiple strictures in the same person as the rule and not an exception. He reports one case in which he found fourteen.[3]

Form.—The form of stricture necessarily varies with the amount and situation of the fibrinous deposit which produces it. This may consist of a few fibres, which encircle the whole or a part of the urethral circumference, like a thread, or may form a band, varying in extent and thickness. This is the "linear stricture" of Mr. Thompson and others; the "bridle stricture" of Charles Bell; and the "valvular stricture" of French writers.

Fig. 58.



Strictures near the orifice of the urethra. (After Thompson.)

[1] Op. cit., p. 54. [2] Op. cit., vol. i, p. 157. [3] Op. cit., p. 68.

Where the fibrinous deposit is more extensive, the stricture covers a larger portion of the urethral walls. In some instances, it is abrupt on either side, like the last-mentioned form, but wider; as if a whip-cord were tied externally to the mucous membrane; this is called an "annular stricture." If the induration be more diffused around its base, a section of the canal will resemble an hour-glass, and the contraction receives the name of "indurated annular stricture." Again, stricture may involve the canal to the extent of half an inch or several inches; when the passage is often more or less deviated from its normal direction, and the stricture is said to be "irregular or tortuous."

Degree of Contraction.—The plastic material of stricture exhibits a constant tendency to contract, and become harder and firmer with time; it is consequently true, as a general rule, that the longer a stricture has existed, the more callous it is, and the less susceptible of dilatation. Exceptions to this law, however, sometimes exist; and strictures of long duration are met with which yield readily, while others, recent in their origin, prove very obstinate.

Complete obliteration of the urethra may take place as a consequence of a wound of the canal, sometimes from within, but more frequently from without. In strictures other than those of traumatic origin, the urethral walls are probably never completely fused together; although cases are reported in which fistulous passages had for a long time turned the urine from its normal channel, and in which, on post-mortem examination, it was impossible to introduce the finest probe through the contraction, even after the external portion of the penis had been slit up.[1] Instances of this kind, however, are rare; in most cases, however great the narrowing, urine will still find its way out, though it may be only by a few drops at a time.

There has been no little discussion of the question, whether the urethra, when permeable to urine, is always permeable to instruments. The late Mr. Syme, of Edinburgh, and also Mr. Lister, asserted, in the earlier years of their practice, that whenever any urine comes out a catheter may with patience and perseverance be got in sooner or later, but they were both of them repeatedly foiled at a later period of their lives, and it is safe to say that no surgeon of any considerable experience will maintain that he has never met with a case of "impassable stricture."

Pathology of Stricture.

In mild cases of stricture, the canal in front of the contraction preserves its normal dimensions and character; but in severe and chronic cases, when the flow of urine has been much obstructed, and the anterior portion of the urethra, through continuity of tissue, has participated in the inflammation which chiefly affects the part behind the stricture, it is contracted; another condition, difficult of explanation, is one of dilatation, which, in

[1] Thompson, op. cit., p. 60–61.

a case described and figured by Charles Bell, was very considerable. Instances in which the urethra was ulcerated in front of the stricture, are also given by the same author.

Posterior to the stricture, the urethra is generally enlarged, as a natural consequence of the impediment to the free evacuation of the bladder. The canal ultimately loses its elasticity and becomes dilated so as readily to admit the finger, or even form a pouch which may appear as a fluctuating tumor in the perinæum. The lacunæ of the mucous membrane and the orifices of the prostatic and ejaculatory ducts frequently participate in this enlargement; and the septa between the pouches thus formed constitute a network, chiefly confined to the floor and sides of the canal, which is well adapted to obstruct the passage of an instrument unless the point be well elevated towards the pubes.

The mucous membrane behind the stricture is the seat of chronic inflammation; it is sometimes contracted and puckered; sometimes thin and minutely injected with bloodvessels; the surface is generally covered with a layer of pasty exudation, and it is from this source that the gleety discharge, which is so constant an attendant upon stricture, is derived. Ulceration frequently takes place, which may be superficial, or which may extend to the deeper tissues, producing large and ragged excavations of the urethral walls, or, in rare instances, it may even occasion destruction of the contracted portion of the canal.

Abscess and Fistula.—A still more serious consequence of stricture is the development of abscesses and fistulæ in the neighborhood of the urethra. In most cases the urethral mucous membrane is impaired or destroyed at one or more points by ulceration; during the straining of micturition, urine, perhaps in a very minute quantity, escapes into the cellular tissue; an abscess is formed which burrows in various directions, or which opens and establishes a fistulous communication between the external surface and the urethra. In other cases abscesses are developed without rupture of the urethral walls or infiltration of urine; and they may occur even when the obstruction to the evacuation of the bladder is far from complete. In most cases, however, a communication is subsequently established by the ulcerative process. When a urethral opening exists, it is generally behind the contracted part, but sometimes in front of it. The course taken by urinary fistulæ is often very erratic; they may open into the rectum, upon the perinæum, upon the surface of the scrotum, upon the abdomen, even as high as the umbilicus, or upon the thighs or nates.

These abnormal passages rarely have more than one opening into the urethra, but very frequently a number upon the external surface: in one case, seen by Civiale, the latter amounted to no less than fifty-two.[1] Their internal surface becomes lined with adventitious tissue, which bears a very close resemblance to mucous membrane, but is destitute of glands and follicles; it is organized, well supplied with nerves and bloodvessels, and constantly secretes a muco-purulent fluid. Calculous matter is deposited

[1] Op. cit., vol. i, p. 539.

in fine particles or in larger masses, resembling mortar, upon the walls, and more particularly near the orifices or in some blind pouch opening into the passage.

Deposition of similar matter often takes place in the dilated sinuses of the prostate, and this gland may become inflamed, and abscesses form in its substance.

Bladder.—The vesical walls become hypertrophied, as a consequence of the obstruction to the flow of urine and the additional force requisite for its expulsion induced by stricture. This hypertrophy chiefly affects the muscular layer, but does not wholly spare the areolar tissue, which is somewhat thickened and increased in density. The walls of the bladder may attain five or six times their normal thickness, and measure from half an inch to an inch in thickness. The developed fasciculi of muscular fibres form prominent ridges upon the mucous surface, and have been aptly compared to the columnæ carneæ of the heart's cavities. Frequent and violent expulsory efforts cause protrusion of the mucous membrane between these columns, and pouches are formed, which, small at first, may gradually increase in size until they equal or excel the dimensions of the bladder itself.

On post-mortem examination the mucous membrane of the bladder is found to be thickened, soft and pulpy, and much congested in patches; its color is heightened and generally of a dark-red hue, its surface is smeared with slimy mucus, which, when mingled with the urine, may obstruct the narrow orifice of the stricture; scattered over it is a quantity of fine calculous matter, or it is covered with lymph, sometimes in small patches, at others, in layers of considerable extent.

The irritability of the bladder excites to frequent acts of micturition, and the capacity of this viscus is eventually much diminished. Instances are recorded in which it would not contain more than an ounce, or even half an ounce, of fluid.

Ureters and Kidneys.—As a stricture obstructs the exit of urine from the bladder, so it cannot but impede the passage of fluid into it; consequently we find changes similar to those already described in the ureters and kidneys. The former are often so dilated that they will admit the finger or thumb, and in some instances, have been mistaken for a portion of the small intestine; their parietes are thickened, and lymphy deposits, and other evidences of chronic inflammation are found upon their internal surface. The kidneys may participate in these lesions; the pelvis, infundibula, and calices, are distended; the medullary tissue of the organ is atrophied under the pressure to which it is subjected, and enormous reservoirs may be formed, capable of containing five, ten, and in one instance, observed by Sir Henry Thompson, twenty ounces.

Genital Organs.—Stricture is not unfrequently attended with hypertrophy and induration of the penis, and tumefaction and œdema of the prepuce.

The ejaculatory ducts may be dilated; their walls, and those of the vesiculæ seminales, inflamed and thickened; and their cavities contain

pus, and other products of inflammation. There is often considerable irritability of the testicle, and attacks of epididymitis sometimes occur, especially after the use of instruments within the urethra.

It is evident from a consideration of the organic lesions which stricture induces in the bladder, ureters, and kidneys, that the secretion of urine must be seriously interfered with, and the perfect elimination of effete matter consequently prevented; and it is also probable that more or less noxious material is absorbed from the partially decomposed urine which collects in the bladder and elsewhere. The inevitable effect of this upon the system at large, and especially upon the nervous centres, is too well known to require explanation.

Symptoms of Stricture.

One of the earliest symptoms of organic stricture is generally a gleety discharge from the urethra. If the contraction of the canal has immediately succeeded an attack of gonorrhœa, the urethra may never have recovered its normal condition since the acute symptoms were present; but in some instances all traces of muco-purulent matter had entirely disappeared, when suddenly, perhaps after some excess, the linen is found again stained, or the lips of the meatus adherent. This discharge is not a constant symptom of stricture, but is present in the great majority of cases. It is chiefly derived from the contracted portion of the canal, and the parts lying directly behind it.

Another early symptom, and sometimes the first which attracts the notice of the patient, is a gradual diminution of the power over his bladder. He is not able to retain his water as long as usual, and a desire to urinate calls him up several times during the night. The stream, moreover, is diminished in fulness, is projected with less force than natural, and may be variously distorted; sometimes it is flattened, at other times spiral like a corkscrew, forked, or divided into two or more portions which diverge from the meatus; or, at the same time that a small stream issues from the canal, a portion falls in drops at his feet; he is obliged to take special care to avoid soiling his shoes and clothes; and finally, when he supposes the act fully accomplished, a few drops dribble away, and wet his person and his clothing. The above symptoms cannot, however, be regarded as pathognomonic of organic stricture, since they may be produced by other causes, as the presence of inspissated mucus in the canal, spasmodic contraction, calculi, irregular action of the bladder, etc.

At the same time, each passage of the urine may be attended with pain and disagreeable sensations, varying in intensity, position, and character. Most frequently there is a sense of dull aching in the perinæum, back, and loins, or in the glans penis; often pain of a sharper character is felt in the course of the urethra or at the neck of the bladder, or follows the course of the spermatic cord, and is most severe in the groins and testicles, while sometimes it shoots down the thighs. Another frequent seat of pain is

behind the pubes, where it is probably due to some degree of inflammation of the bladder.

As the disease progresses, all the above symptoms are aggravated; and the urgency of micturition, especially, is much increased. Frequently, the patient is almost wholly deprived of sleep by repeated calls to urinate, and the length of time which this act requires. In aggravated cases, the urine dribbles away in small quantities, while the patient is asleep, or without his consciousness during the day. This has sometimes been mistaken for incontinence of urine; whereas it is almost invariably due to distention of the contracted bladder and overflow of its contents. The urine also undergoes certain changes in consequence of its retention and partial decomposition, and the vesical inflammation which is thereby excited. These have already been mentioned in the chapter on cystitis.

Hæmaturia, which, however, is seldom excessive, sometimes occurs in connection with stricture, and is most frequently met with in old and aggravated cases in which the mucous membrane of the urethra and bladder is much congested.

The *genital functions* may be variously interfered with. In consequence of the irritation of the parts, frequent erections may take place, or nocturnal emissions occur. In other cases, erection is never perfect, owing to the rigidity of the urethra, or an obstruction to the entrance of blood into the corpora cavernosa; pain may be felt in sexual intercourse, and the semen, instead of being at once ejaculated, slowly dribbles away, or passes backward through the dilated urethra into the bladder; hence, persons with stricture are frequently impotent.

Hæmorrhoids, prolapsus ani, and irritation about the rectum, which is occasionally severe, are often produced by the repeated and violent straining required in emptying the bladder. In a similar manner, hernia is liable to occur, especially in old men.

Retention of urine sometimes supervenes in the early stages of organic stricture, in consequence of congestion and spasm; it may indeed, in rare instances, afford the first indication to the patient that he is the subject of stricture; but in most cases it appears at a later period, when the obstruction to the passage of urine is already very great. It generally follows exposure to wet or cold, a long ride or drive, and, most frequently, a hearty meal, at which alcoholic stimulants have been freely indulged in.

Distention of the bladder, in such cases, may even produce rupture of the vesical walls. If the peritonæum be involved in the rent, the urine gains entrance to the abdominal cavity; the vesical tumor disappears, but the abdomen is tense and swollen, and death soon occurs from peritonitis. More commonly the contents of the bladder are at first effused into the sub-serous cellular tissue, where they may cause extensive gangrene of the surrounding parts, or whence they may afterwards escape into the abdominal cavity by ulceration. In no case of rupture of the bladder from retention, has the patient been known to recover.[1]

[1] Thompson, op. cit.

Still more frequently, the distention of the bladder produces rupture ot the urethra behind the stricture, where its walls are weakened by chronic inflammation and ulceration. In the sudden and extensive infiltration of urine which ensues, no time is given for adhesive inflammation to erect barriers to its progress, as often happens in the slower formation of urinary abscesses, and thus the urine, forced on by the contractile power of the bladder, permeates the loose cellular tissue, wherever it is not limited by the fasciæ. When the rupture takes place anteriorly to the triangular ligament, the effusion, after breaking through Buck's fascia, extends forwards and upwards into the scrotum and over the abdomen; its extent may generally be defined by the swelling and discoloration of the integument, and an emphysematous crackling on pressure, which is due to the mixture of gases with the fluid; the vascular connection between the superficial and deeper tissues is cut off or impeded, and, unless free incisions be made, gangrene of extensive portions of the skin may ensue. Thus, cases are recorded in which the effusion perforated the superficial perineal fascia and extended down upon the thighs, and in which the greater part of the integument from the knee to the umbilicus, including the coverings of the penis and scrotum, sloughed away, and left the testicles entirely exposed and suspended only by the spermatic cords and vessels; yet, even under these circumstances, recovery has been witnessed. A symptom, which is to be regarded as of serious import, is the appearance of a dark spot upon the glans penis, which indicates that the infiltration has gained access to the corpus spongiosum urethræ, and that gangrene has already commenced.

When rupture takes place posteriorly to the triangular ligament, the symptoms may for a time be obscure: as when occurring elsewhere, the patient often has the sensation of something giving way, and experiences temporary relief from his sufferings; if the rent be large enough to allow of the free escape of urine, the vesical tumor subsides, and, the tension of the parts being relieved, the patient may be able to pass water, but the quantity thus evacuated or drawn off is found to be small; soon deep throbbing pain is felt in the perinæum, and symptoms of general depression set in; and the urine, after burrowing in various directions, may approach the surface.

Causes of Stricture.

A knowledge of the causes of stricture, and the relative frequency ot their action, may best be attained from an analysis of a large number of cases, such as is furnished in the following table prepared by Mr. Thompson. It should be observed that 143 of these 220 cases were collated from the records of University College Hospital, London, and 49 from reports by different surgeons in medical journals; occurring for the most part in hospital practice, they represent the worst class of urethral contractions.

ANTECEDENTS, OR SUPPOSED CAUSES OF 220 CASES OF STRICTURE.[1]

Gonorrhœal Inflammation in	164
Injury to Perinæum	28
Cicatrization of Chancres or Chancroids	3
Ditto, following *Phagedæna*	1
Congenital, including cases in which the urethra may have been small from malformation, and those in which marked irritability of the urinary organs existed from childhood, accompanied by an unusually small stream	6
Poisoning by Nitrate of Potash,[2] *Lithotrity*, *Masturbation*,[3] of each one	3
True Inflammatory Stricture, including temporary stricture and retention from sudden acute inflammation, usually caused by some excess, and disappearing by resolution	8
True Spasmodic Stricture, caused by irritation about the rectum	2
" " " no cause assignable	2
" " " caused by undue acidity or alkalinity of the urine	3
	220

Of the 164 cases attributable to gonorrhœa—

In 90 the disease is reported to have been *chronic* or *neglected*.

" 3 it was attributed by the patients to strong injections.

" 6 the discharge is stated to have ceased entirely and rapidly under treatment; but in five of these stricture appeared almost immediately after.

" 4 other cases the stricture appeared to be almost simultaneous with the gonorrhœa.

In the remaining 61 there is no report of chronicity, etc.

Of the 164 cases attributable to gonorrhœa—

10 appeared immediately after, or during the attack;

71 " *within* 1 year of its occurrence;

41 " " 3 or 4 years:

22 " " 7 or 8 years;

20 are reported at periods between 8 and 20 to 25 years.

It appears from the above table that gonorrhœa holds the first, and injuries of the perinæum the second rank in the etiology of stricture.

Urethral contractions are favored by the long continuance, rather than the severity, of urethritis. If we omit the 61 cases of the above table in which there is no report of the duration of the preceding gonorrhœa, we find that, in nearly nine-tenths of the remainder, the urethral inflammation, to which the stricture was attributable, was either chronic, or neglected. Inquiries addressed to patients laboring under stricture show that, in the great majority, the urethral contraction has been preceded by several attacks of gonorrhœa; but, whether by one or more, that the last was prolonged for many weeks or months, and terminated in a gleet. We may hence infer that whatever, either in the patient's mode of life or in his constitutional tendencies, prolongs the duration of a gonorrhœa, tends to produce stricture.

[1] Thompson, op. cit. p. 124. [2] Medical Times, Lond., June 22, 1844.

[3] Lallemand. Clinique Médico-Chirurgicale, 1re part, p. 109.

Laceration of the urethral walls during chordee, and wounds from the imprudent use of sounds, catheters, etc., require a passing notice. The former may occur spontaneously, or arise from the habit, more prevalent among Frenchmen than Americans, of relieving chordee by forcibly extending the penis; or, as is said, "breaking the chord." Wounds of the urethra by instruments from within evidently have the same effect as from without; in the process of cicatrization which ensues, the natural coaptation of the parts must frequently be lost, and fibro-plastic material endowed with contractile properties be deposited. A distinction, however, is to be made between transverse and longitudinal wounds of the urethra from within. The former only may be said to be likely to produce strictures. Such results do not follow longitudinal incision, made, for instance, in internal urethrotomy.

Much influence in the production of stricture has been attributed to the use of injections. I feel obliged to dissent *in toto* from this opinion, which appears to me to be based upon reasoning *post hoc ergo propter hoc.* When made very strong, or used at an improper stage of the disease, or with excessive force, injections may doubtless act as escharotics, or aggravate the inflammatory action, and thus favor urethral contraction, but this effect pertains only to their abuse.

A chancre or chancroid, like any other ulcer, destroys a certain portion of the tissues upon which it is situated, and this loss of substance is not restored in the process of cicatrization, but the gap is filled with fibro-plastic deposit, in the form of granulations, which gradually contracts and approximates the edges of the original sore, or which forms a hard unyielding cicatrix between them. In this manner venereal ulcers situated upon any portion of the urethral mucous membrane may lay the foundation of stricture. Examples of this kind are most frequently seen in sores upon the margin of the meatus, or in the fossa navicularis.

Diagnosis.

The general symptoms alone might be considered sufficient to indicate a case of stricture, but in many instances are very deceitful. There are other affections of the urinary organs, the symptoms of which closely resemble those of stricture, and which have often been mistaken for it. Experience, therefore, would show that the greatest care should always be employed in forming a diagnosis. The diseases which are most likely to be confounded with organic stricture, are subacute inflammation of the prostate, and urethral neuralgia and hyperæsthesia.

Subacute inflammation of the prostate may be attended by nearly every symptom which has been described as belonging to stricture, viz., by frequency and difficulty of micturition, gleety discharge, and pain in the perinæum, above the pubes, and elsewhere. This identity in the symptoms may readily lead to a mistake in diagnosis, which may even be confirmed by a superficial exploration of the urethra; for the prostatic portion of the canal, in this affection, is exceedingly sensitive and the introduction

of a catheter attended with severe pain; if, then, the surgeon yields to the feelings of the patient and fails to make a thorough examination, or, if he employs a fine sound or bougie, the point of which is liable to be obstructed by catching in some lacuna of the mucous membrane, the erroneous conclusions already drawn from the history of the case may apparently be confirmed.

The same mistake may also occur in cases of urethral hyperæsthesia, either when occasioned by sympathetic irritation from stone in the bladder, affections of the rectum, etc., or when, in the absence of any apparent cause, the exalted sensibility can be attributed only to nervous derangement. The diagnosis of a suspected case of stricture can, therefore, be founded only upon a careful and thorough exploration of the urethra, and the instruments required in such examination, and the manner of using them, will now claim our attention.

Exploration of the Urethra.—The instruments requisite for physical exploration of the urethra, and the diagnosis of stricture, most of which are also useful in treatment, are a set of sounds, solid and flexible catheters, and bougies of various forms. I propose to describe those only which I have found most useful in practice.

Shape and Size of Metallic Instruments.—The degree of curvature of unyielding instruments used in urethral exploration is a matter of no small importance. It would seem desirable that the curve should correspond to the natural curvature of the least movable portion of the urethra itself, which is that portion underlying the symphysis pubis. Mr. Thompson has adopted this principle in the construction of catheters and sounds, and his example has of late been very generally followed, since it has been found that experience confirms the deductions from theory, and that urethral instruments with such a curvature are most readily introduced. The subpubic curve is an arc of a circle three and a quarter inches in diameter, or, in other words, of a circle described by a radius one and five-eighths of an inch in length, the chord of the arc measuring two inches and three-quarters. The accompanying figure exhibits a catheter and sound so bent as to correspond to this curve.

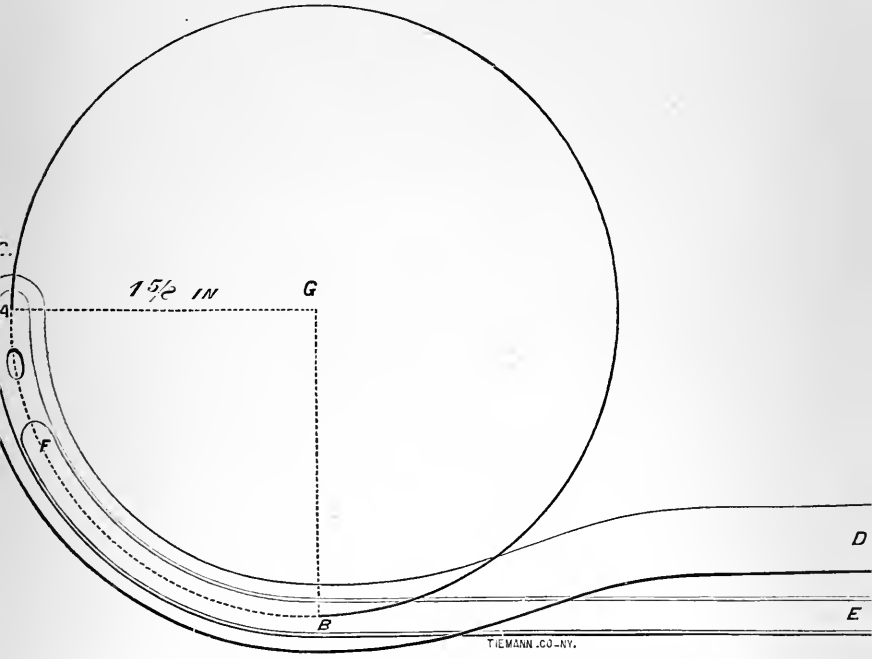
In order that the precise direction of the point of the instrument may be indicated by the direction of its shaft, it is desirable that a constant relationship should exist between the two. According to the principle of construction here recommended, this is a right angle in the catheter, and in the sound, a somewhat shorter instrument, an angle of 120°, or a right angle and a third.

Another form of sound, known as Béniqué's, is a very desirable one in some cases. It has a double curve corresponding nearly to the two curves of the urethra when the penis is not elevated against the pubes, and hence is of the same shape that a flexible bougie assumes when introduced into the bladder and abandoned to itself. When properly made, it will be found on examination, as shown in the diagram, that its extremity follows

the same curve as that above described, but that it includes a larger arc of the circle. Its point is likewise at a right angle with its shaft.

As to the choice between these two forms of sound, it may be said: in practised hands they are generally equally easy of introduction, although

Fig. 59.



A B represents an arc of a circle three and a quarter inches in diameter (radius 1⅝ in.); A B E, a catheter with Thompson's curve; F B E, a sound, with the same curve, but shorter; C B D, a large Bénique's sound, its extremity following the same curve, but including a larger arc of the circle.

I have met with cases in which the one entered more readily than the other. For many years, I have been in the habit of using the short sound with Thompson's curve for the dilatation of stricture,—when, of course, there would be no object in reaching the deepest portion of the canal,—and of using a long sound with Béniqué's curve in the treatment of cases of irritability of the neck of the bladder or whenever it is desirable to have the instrument enter this viscus and be retained for a time.

The greatest confusion formerly prevailed, and still prevails to a considerable extent, concerning the numbering of catheters and sounds. We hear of an "English scale," but there is no such thing as a constant English scale, since the numbers of no two English makers exactly correspond, although they do approximately, and we cannot as yet dispense with the term, however inaccurate. The French, on the contrary, have a definite standard, and if you buy half a dozen *filières* of as many different instrument makers in France, you will find them all to agree. Besides this

recommendation of uniformity, the French scale has also this advantage, that the steps of its gradation are shorter than the English, which is often very desirable in dilating strictures.

The French scale, often known as the *Charrière-filière*, progresses by steps of one-third of a millimetre *in diameter*, that is to say: No.1 represents an instrument one-third of a millimetre *in diameter*, No. 2 two-thirds, No. 3 three-thirds or one millimetre. Given the number of the instrument, and you know its *diameter* in as many thirds of a millimetre.

I have italicized the word diameter, because in the previous edition of this book I made the stupid mistake of saying that the number of each instrument represented its circumference in millimetres, and other writers have followed my bad example. If the circumference of a circle were exactly three times its diameter, my statement would have been true, but, of course, it is not. The diameter is to the circumference as 1 is to 3.14159, and although this fraction beyond the three might be ignored in estimating the circumference of the smaller numbers of sounds, yet its multiplication in the higher numbers makes no little difference. The following table exhibits the diameters and the circumferences of sounds from numbers one to forty inclusive according to the French scale:—

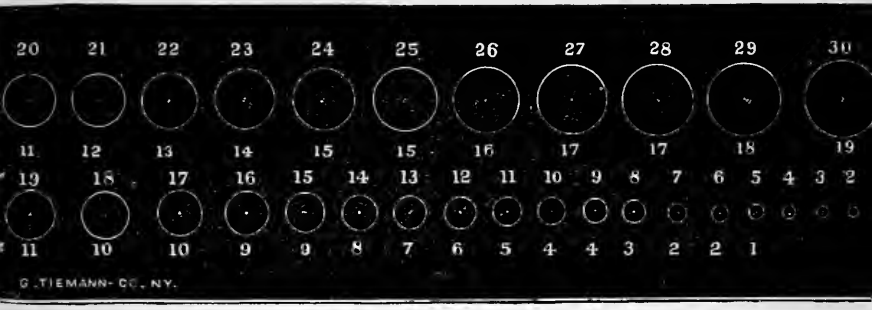
No.	Diameter in millimetres.	Circumference in millimetres.	No.	Diameter in millimetres.	Circumference in millimetres.	No.	Diameter in millimetres.	Circumference in millimetres.	No.	Diameter in millimetres.	Circumference in millimetres
1	0.33	1.05	11	3.67	11.52	21	7.00	21.99	31	10.33	32.46
2	0.67	2.09	12	4.00	12.57	22	7.33	23.04	32	10.67	33.51
3	1.00	3.14	13	4.33	13.61	23	7.67	24.08	33	11.00	34.56
4	1.33	4.19	14	4.67	14.66	24	8.00	25.13	34	11.33	35.60
5	1.67	5.24	15	5.00	15.71	25	8.33	26.18	35	11.67	36.65
6	2.00	6.28	16	5.33	16.76	26	8.67	27.23	36	12.00	37.70
7	2.33	7.33	17	5.67	17.80	27	9.00	28.27	37	12.33	38.75
8	2.67	8.38	18	6.00	18.85	28	9.33	29.32	38	12.67	39.79
9	3.00	9.42	19	6.33	19.90	29	9.67	30.37	39	13.00	40.84
10	3.33	10.47	20	6.67	20.94	30	10.00	31.42	40	13.33	41.89

It will thus be seen that when Dr. X, who bases his "French" scale on circumferences, tells us that he has divided a stricture up to 30, he has really divided it to less than 29 of the true French scale, and that when he says 40, he should say a little over 38, etc. etc.

Drs. Van Buren and Keyes have proposed a scale, which they have christened "The American (?) scale," and which is intrinsically better than the French scale, since it progresses by *half* millimetres in diameter and thus avoids the thirds of millimetres of the French scale, evidently an undesirable departure from the metric system. I must, however, object to the introduction of any new scale, when one already exists that is known and used as a standard by so many surgeons in every civilized country. To depart from this standard on one's own responsibility is merely to in-

troduce inextricable confusion. Fig. 60 represents the Charrière-filière, with the numbers (expressing thirds of millimetres in diameter) above the

Fig. 60.



openings. For the sake of comparison, I have added below the openings the corresponding numbers of the English scale with as great accuracy as I have been able to estimate them.

Fig. 61.

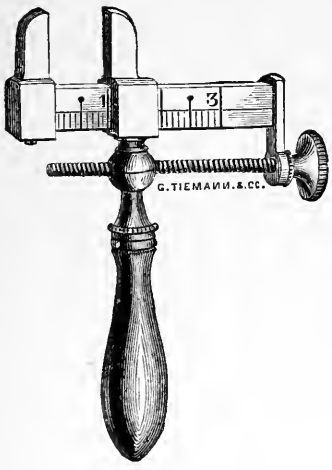
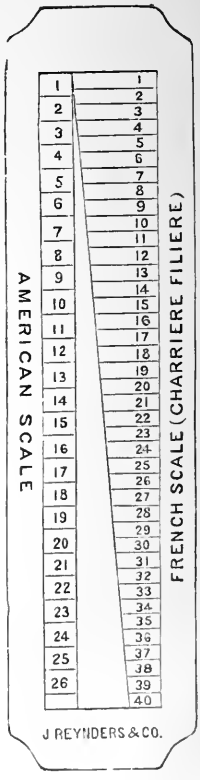


Fig. 62.



It should be observed, that in the present work whenever the size of urethral instruments is mentioned, the number of the French scale is intended.

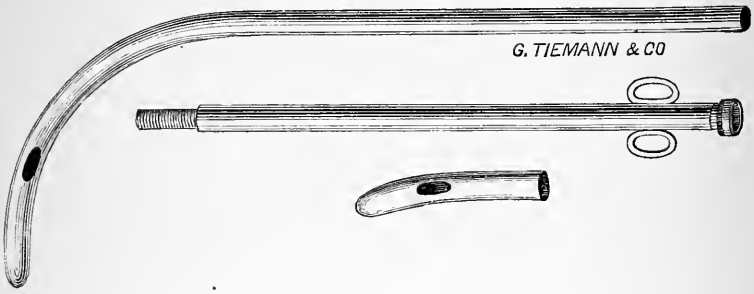
For measuring the diameter of a given instrument, supposing the same to be unknown, we may employ the gauge represented in Fig. 61.

A still more convenient gauge, however, has been invented by Dr. H. E. Handerson, of New York, and is shown in Fig. 62. The catheter, sound, etc., to be

measured, is simply to be inserted in the base of the opening and slid towards the apex as far as it will go, when the parallel lines on either side will indicate its size according to both the French and the Van Buren-Keyes scale.

Catheters are conveniently made somewhat longer than the canal they are designed to traverse, and usually measure about eleven inches. The handle of the catheter is provided with a firm oval ring attached to each side, in order that the least twisting of the instrument on its axis during its introduction may be at once manifest to the operator, and also to permit of its being retained as a permanent catheter. The vesical extremity of the instrument has two eyes for the entrance of urine, one situated half an

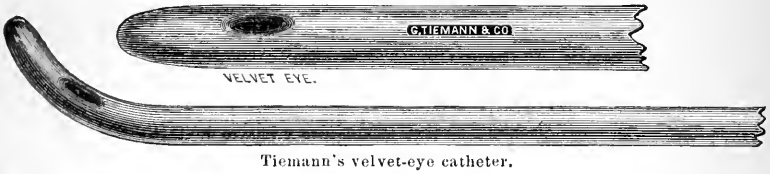
Fig. 63.



Compound male and female catheter.

inch, and the opposite one an inch from the extremity. They are often made too large, and allow of the protrusion of folds of the lining membrane of the canal, obstructing the passage of the catheter, and exciting unnecessary pain. Their edges should be bevelled off with nicety. Instead of these two lateral eyes, the end of the catheter is sometimes pierced with

Fig. 64.



Tiemann's velvet-eye catheter.

numerous small apertures, which are objectionable on account of their liability to become clogged with blood or mucus.

Fig. 65.

Otis's prostatic guide.

A "complete set" of catheters is entirely unnecessary. As they are used only for evacuating the bladder, a large and a small one (Nos. 8 and

Fig. 66.

20 French), besides a probe-pointed, a prostatic, and a female catheter, fulfil every purpose. The "compound male and female catheter" (Fig. 63) is, however, a requisite for every pocket-case of instruments.

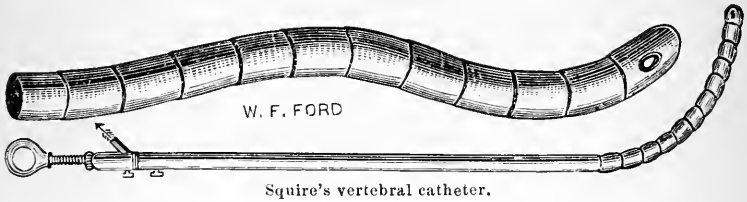
Of gum-elastic catheters, those made by the French, with a conical end and a bulbous point (see Fig. 68) are often of value, on account of the ease and safety of their introduction. They are admirably fitted for a patient's own use, since their flexibility renders it almost impossible for him to do himself harm. In cases of enlarged prostate, however, there is nothing equal to the Nélaton catheter, of pure rubber, which is now made in England of superior stability and outside finish and which is commonly known as Jaque's catheter. It is also made in this country by Geo. Tiemann & Co., who claim to have improved the eye of the instrument so that it cannot excite irritation in its passage (Fig. 64).

In some instances it is desirable to impart to this instrument increased firmness without impairing its elasticity, in which case the stylet or guide of Prof. Otis, consisting of a light steel rod (A) eight inches in length, upon which is screwed a spiral riband (B) five inches in length, will be found of value (Fig. 65).

A silver prostatic catheter, with more than the usual curve and a long beak, should always be at hand. Fig. 66 represents the size and shape of one which has never yet failed me in cases of retention of urine from enlargement of the prostate.

Squire's vertebral catheter (Fig. 67) is also highly esteemed by many of our best authorities in cases of prostatic obstruction, but many accidents

Fig. 67.



Squire's vertebral catheter.

have occurred from the separation and detachment of its links, owing to imperfect construction, and it may well be supplanted by the Jaque's catheter, with or without a stylet, already mentioned.

Sounds.—The best sounds are made of "Stubb's steel," and are either highly "polished in oil," or, more frequently at the present day, nickel-plated, both to avoid rust and to present a smooth surface to the urethral walls. For reasons already given, I prefer to have in my office two full sets, one of Thompson's, the other of Béniqué's, curve. The former, however, may be made to answer every purpose, and are quite sufficient for a case of instruments to take to an operation or for the use of a general practitioner. They should range in size from number 12 to 36, or even 40. In cases of stricture so tight as not to admit No. 12, it is better to employ bougies, since the stiffness of a small metallic instrument exposes to the danger

of making a false passage. Their handles should be broad and roughened, so as to afford a secure hold to the hand and indicate any deviation in the direction of the point. It is well to have the points gradually tapering to two sizes smaller than the shaft, and the same arrangement enables us in making up an out-door case of urethral instruments to economize space by dispensing with every other number of the scale.

Bougies.—Bougies are made of wax, gum elastic, whalebone, and other materials, and are furnished with variously shaped points.

The English mahogany-colored bougies, which on account of their durability are so commonly found in surgical cases in hospitals and private offices, are objectionable, *except in certain cases of prostatic obstruction* in which considerable stiffness of the instrument is called for, because of their not readily following the natural curve of the urethra. They are the source of much of the pain and even injury so often inflicted upon patients in catheterization. No other bougies can equal those made by the French, which are black in color, highly flexible, conical towards the extremity, and furnished with an olive-shaped point, which prevents their catching in the lacunæ of the canal.

Fig. 68.

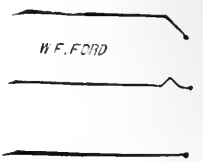
French flexible bougie and catheter.

"Filiform bougies" of the same material are indispensable in the treatment of tight strictures, and should be in the hands of every surgeon who attempts to treat such cases. If their value were better known, we should hear of fewer instances of "impassable" strictures.

Fine whalebone bougies (Fig. 69), some with straight and others with eccentric and twisted points, are also of value in cases of tight strictures in the anterior portion of the urethra, but on account of their stiffness they are less adapted to strictures in the sub-pubic curvature.

The desired shape and stiffness may be imparted to the points of fine flexible bougies by first soaking them in hot water, then twisting them as required, and finally plunging them into cold water. Or, again, the twisted points may be covered with several coats of collodion, which will retain their form even when exposed to the secretions of the urethra and the urine.

Fig. 69.



Fine whalebone bougies, twisted points.

The employment of gum-elastic and whalebone filiform bougies as guides in internal urethrotomy and in the rupture of strictures, will be mentioned hereafter.

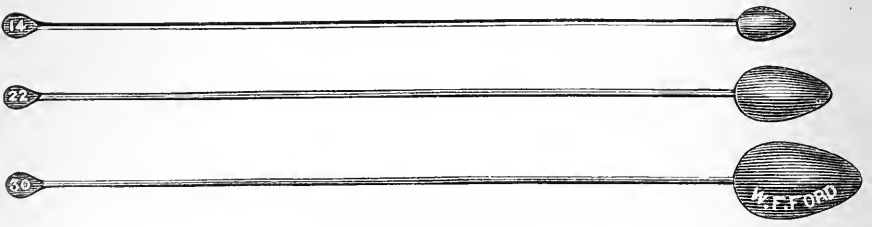
All bougies should be carefully examined from time to time, and if found impaired in the slightest degree should at once be destroyed, lest they be incautiously used and a portion break off in the canal. Bougies of elastic gum become rough with use, whereby they irritate the mucous membrane, and should in this case also be discarded. After using them, they should be wiped quite dry and free from oil, which acts on the rubber, and

then be dusted over with powdered soapstone, and be kept, in warm weather, in a cool place, as in an ice-chest. But no rubber material can be long kept in our climate, hence it is desirable for the surgeon to replenish his drawers sparingly at any one time. Whalebone bougies must be oiled occasionally, or they become brittle and unsafe.

The question has arisen, which is the less painful to the patient, the introduction of a metallic or flexible instrument? My own preference, except in somewhat tight strictures, is decidedly in favor of the former, and this preference is founded on the statements of my patients when I have had occasion to use both. I would certainly, however, recommend one who was not in the habit of using instruments, to employ the latter (flexible), but as my friend Dr. Ashhurst[1] justly remarks, "the practitioner will do wisely not blindly to follow one exclusive method, but to vary his remedies according to the exigencies of each particular case."

Acorn- ("bulbous") *pointed Sounds and Bougies.*—We are indebted for the original conception of these instruments to Chas. Bell,[2] who, as early as 1807, described them under the name of "ball-probes," and claimed for them all the advantages which they have since been proved to possess. Bell's instruments, as the name he gave them indicates, were ball-shaped or spherical at their extremity; they were made of metal, both ball and shaft. The ball-shaped head was afterwards changed to one of an olive form. This was no improvement, since a sphere will better detect a slight contraction than any bulb of an olive-shape. An actual gain was acquired in making the terminal bulb like an acorn with a somewhat abrupt shoulder, thereby facilitating the introduction of the instrument and at the same time increasing its accuracy of diagnosis upon withdrawal. Leroy d'Etiolles[3] recommended the same instruments made of flexible material. As now chiefly used, made of metal and with acorn-shaped bulbs, they were described in the first edition of this work (p. 275), pub-

Fig. 70.



Acorn-pointed sounds.

lished in 1861, when they had long been in common use. It is desirable to have them in sets, like sounds ranging in size from 12 upwards, nickel-plated, their shafts straight and about six and a half inches long,

[1] The Principles and Practice of Surgery, 2d ed., 1878, p. 913.
[2] Chas. Bell, Operative Surgery, Am. reprint, Phil., 1812, vol. i, p. 72.
[3] Traité d. angusties d. l'urètre, Paris, 1845, p. 122.

with a disk upon the distal end upon which the number is marked (Fig. 68).

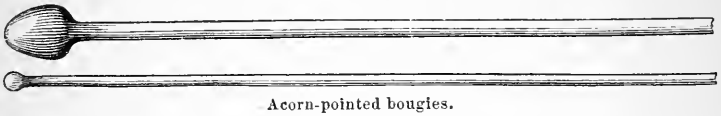
This form is the most generally useful, but it should be distinctly understood that it is adapted only for exploration of that portion of the urethra anterior to the triangular ligament. If it be desired to explore beyond this point, we must either use a similar instrument which I have had constructed curved like an ordinary sound (Fig. 71), or employ the acorn-

Fig 71.

Curved acorn-pointed sound.

pointed bougie, made of flexible material (Fig. 72). In practice, however, bulbous sounds or bougies are rarely resorted to for exploration of the deeper portion of the canal.

Fig. 72.



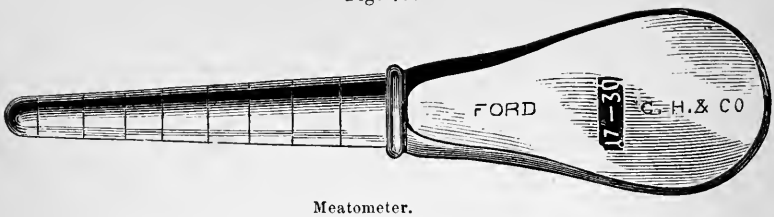
Acorn-pointed bougies.

The advantages offered by these instruments are the following: They enable us to detect and locate points of tenderness in the canal, where a chronic gonorrhœa or gleet very likely has its seat. They are a valuable means for determining the presence of slight contractions or the so-called "strictures of large calibre." It is commonly said that they enable us to determine the length of strictures, but this is evidently impossible, unless the stricture terminate abruptly at each extremity, which is rarely the case. A stricture is usually shaped like an hour-glass, and more or less contraction exists before the obstruction is encountered by any sound that can be made to pass through it. The presence of a slight stricture is better detected on the withdrawal than on the insertion of the sound, since the abrupt base of the bulb then impinges more decidedly against it. If a second stricture exist beyond the first and tighter than the latter, it may be detected by the acorn-pointed sound.

The size of the meatus is conveniently measured by meatometers, such as recently figured and described by Prof. Henry G. Piffard.[1] The accompanying cut (Fig. 73) will explain itself. It is desirable to have two on hand, so as to include the whole scale of sizes to which the meatus is liable, each being marked with the numbers corresponding to its divisions. If the surgeon wishes to multiply his instruments in this direction, he may do so with short *bougies à boule* (Fig. 74). This refinement, however, is hardly necessary to those not over-blest pecuniarily.

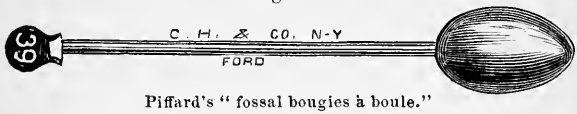
[1] Physician and Pharmac., N. Y., Jan. 1, 1879.

Fig. 73.



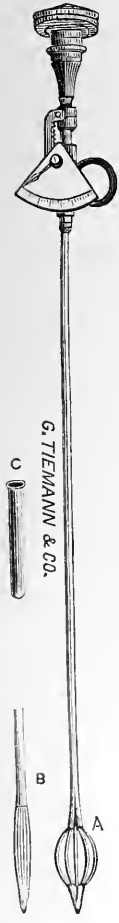
Meatometer.

Fig. 74.



Piffard's "fossal bougies à boule."

Fig. 75.



Otis's urethrometer.

Urethrometer.—Since the meatus is usually the smallest part of the urethra and varies very much in its calibre, it may not allow the introduction of any of the instruments thus far mentioned of sufficient size to thoroughly explore the canal and especially to detect slight contractions. An instrument which could be inserted through a narrow meatus and then be dilated within the urethra, with an index at its distal extremity showing the amount of its dilatation, was therefore a desideratum. This want has been supplied by the ingeniously contrived urethrometer of Prof. Otis (Fig. 75), who describes it as follows:—[1]

"It consists of a small, straight canula, size No. 8, French, terminating in a series of short metallic arms, hinged upon the canula and upon each other. At the distal extremity where they unite, a fine rod, running through the canula, is inserted. This rod (which is worked by a stationary screw at the handle of the instrument), when retracted, expands the arms into a bulb-like shape, 10 millimetres in circumference when closed, and capable of expansion up to 40 millimetres. A thin rubber stall (C) drawn over the end of the closed instrument, protects the urethra from injury and prevents the access of the urethral secretions to the interior of the instrument. When introduced into the urethra and expanded up to a point which is recognized by the patient as filling it completely—and yet easily moving back and forth—the index at the handle then shows the normal circumference of the urethra under examination. In withdrawing the instrument, contractions at any point may be exactly measured, and any want of correspondence between the calibre of the canal and the external orifice be readily appreciated. Among the advantages claimed for this instrument are: I. Its capacity to measure the size of the urethra and to ascertain the locality and size of any

[1] Stricture of the Male Urethra, N. Y., 1868, p. 77.

strictures present, *without reference to the size of the meatus*. II. It enables the surgeon to complete the examination of several strictures by a single introduction of the instrument."

While admitting the great advance made by Dr. Otis in enabling us to determine more accurately the size of the urethra at its various points, yet his instrument possesses this defect: its extremity is of an elongated olive shape, and hence is less capable of indicating a slight contraction than if it were of an acorn form—the same objection that is made to Bell's original ball-probes, only still greater. This defect is remedied in B. Wills Richardson's urethrometer,[1] and also in one invented by Prof. Robt. F. Weir, of New York (Fig. 76).

Fig. 76.

Dr. Weir's urethrometer.—The rings on the shaft locate the points of arrest, and permit subsequent accurate measurement.

Dr. Otis believes that a constant relative proportion exists between the calibre of the urethra and the size of the penis, as follows: When the flaccid penis, about three-fourths of an inch back of the corona glandis, measures 3 inches in circumference, the size of the urethra is 30 millimetres in circumference, or more.[2] When it is $3\frac{1}{4}$ inches, it is 32 or more; $3\frac{1}{2}$ inches, 34; $3\frac{3}{4}$ inches, 36; 4 inches, 38; $4\frac{1}{4}$ to $4\frac{1}{2}$ inches, 40 or more millimetres. The constancy of this relationship is denied by Dr. R. F. Weir,[3] but seems to have been received generally as at least approximatively correct, and hence of considerable practical value.

The urethrometer is commonly introduced as far as the bulbous portion of the urethra, that is to say, about $4\frac{1}{2}$ to 5 inches, before being dilated. Upon withdrawing it, it will usually be found necessary to screw it down 2 or 3 millimetres when it arrives at $3\frac{1}{2}$ or 3 inches from the meatus even in perfectly healthy urethræ. Thus diminished in size, it ought, according to the statement of its inventor, to traverse the remainder of the canal to the meatus without hindrance, unless some abnormal contraction be present.

But here comes up a question: Is a normal, healthy urethra always uniform in its calibre in its spongy portion, and must every irregularity which can be detected by the urethrometer be regarded as an evidence of

[1] Dublin Q. J. M. Sc., Nov. 1873.

[2] Dr. Otis's scale in millimetres of *circumference* differs somewhat from the *Charrière-filière*, or French scale. (See p. 280)

[3] New York M. J., April, 1876.

disease, or are constrictions (or obstructions) in this portion of the canal to some extent independent of disease and consistent with a state of health, or, in a word, *normal?* My own opinion is most decidedly in favor of the latter view. Those who maintain the contrary are logically forced to the conclusion—which they readily admit—that every obstruction that can be detected by the urethrometer, even in the absence of present inconvenience, requires internal urethrotomy, for fear of some eventual ill effect. Such is not my opinion. The two sides of this question were well presented in a discussion before the New York County Medical Society, Jan. 24, 1876, and at its subsequent meeting, by Dr. Otis on the one hand, and Drs. Sands and Weir on the other. A report of the same may be found in the columns of the *New York Med. Journ.* for April, 1876.

Dr. Weir, a most able and conscientious observer, formulates his conclusions, in which I fully concur, as follows:

1. The spongy portion of the urethra is the smallest (except the meatus) and least dilatable portion of the canal.

2. Normal constrictions (or obstructions) are to be met with in this portion of the canal as small certainly as No. 29, and the means at present resorted to are insufficient for the differentiation of such from "strictures of large calibre."

3. The healthy urethra in this portion can generally be readily and safely dilated up to an average size of 32 millimetres.

4. The normal size of the meatus is from No. 21 to 28.

5. The urethral canal is, in the words of Jarjavay,[1] "narrow at the meatus, dilated in the glans, and very slightly narrowed at the termination of the fossa navicularis; then it forms a cylinder nearly uniform to the prepubian angle, where a coarctation is found. It enlarges then to the bulb," etc.

It may be remarked that somewhat more pain and uneasiness are occasioned by the urethrometer than by the use of an ordinary sound or *bougie à boule*, and a few drops of blood are likely to follow the withdrawal of the instrument.

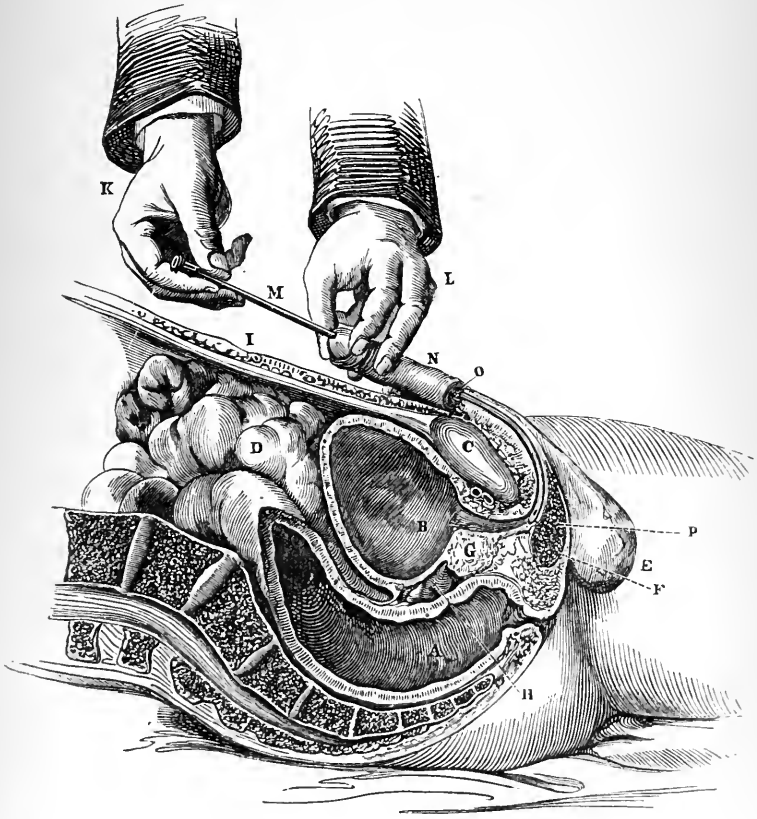
Introduction of the Catheter.—A catheter may be introduced while the patient is in the standing or sitting posture, but the recumbent position is on many accounts the best; the patient lying square on the back, with the shoulders elevated, the knees drawn up and somewhat separated, the genital organs entirely exposed, and the surgeon standing or sitting on his left.[2] The operator now raises the penis to an angle of about sixty degrees with the body, thereby effacing the anterior curve of the urethra, by means of the ring and middle finger of the left hand, its palm looking upwards; the

[1] Recherches anatomiques sur l' urèthre, 1856, p. 208.

[2] This is the position usually recommended, but much depends upon the habit of each surgeon. For myself, I prefer to be on the patient's right, and to introduce the instrument as far as the bulb with its *concexity* facing the pubes, when by rotating the shaft round towards the abdomen, the point readily slips into the membranous portion. This method, called the "*tour de maître*," has been said to be "dangerous," but on what grounds, I have yet to learn.

thumb and forefinger are thus left free to retract the prepuce and separate the lips of the meatus. The catheter, previously warmed and oiled,[1] is held tightly between the thumb and fore and middle fingers of the right-hand, "like a pen," its shaft corresponding to the fold between the abdomen and the left thigh. The introduction of the instrument should be slow and with the exercise of little force; its own weight is almost sufficient to effect its passage if properly directed; if any obstruction be met with, the instrument should be withdrawn for a short distance and again advanced with the direction of its point slightly varied, or if the obstacle be due to spasmodic contraction of the urethra, it may generally be overcome by

Fig. 77.



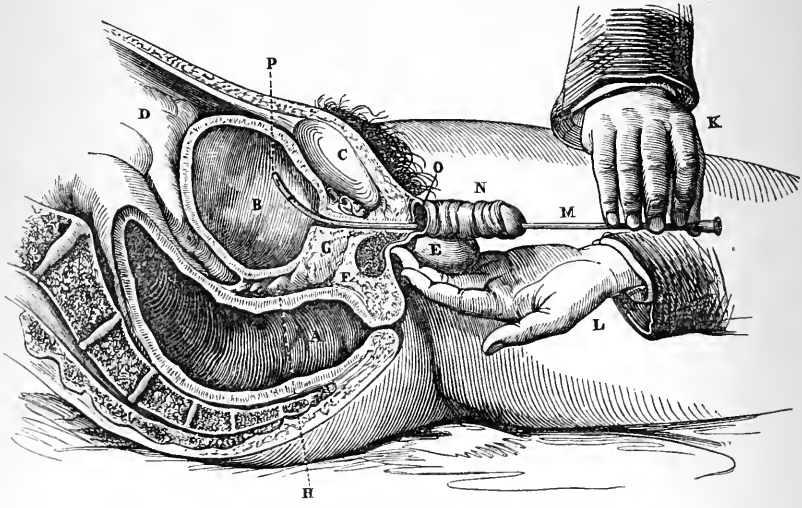
First step in introducing a catheter. (Voillemier.)

gentle pressure continued for a moment or two; while passing through the first two inches of the urethra the point of the instrument is inclined to the lower surface in order to avoid the lacuna magna; beyond this it should be

[1] Vaseline, with the addition of ten grains of carbolic acid to each ounce, is one of the best and most convenient lubricants for this and other urethral instruments.

directed rather to the upper surface to escape the sinus of the bulb; when it has penetrated beneath the pubes, the shaft is brought round to the median line of the body, and parallel to the surface of the abdomen; the handle is now to be elevated to a perpendicular and, pressure being made with the disengaged hand upon the mons veneris and the root of the penis for the purpose of stretching the suspensory ligament, be gently depressed between the thighs, not forgetting meanwhile to maintain a certain amount of progressive motion in the instrument,[1] when the point will usually glide into the bladder; if any difficulty is met with at this stage of the proceeding, it is probably because the point has caught in the extensible tissue of the bulb, and the instrument should be again raised to a perpendicular and slightly withdrawn, and the penis elongated by traction before the manœuvre is repeated; further assistance may be obtained, if necessary, during the latter part of the introduction, by gently pressing against the convexity of the instrument just back of the scrotum, or by introducing a finger into the rectum, ascertaining the exact position of the point and guiding it forwards and upwards against the posterior surface of the symphysis; the passage of the extremity over the uvula vesicæ is often indicated by nausea or a slight tremor on the part of the patient, and its entrance into the bladder by a flow of urine.

Fig. 78.



Second step in introducing a catheter. (Voillemier.)

Let us review these several steps, and notice the chief natural obstacles which are to be avoided. The first is the lacuna magna situated upon the upper surface of the urethra; this is to be shunned by directing the

[1] "The great art in passing a sound consists in properly combining the motion of reversion with that of progression imparted to the instrument." (Voillemier.)

point of the instrument towards the lower surface during the first two inches of its passage. The second is the symphysis pubis, against which the extremity will impinge, if the abdomen be distended and the handle be held in the median line; hence the direction to hold the shaft parallel to the fold of the thigh, and not to bring it to the median line or elevate it until the point has penetrated beneath the symphysis. The third is the sinus of the bulb; the urethral wall is here very extensible, and is readily thrown into a fold upon which the point of the instrument catches instead of passing through the opening in the triangular ligament into the membranous portion; this is less likely to happen if the tissues be stretched by traction upon the penis; and, if it occur, the point is to be disengaged by slightly withdrawing it, and afterwards advanced in a direction more towards the upper surface of the canal. It is to be observed that this is the only stage of the process in which traction upon the penis is desirable; after the point has entered the membranous portion, it is positively injurious. Again, hypertrophy of the prostate or abnormal development of the uvula vesicæ may oppose an instrument in the last part of its passage; this is to be avoided by depressing the handle and thus elevating the point towards the symphysis: in these cases a prostatic catheter is often required.

In using a flexible filiform bougie, the fact that it has passed the stricture and entered the bladder may be known by our ability to insert it up to the handle, and to give it a to-and-fro motion with perfect freedom.

It is a golden rule in every case of suspected stricture to make the first examination with an instrument sufficiently large to distend the urethra, whatever history of his previous symptoms may be furnished by the patient; in this manner many sources of error already indicated will be avoided. The difference in the impression conveyed to the hand of the operator by mere spasmodic contraction of the urethra and an organic stricture, is very marked, but can be better felt than described. In the former case, the tissues against which the point of the instrument impinges evidently preserve their natural suppleness, and the obstruction yields to gentle and continued pressure; while in the latter, a firm resilient obstacle is felt, which can be thrust backwards, imparting more or less motion to all the surrounding parts; and if, after a trial of one or more smaller instruments, one be found which can be successfully introduced within the stricture, it is grasped or "held" by it in a very characteristic manner. This can be only very imperfectly simulated by any contraction of the voluntary and involuntary muscles surrounding the membranous portion of the urethra which are sometimes called into action, especially in irritable subjects, by the presence of a foreign body, and it requires but little practice to make the distinction. Moreover, in spasmodic contraction, a full-sized sound can be introduced with a little gentle coaxing, and, if allowed to remain a short time, is found to be freely movable.

Strictures of the urethra anterior to the scrotum are sometimes appreciable from the surface in consequence of the amount of firm deposit which surrounds them; and external as well as internal examination is always

desirable in order to ascertain the presence of any sinus or abscess in the neighborhood of the canal.

However simple the introduction of a sound or catheter may appear to be, and however simple it really is in most instances to a practised hand, yet cases now and then occur in which the most able surgeons meet with difficulty or are completely foiled on the first trial. The evident rule in such cases is to be sure to do no harm and, if necessary, *patiently to wait.*

Treatment.

Constitutional Means.—The constitutional management of stricture must of course vary in different cases. It is sufficient, in most cases, to prescribe such measures as will best promote the health, and place the system in the most favorable general condition. An indication of the highest importance is to lighten the duty imposed upon the kidneys, and render the urine bland and unirritating to the inflamed surfaces over which it passes; and this is to be chiefly accomplished by regulating the character and quantity of the food, and favoring depuration of the blood through other channels, as the skin, bowels, and lungs. The diet should be simple but sufficiently nourishing; stimulants, and especially effervescing stimulants, as champagne and beer, highly seasoned food, cheese, cabbage, salt meats, strong coffee, and all articles which tend to load the urine should be avoided; the bowels should be opened daily, if necessary, by gentle laxatives, but violent purges are to be avoided. The skin should be stimulated by frequent bathing and friction; when there is much irritability of the urethra, the hot hip-bath will be found very beneficial; no more exercise should be taken than is sufficient to maintain the appetite and strength; and in general the patient should lead a quiet and regular life. When the urine is alkaline, or contains an undue quantity of lateritious deposit, great benefit will be derived from the compounds of potash and soda with the vegetable acids, as the citrate and acetate of potash, and tartrate of soda and potash, etc. Sir Henry Thompson recommends benzoic acid in these cases.

Probably no class of affections has more thoroughly taxed the ingenuity of surgeons to discover some speedy and effectual method of cure, than have strictures; and a volume might be filled with the different operative procedures which have been proposed for this purpose; but the limits of this chapter require that I should confine myself to the strictly practical, and speak of those methods only which have stood the test of experience.

Dilatation.—Numerous explanations have been given of the mode of action of dilatation, but the one now generally received, and which is probably correct, is, that, so far as it effects any permanently good result, it acts by promoting absorption. The presence of a bougie within a stricture may mechanically dilate its walls, but sooner or later after the withdrawal of the instrument, the plastic material again contracts; and all the phenomena attendant upon dilatation show that it accomplishes something

more than this, and that, like pressure elsewhere, it possesses the power of producing absorption of inflammatory deposits. At an early period of the existence of stricture, before its constituent elements have become firmly organized, there is reason to believe that they may be entirely removed by the treatment now under consideration; at a later stage, a portion only can be thus dissipated, and it is in these cases especially that we are forced to be content with palliating the evil by mechanically enlarging the canal from time to time, or to resort to rupture or urethrotomy.

With regard to the instruments employed in dilatation we are in many instances limited to fine flexible bougies, because these alone can be made to pass the obstruction, and, as previously stated, flexible instruments are advisable in all cases which will not admit a sound as large as No. 12 (French). In less contracted cases, the unyielding material of metallic instruments gives them the advantage of not being indented by the firm walls of indurated strictures; and being inflexible they are entirely under the control of the operator and can be guided with precision in any desired direction; in all cases complicated with false passages they should undoubtedly be preferred. On the other hand, although no instrument can be made to glide into the bladder more gently and safely than a well-polished or nickeled steel sound, yet when used by persons of little experience in urethral exploration, it may occasion much suffering and inflict serious injury; such persons, whether incompetent surgeons, or patients practising upon themselves, without previous instruction, should only make use of the flexible, bulbous-pointed, French bougies previously described.

The same method should be followed in performing dilatation as in ordinary catheterism. If the first instrument employed will not enter the obstruction, a second and smaller one must be tried; the dimensions of the stream of urine indicating by approximation the actual size required. All attempts to penetrate the narrowed channel should be made with the utmost gentleness, and any sudden thrusting of the instrument avoided; force is only admissible when the point is felt to be "held," thereby indicating that it is already engaged in the passage, and even then pressure must be steady, only very gradually increased, and always moderate. False passages are usually found below or at the sides of the urethra; hence, if there be any reason to suspect their presence, the extremity of the instrument should be carefully guided along the upper surface. It often happens, however, that the orifice of the stricture is eccentric, being above or below, or to one side of the centre of the canal; if therefore previous attempts have proved unsuccessful, the direction of the instrument may be varied; or, if a bougie be used, it may be turned on its axis at the same time that it is gently pressed forwards. Assistance is sometimes afforded, especially in strictures of the spongy and bulbous portions, by passing the disengaged hand down externally to the seat of the obstruction and exercising a certain degree of pressure. In cases of extreme difficulty, Sir Henry Thompson recommends that the urethra should first be freely injected with olive oil, which is to be retained by compression of the meatus while a small instrument is passed; he believes that thus the stricture is not only

thoroughly lubricated, but also somewhat dilated by the mechanical pressure of the fluid, and states that this method has proved of very decided advantage in his hands.

A tight stricture may foil our efforts on the first trial, in which case the attempt should not be renewed for at least three or four days, or until all inflammatory reaction has ceased. With patience and perseverance, success may often be obtained after a number of sessions, even five or six. The endoscope may afford valuable assistance, as in several cases reported by Prof. R. F. Weir.[1] The endoscopic tube is to be crowded down firmly upon the surface of the stricture; then on making traction, by grasping the penis tight enough to prevent the tube from slipping, a funnel-shaped depression is formed, into the bottom of which a filiform bougie is passed and there held while the endoscopic tube is withdrawn. The bougie, being thus supported by the urethral walls, can now, in many cases, be readily passed on into the bladder.

In cases of tight stricture, accompanied by hyperæsthesia or spasm, an anæsthetic is desirable.

The length of time that an instrument should be retained will depend somewhat upon the sensitiveness of the canal. Mr. Thompson recommends that it should be immediately withdrawn. I am in the habit of leaving it in for from two to five minutes. The phenomena following the passage of an instrument through a stricture have been carefully studied by Sir Henry Thompson, and are both highly interesting and instructive. At the first succeeding act of micturition, the stream of urine is found to be increased in size: in the course of a few hours it diminishes, and is even smaller than before the introduction of the instrument; finally, after a day or two, it is permanently enlarged. Thompson attributes the first-mentioned effect to mechanical dilatation; the second to reactive congestion and spasm; and the third to the subsidence of the latter, and to the removal by absorption of a portion of the organic deposit. The practical deductions from these observations are: that an instrument should not be inserted with such force, nor retained so long, as to excite decided inflammatory action; and that catheterism should not be repeated until the irritation produced by previous applications has disappeared.

An interval of from two to five days between the applications is usually sufficient. At the second visit, the instrument first employed may be introduced for a moment, then withdrawn, and the next larger size inserted. Thus by a gradual advance, the stricture may be enlarged to a calibre corresponding with that of the external meatus, but not to the original size of the constricted portion of the canal, unless the unyielding ring of the meatus be slit up. This should be done, unless the meatus is unusually patent, and the dilatation then be continued until an instrument equal in size to the normal calibre of the urethra, as measured by the urethrometer, can be freely passed; in short, dilatation to the fullest extent is to be recommended. Under no circumstances should catheterism be at once

[1] Am. J. Syph. & Derm., N. Y., 1870, vol. i, p. 34.

abandoned so soon as the stricture is dilated to the desired extent, whatever that may be; but the patient should be taught how to pass instruments himself and be directed to use them once a week for several months and at gradually increasing intervals for the remainder of his life. Any future tendency to contraction, as evinced by trial, should warn him that the subsequent treatment has not been faithfully carried out.

Continuous Dilatation.[1]—A more expeditious mode of dilating stricture is by the method known as "continuous dilatation," in which a catheter, if it can be introduced, is retained for a considerable length of time, generally for several days in succession. In the course of twenty-four or forty-eight hours, a purulent discharge appears, proceeding from the seat of the obstruction, and the passage is rapidly enlarged; other instruments gradually increasing in size are then successively introduced, until the desired amount of dilatation be attained. No one instrument should be left in for more than forty-eight hours, lest it become incrusted with calculous deposit or cause deep ulceration of the urethral walls.

This practice is not to be recommended, unless when from any cause, as for instance the presence of false passages, the difficulty already experienced in introducing a catheter has rendered it probable that it cannot be reinserted if once withdrawn. Continuous dilatation is likely to be attended with untoward symptoms and is always followed by a strong tendency to recontraction. I never resort to it except to the slight extent of enlarging the canal sufficiently to enable me to pass the shaft of some instrument intended for internal urethrotomy or rupture.

Within the last few years, several attempts have been made to revive continuous dilatation, and have acquired some temporary notoriety; one by M. Le Fort,[2] and another by M. Corradi,[3] of Florence. Although the names applied by these authors to their methods would lead one to suppose them to be new, the process is essentially the same as that already mentioned, and is to be judged as such. An interesting paper on Corradi's method is to be found in the thesis of M. Bos.[4]

"*Over Distention*"—Mr. Thompson applies this name to a method which does not differ from that heretofore known as "rapid dilatation," except that the instrument employed by him permits distention to be carried beyond the size which the meatus of the urethra will admit. The action of this instrument will be readily understood from Fig. 79. Mr. Thompson describes as follows the manner of using it:—

"The method of applying the power by this instrument differs materially from that in others, in being made slowly (better, therefore, under the influence of chloroform), so that from seven to ten minutes are occupied

[1] "Dilatation permanente" of the French.

[2] Malgaigne, Méd. opérat., édit. Le Fort, 1875, p. 567.

[3] See Broca, Rapport sur la prix d'Argenteuil, Bull. de l'Acad. de méd., Paris, t. xxxiv, p. 1215.

[4] De la dilatation rapide des rétrécissements de l'urèthre, Thèse inaugurale, Paris, 1876.

in slowly reaching the maximum point of distention; the object being to overstretch the morbid tissues as much, and to rupture them as little, as possible, in order to destroy, or, at all events, to greatly impair, the natural tendency of the stricture to contract. Before operating, the distance of the stricture from the external meatus is measured by passing a full-sized bougie down to the stricture; the slide is then placed upon the figure which denotes that distance. The instrument is passed until the slide arrives at the meatus; when the maximum distention is reached, the screw is turned back a little, so as not to close the blades; the instrument is withdrawn; a full-sized gum catheter is passed, and allowed to remain twenty-four hours. On the third day after the operation, a large metallic sound is passed, and subsequently at longer intervals. If it is preferred to rupture instead of to distend to the same degree, the handle must be turned rapidly, and in a few seconds the full size named can be obtained."

Fig. 79.

I find it difficult to reconcile Mr. Thompson's commendation of this practice with what he says in the next sentence when speaking of "rapid dilatation:" "This term and the practice it describes may now lapse into oblivion. The proceeding by rupture, whatever else it may do, must of necessity render wholly unnecessary any resort to the violent measures employed as rapid dilatation!"

I have reason to believe that this instrument is rarely used at the present time, even by its inventor.

In concluding the remarks upon this method of treatment I desire to say that gradual dilatation should be selected as the safest and best method of treatment for the majority of strictures, especially when seated at a greater depth than four inches from the meatus. As we shall see presently, it is not as well adapted for strictures of the pendulous portion of the penis; but even here the general practitioner, who is not familiar with urethral surgery, should not hastily abandon this method of treatment in favor of the more dangerous ones which we have yet to describe.

Internal Incision and Rupture.—There are certain considerations connected with these two methods of treatment which, in order to avoid repetition, it may be well to take up at the outset.

The nearer a stricture is situated to the external meatus, the less the danger, as a general rule, from operative interference. Strictures within

three inches of the external orifice, and especially those at the meatus, are so unyielding, and recontract so readily, that incision becomes desirable. In the subpubic curvature the vascularity of the tissues would seem to call for rupture in preference to internal urethrotomy, and in practice, the former will, as a rule, be found to be the safer operation.

There was formerly a radical defect in most instruments intended to operate upon urethral strictures from within the canal. I refer to the large size of the shaft of the instrument, which rendered it impossible to employ them in very tight strictures, and hence these instruments were open to the grave objection that a quarter or more of the treatment must first be accomplished by dilatation before they could be used. Two inventions obviate this difficulty in an admirable manner, and *enable us to make use of either rupture or internal incision in any case of stricture through which any bougie, however small, can be passed.*

Fig. 80.

In one of these, original with that eminent surgeon, Prof. Wm. H. Van Buren, M.D., the extremity of the urethral instrument is perforated like a canula for a short distance, say the eighth of an inch, from its tip, with a groove extending further up the shaft, so that the instrument may be introduced threaded, as it were, upon a fine bougie previously inserted (Fig. 80).

This invention, while commending itself by its simplicity, is only adapted to whalebone bougies; gum bougies are too flexible to serve as the guide; and since the latter can often be passed through strictures in the subpubic portion of the canal, when the former cannot, the use of this device is, I think, limited.

In the other plan, a flexible bougie is provided with a metallic cap which screws on to the extremity of the instrument (Fig. 81). The bougie may be of any degree of fineness; if its point can be introduced through the stricture and retained for a short time, the main portion of the stem will soon follow; the metallic shaft is then screwed upon the bougie and passed into the bladder, when the stricture is completely under the control of the operator.

In my own practice I have extended the use of this plan by providing my urethral case of instruments with a dozen or more flexible gum bougies of various degrees of fineness all of them armed

with metallic screws, any one of which will fit the extremity of either of the instruments I most frequently employ for the purpose of rupture or internal incision, and which may also serve as a guide for a catheter to draw off the urine. This plan is only objectionable because it requires a

Fig. 81.

degree of nicety in the adjustment of the screw-tips which few instrument-makers will give unless carefully watched and driven up to the mark; but it is, I believe, the best, and is of extended application.

These devices, and especially the latter, enable us to *seize the opportunity for an operation.* Strictures are not at all times equally permeable. We may "get through" one day and not another. If a special day and hour be appointed for the operation, unexpected difficulties will often be met with. When a difficult case of stricture presents itself and the first trial fails to pass the contraction, time and patience are the first requisites. Haste is almost sure to do harm. Let the exploration be repeated at proper intervals, always with flexible bougies armed with screws available when the opportunity offers; then when, thanks to skill and chance, the contraction is passed, the choice of the operation, whether rupture or incision, is left to the operator. Whichever instrument he prefers may be attached to the bougie, which is coiled up in the bladder as the shaft is made to advance, and the patient is relieved of his distress upon the spot by a rupturing tube or incising blade.

There are certain considerations pertaining to the treatment before and after the operation, whether by rupture or incision, which may as well be mentioned here.

No one should think of operating upon a stricture, unless in case of special emergency, while the patient is depressed from any cause. I find that many patients from the South and West are suffering with symptoms referrible to malarial influence, aggravated probably by their urethral trouble, and this condition should first be removed by quinine and tonics.

A still more important point is to examine into the condition of the kidneys. It should be an invariable rule before operating in any case of stricture, to make one or more thorough examinations of the urine, and to note its amount in the twenty-four hours, its specific gravity, the presence of albumen, casts, etc. The importance of a continued low specific gravity as indicative of renal trouble, even if casts cannot be found, should not be forgotten. It is almost needless to say that any evidence of kidney disease makes the prognosis a grave one, and should lead us to avoid an operation if possible.

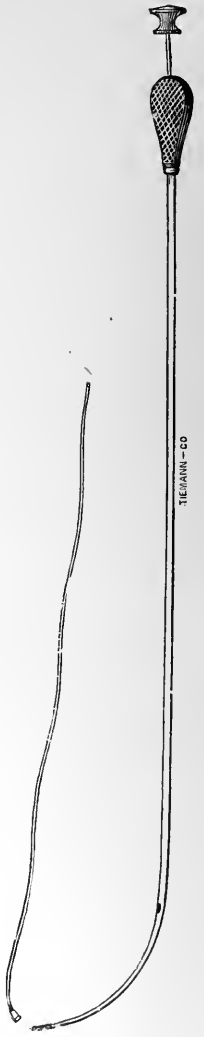
If an operation be decided upon it is best to keep the patient quiet for a few days beforehand, and to take measures to have the rectum empty. At the time of the operation the size of the meatus should be carefully examined, and, if necessary, be enlarged, by the method presently to be

described, to a size corresponding to the supposed calibre of the urethra, as estimated by Otis's rule already given (see p. 289).

Supposing the incision or rupture to have been made, the surgeon is naturally inclined to explore the canal by means of *bougies à boule* or otherwise, in order to ascertain if the desired result has been fully attained, and that no band of stricture remains. In operating upon the first three or four inches of the canal, this exploration may be made within reasonable limits with impunity, and, indeed, the operation may be repeated on the spot if found necessary. In cases, however, of tight stricture at the depth of from four to five and a half inches, I am satisfied that much harm is often done by such subsequent exploration over the raw surface. In these deep-seated strictures it is far better to remain satisfied, for the time being, with the fact that the divulsing tube or the incising blade has been successfully passed, and leave further exploration to a subsequent period. In short, it is one of those instances in which the old proverb *festina lente* is of great value, and in cases of tight stricture, especially when deep-seated, it is well to tell the patient beforehand that probably more than one operation will be required to render the result complete.

If the bladder was not emptied a short time before the operation, or if the operation has been prolonged, it is now well to draw off the urine, so that any further call to micturate may be delayed as long as possible. For this purpose we may employ an ordinary catheter, or, under those circumstances just mentioned, when the repeated introduction of instruments is undesirable, a fine catheter (Fig. 82) may be screwed to the bougie-conductor without withdrawing the latter from the canal any further than is necessary to detach the metallic shaft of the instrument employed in the operation. A steel stylet traverses this catheter, in order to give it greater firmness and prevent the eye from being clogged with blood.

Fig. 82.



Author's catheter, with screw-point so that it may be attached to any filiform bougie employed in previous rupture or incision.

Many authorities advise that after these operations a catheter should be tied in the bladder, and retained for 24 or 48 hours. I have never done this in my operations of rupture and internal incision, and have seen no reason to regret my course. On the contrary, I believe that patients do better without this source of irritation. If the permanent catheter be used, its extremity should be left open and connected with a urinal by means of an India-rubber tube. Even then the urine is apt to

dribble away by the side of the instrument and come in contact with the incision, the very thing that the employment of the catheter was intended to avoid.

Before leaving the patient it is desirable to introduce into the rectum a suppository containing a quarter of a grain of morphia, and to give by the mouth one or two drops of the tincture of aconite root, ordering its repetition every two to three hours, for the purpose of preventing urethral fever. This use of aconite, which is certainly of great value, is said to have been first suggested by Mr. Long.[1] The patient should be directed to delay passing his urine as long as possible, and if he should have a chill on the first act of micturition, to take a hot bath. Rest in the horizontal posture is necessary for the ensuing twenty-four hours, but, in most cases, is not longer required.

His temperature should be carefully watched, since it is found by experience that this is the best test of his condition. Even if all other symptoms are favorable, a high degree of temperature should lead us to defer any introduction of an instrument. Much mischief is often done by too early catheterization after the operation, the surgeon either regarding it as necessary in order to keep the urethra patent, or, perhaps, mistaking suppression of urine for retention. Nothing appears to be lost by delay, for I have found the canal open after a week, a fortnight, and, in one case, even as late as a month. Provided that all goes on well, that there are no unfavorable symptoms as of urethral fever, and that the temperature remains normal, we are able to pass a sound by the third or fourth day, taking at first one of moderate size, and then one as large as the normal calibre of the urethra. This should be repeated every second day at least, until the absence of blood, even if some purulent discharge still remains, indicates that the wound has healed, and this usually takes about a fortnight.

In the previous edition of this book occurs the following passage, which expresses the generally received opinion as to the necessity existing for any one who has once had stricture to employ sounds at intervals for the remainder of his life.

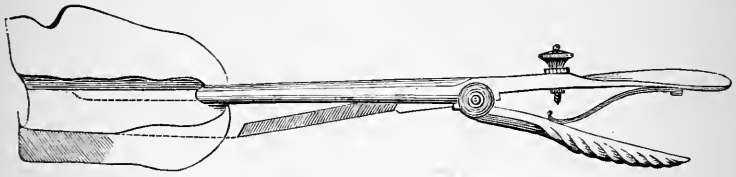
There is no fact with regard to stricture better worthy of remembrance than this, that after any mode of treatment a stricture is sure to return in time, unless the patency of the canal be kept up by the intermittent use of sounds. How often these should be used depends upon the amount of tendency to contraction, and varies in different cases; a safe rule is at intervals of four days for a month, then at intervals of a week for six months, and finally at intervals of a month or two for years or for the remainder of life. But it is not necessary or even desirable that a patient should be dependent for this after-treatment upon a surgeon; he should be taught to do it for himself, and after a little practice will do it better than any one can do it for him; his instruments should be selected by the surgeon, and he should be impressed with the importance of his using them faithfully.

[1] Liverpool M. Chir. J., Jan. 1850.

There can be no question that the above course should be followed in all cases which have been treated by dilatation alone. It is, however, asserted by Otis and others that the thorough division of strictures by internal urethrotomy effects a permanent cure, and that the canal will ever remain free after the operation, even if nothing has been done meanwhile. I have met with several cases which would seem to confirm this view, but a sufficient time has not yet elapsed either in my own cases or in those published by others, to warrant any one in expressing a decided opinion.

Internal Urethrotomy.—Strictures at or near the meatus were formerly divided by means of Civiale's concealed bistoury (Fig. 83), or by a curved sharp-pointed bistoury, its point being protected by wax on its inser-

Fig. 83.



Civiale's concealed bistoury. (After Phillips.)

tion. Both of these instruments are now regarded as less desirable than an ordinary blunt-pointed tenotome, which affords the surgeon greater precision in making his cut. Prof. Otis prefers one curved; Prof. Piffard one straight as here represented (Fig. 84). There is but little to choose be

Fig. 84.

tween these two forms. The cut is always to be made downwards or on the floor of the urethra, and the enlarged opening to be subsequently tested with a *bougie à boule* to ascertain if it be of sufficient size.

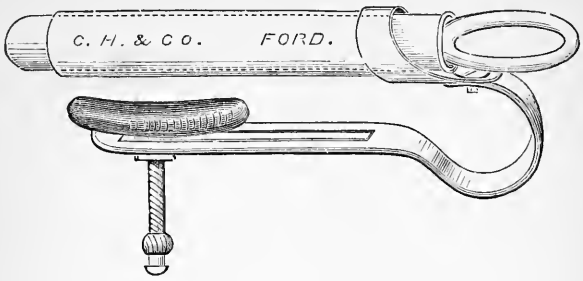
In practising this operation, which I fear is becoming more common than is necessary, there are two points desirable to be borne in mind. On the one hand, the operation must be done thoroughly in order to be efficacious. If the meatus or stricture is merely nicked, the operation will have to be repeated, and, again, patency of the opening must be secured by the passage of instruments every day or two until the wound has healed.

On the other hand, great care should be used not to convert the meatus into a hypospadias, a result which is excessively annoying to patients and which is often followed by a persistent, nodular induration at the inferior edge of the cut.

In order to prevent hemorrhage it is well to stuff the wound with styptic cotton, which may be allowed to remain until it comes away spontaneously, and the urine is readily discharged above it. Should hemorrhage, however, occur, it is in a situation where it may usually be readily con-

trolled by pressure or by ice. Dr. Henry Dick[1] has invented an ingenious *Sonde-tourniquet* for this purpose (Fig. 85).

Fig. 85.



Dick's sonde-tourniquet.

This instrument consists of a urethral canula containing a plug which is to be withdrawn on the passage of the urine, and a screw-pad to effect compression on the external surface of the corpus spongiosum.

In incising strictures further removed than those in the immediate

Fig. 86.

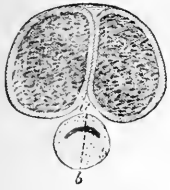


Fig. 87.

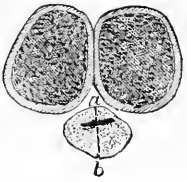


Fig. 88.

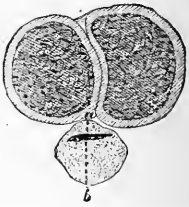


Fig. 89.

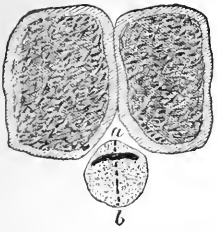


Fig. 90.

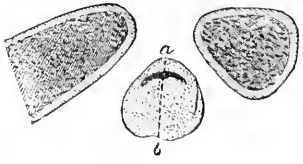


Fig. 91.

SECTIONS OF THE PENIS SHOWING THE POSITION OF THE URETHRA IN THE CORPUS SPONGIOSUM BETWEEN THE GLANS AND THE TRIANGULAR LIGAMENT.

Fig. 86, m. 0.010 below base of glans.
Fig. 87, m. 0.035 " " "
Fig. 88, m. 0.055 " " "
Figs. 89, 90, 91, from the beginning of the end of bulbous portion of urethra to near beginning of prostatic portion, *i. e.*, to where the overlying corpus spongiosum ends.
Lines *a b*, sections of the corpus spongiosum, showing the relations of the urethra to the erectile tissue.

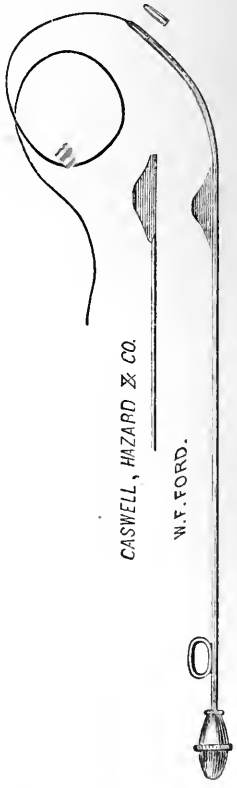
neighborhood of the meatus, the question arises whether the cut had better be made downwards or upwards. Each method has had its advocates and

[1] Subcutaneous and Other Methods of Dividing Strictures of the Urethra, London, 1878.

instruments have been made accordingly. Reasoning from the anatomy of the parts, there is less danger of hemorrhage when the cut is made upwards, since the amount of vascular tissue of the corpus spongiosum overlying is much less than that underlying the urethra. The accompanying wood-cuts, for which I am indebted to the kindness of Prof. R. F. Weir, exhibit sections of the penis, at various distances from the glans. They represent the average of the appearances presented in sections of five penes, frozen in ice or with gelatine injected into the spongy tissue of the three corpora.

Figs. 86 to 91 show how much greater is the thickness of the vascular tissue of the corpus spongiosum upon the floor than the roof of the urethra. The last one (Fig. 91) represents a section at the extreme limit of the bulb where it rests against the triangular ligament and corresponds above to the membranous urethra. It would here appear that the danger from a section upwards, as we reach the bulbo-membranous junction, is almost nil. It is true that in the triangle formed by the junction of the three corpora, two or three veins are found which might possibly be opened in a large upward section, but the hemorrhage from them could easily be controlled. Since there are no arguments, so far as I am aware, in favor of a downward section, I believe the above considerations should prevail, and lead us to make the section upwards in the median line in all urethrotomies posterior to the meatus and fossa.

Fig. 92.



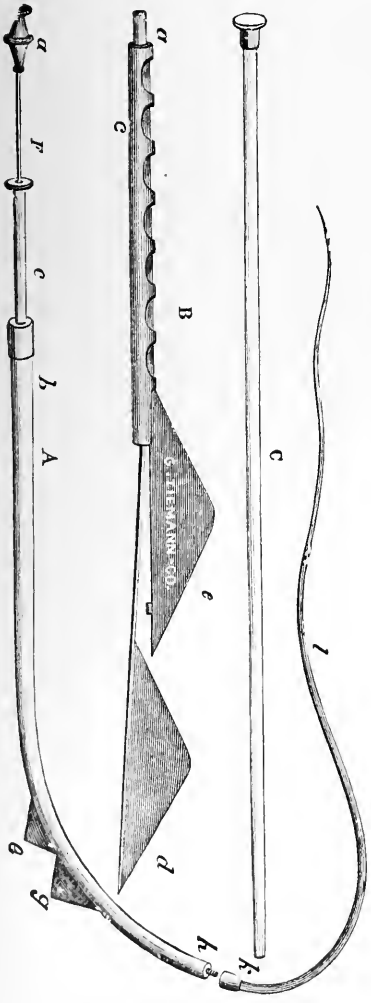
Maisonneuve's urethrotome modified.

The instruments invented for internal urethrotomy are legion in number, and we have no intention even to mention others than those we can best recommend. We believe that for all ordinary cases likely to be met with in practice, two will be found sufficient, viz., Maisonneuve's urethrotome for tight strictures; Prof. Otis's dilating urethrotome for such strictures of larger calibre as will admit its shaft.

Maisonneuve's urethrotome consists simply of a grooved staff, which need not exceed No. 7 of the French catheter scale (two and one-third millimetres in diameter), provided at its extremity with a screw-point, to which is attached a filiform bougie. The blades, intended to slide in the groove and to divide the stricture, are triangular in shape, sharpened before and behind, but blunt at the apex, so that they may pass over the sound urethral mucous membrane without wounding it.

I have slightly modified this instrument, and as I think, with advantage. In the original, the curve of the shaft is a very long one, necessitated by the fact that the groove extends to the point, and that the blade cannot be made to follow a short curve, but the introduction of the instrument is thereby rendered difficult in many cases. I have consequently introduced the short curve of Mr. Thompson, and had the groove extend only through the straight portion of the shaft, which is quite sufficient, since whenever the point has been made to pass the stricture, the straight shaft with its groove will readily follow. (See Fig. 93.)

Fig. 93.



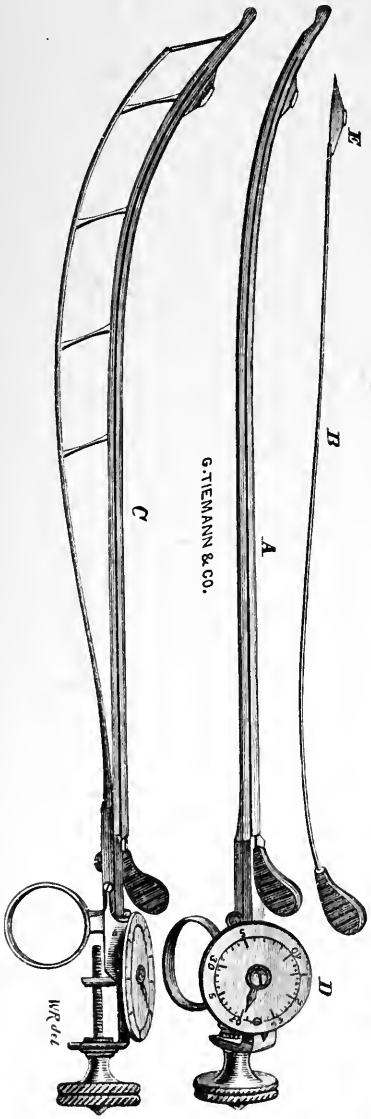
Voillemier's urethrotome.

The manner of using this instrument is very simple. In most cases the filiform, flexible conductor is first introduced as a guide, and the shaft of the instrument is then screwed upon it, and made to follow it into the bladder. In many instances, I have been able to introduce the shaft alone, armed with the blunt point, which is always provided, when I have found it impossible to pass the conducting bougie. In either case, when the bladder is fairly entered, as may be recognized by the finger in the rectum, the penis is to be put upon the stretch, and the blade, usually the largest in the set, is thrust down to the extremity of the groove, dividing every obstruction before it. A double incision of the stricture is often made by my friend, Prof. Weir, by rotating more or less the shaft of the instrument before withdrawing the blade, which then cuts the stricture at a different point as it comes out. The blade is now withdrawn, the bladder emptied of urine by the catheter, and other measures adopted which have already been mentioned.

M. Voillemier objects to Maisonneuve's instrument on the ground that it is liable to wound the healthy mucous membrane, and instances the case of a patient who died of cholera shortly after the operation, and in whom the urethra was found to be incised from the meatus to the bladder.

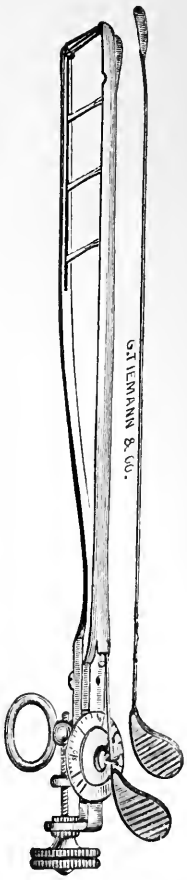
He proposes to remedy this difficulty by means of a shield which covers the blade in its passage through the healthy urethra, and which can be withdrawn as soon as the stricture is encountered. I have used Maisonneuve's instrument in a large number of cases, and have had no reason to

Fig. 94.



Otis's dilating urethrotome, No. 3.

Fig. 95.



Otis's dilating urethrotome, No. 4.

believe that, when properly made, it is open to the objection urged; moreover, on trial of Voillemier's instrument I have found it more difficult to manage, and very liable to get out of order.

Prof. Otis has produced several dilating urethrotomes, known by instrument makers as Nos. 1, 2, 3, and 4. Woodcuts of Nos. 3 and 4, the one curved and the other straight, are here given. The latter is sufficient, as the instrument should only be used in the straight portion of the urethra.

Fig. 96.

Civiale's urethrotome.

These instruments consist of a pair of steel shafts connected together by short pivotal bars, on the plan of an ordinary parallel ruler. They are separated by means of a screw at the handle, near which is a dial indicating the extent of their divergence. The upper bar of the instrument is traversed by a urethrotome, terminating in a thin, narrow, spring blade, which, when at the extremity of the groove in which it runs, is concealed in a slot. The instrument, with its contained urethrotome, having been passed down beyond the site of the stricture and dilated until the stricture is made tense, the handle of the urethrotome is withdrawn, causing the blade to rise from the depression in which it was concealed, and the stricture is divided upon its upper wall from behind forwards. The advantages claimed by its inventor for this instrument are: that it attacks a tense instead of a flaccid stricture; that its incisions are made at a predetermined point, depth, and extent; that it is especially adapted to strictures of large calibre; and that it combines great strength with ease of manipulation[1]—all of which I have found to be true.

Civiale's urethrotome was for a long time the favorite one and is still preferred by Sir Henry Thompson. A glance at the accompanying cut will be sufficient to understand its construction. The terminal bulb in which the blade is concealed equals about No. 16 or 17 (about 7 or 8 of the English scale), and hence the instrument cannot be used when the passage is of less size. The blade cuts from behind forwards and either above or below the canal, as the operator may prefer.

I cannot close these remarks upon internal urethrotomy without expressing the opinion that the tendency of the present day is to underrate the skill and experience required for its performance, to undervalue its dangers and inconvenience to the patient, and to resort to it with unnecessary frequency. It may not require such skill as is demanded for the extraction of cataract, and which ought to delegate that operation exclusively to specialists, but it requires an amount of care, skill, and experience not possessed by every practitioner of medicine or every man calling himself a surgeon. I will quote a case in point:—

Mr. A., aged 38, was operated on by Dr. Z., a surgeon of this city, at

[1] Otis, op. cit. p. 37.

the latter's office for three strictures, situated respectively at one inch, two inches, and four inches from the meatus. Maisonneuve's urethrotome, with the blade cutting *downwards* and provided with a guide, was employed. The first and second strictures were cut easily, but the last with difficulty and with the use of some force. Considerable hemorrhage followed immediately upon the operation, and, on the following day, Dr. Z. was summoned to patient's house. He had had a chill, was almost pulseless, and in such collapse that it was thought he would die that night. The scrotum and penis were much swollen, and incisions made into these parts gave issue to a bloody fluid which was evidently mostly urine. At the end of a week, sloughing began and progressed until the anterior surface of the scrotum had come away together with the under surface of the penis from the base of the frænum to the peno-scrotal angle, exposing the urethra to this extent, its upper wall alone remaining. The patient finally recovered, and was relieved of his hypospadias in one of our hospitals by means of several plastic operations. In this case it is probable that the steel shaft of the instrument did not follow the guide, and was thrust through the urethral wall.

This operation is also not free from danger to life, although this depends in a great measure upon the seat of its performance. Those surgeons who limit it to the first two or three inches of the urethra may be able to report a large number of cases without a single fatal result, but if this limit be exceeded, deaths will often follow as a consequence, even when great caution has been used; and instances of this kind are every little while coming to our knowledge in a quiet way. I have myself lost two patients from septicæmia following internal urethrotomy for strictures situated about four and one half inches from the meatus, the one occurring four days and the other fourteen days after the operation.

The minor evils liable to follow the operation, as urethral fever, hemorrhage, incurvation of the penis, etc., are by no means inconsiderable, and will receive attention in the section on the Consequences of Operations on Stricture.

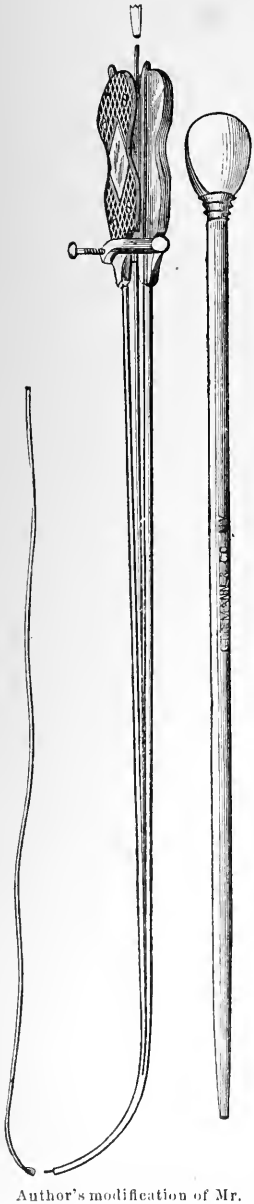
In view of the above considerations, the surgeon may well avoid internal urethrotomy, unless decidedly called for, and when other means are unavailable. Knowing what I do of the operation, if I had a marked and annoying stricture in the anterior portion of the urethra, or if I had an obstinate gleet which no other means would relieve, or if I were the subject of one of those tormenting neuralgias dependent upon stricture *that we read of*, I would have my stricture cut; but if I had only a "stricture of large calibre" presenting no obstruction to the urine and occasioning no inconvenience, no argument drawn from possible ills in the future could persuade me to be subjected to the knife, and—*what a surgeon would not have done to himself he has no right to recommend to others!*

Rupture.—Of late years, the rupture of stricture, which was formerly advocated by Perrève, has become quite generally known, chiefly through the labors of Mr. Holt, of the Westminster Hospital, London.

Mr. Holt's instrument, a modification of that of Perrève, "consists of

two grooved blades fixed in a divided handle, and containing between them a wire welded to their points, and on this wire a tube (which, when introduced between the blades corresponds to the natural calibre of the urethra) is quickly passed, and thus ruptures or splits the obstruction."

Fig. 97.



Author's modification of Mr. Holt's instrument.

The instrument, as originally proposed by Mr. Holt, possessed certain defects which I have endeavored to remove. It was evident to others as well as myself, that the expansive power of the instrument was insufficient; that even when the largest tube of the set was employed, there were some strictures which would merely stretch as it passed without being ruptured, and which would afterwards show the marked tendency to recontraction which always follows rapid dilatation. The remedy for this was evident,—to allow wider separation of the blades, and to be supplied with larger tubes, one of which, after slitting up the meatus, could be selected corresponding in size, not to the external orifice as Mr. Holt advises, but to the calibre of the spongy portion of the urethra.

The other changes which I have introduced, consist in having the point of the instrument at a right angle to the shaft, following Mr. Thompson's curve, with a view of facilitating its introduction, and in adding a filiform attachment to serve as a guide for the shaft which is equal in calibre to No. 11 (three and two-thirds millimetres in diameter). As previously stated, the bougie attachments are also made to fit other urethral instruments employed for incision, etc., so that the choice of the operation is still open after the guide has passed the obstruction. The instrument thus modified is represented in Fig. 97. I do not think anything is gained by having the central wire hollow, as the capacity of the tube thus formed is too small to allow of the passage of the urine, and the instrument ought not to be in the hands of any one who has not other means of judging whether he has entered the bladder or not. The instrument may, of course, be used without the bougie attachment, its screw-point being protected with a cap provided for the purpose

In using this instrument the shaft should be passed fairly through the stricture, so that the latter may feel the full force of the rupturing tube. The point of the tube selected is then to be placed upon the wire between the blades, and to be thrust down *as rapidly as possible* to the end, in order to insure rupture and not mere dilatation of the contraction. Before withdrawing the instrument, it is to be rotated so as to separate still further the sides of the rent.

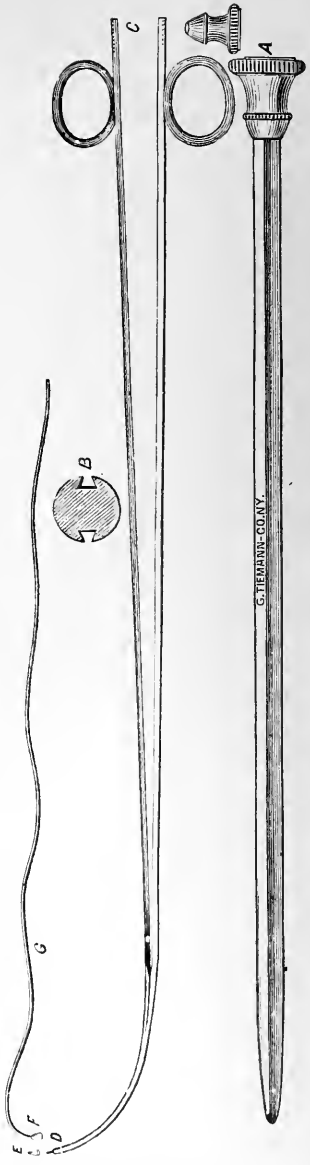
Mr. Holt believes that by this method the mucous membrane of the urethra "*is not torn* but *simply dilated*, and the submucous deposit, the cause of the obstruction, is *alone split*, hence the trifling hemorrhage and the impossibility of infiltration of urine." I entertain doubts of the correctness of this view, and the lining membrane of the canal has certainly been found to be lacerated in several instances of post-mortem examination; but, however that may be, this is one of our best means for the treatment of certain strictures.

Voillemier's rupture instrument may also be recommended. I have had the tubes made larger than in the original instrument; my largest tube equals No. 29, and the smallest No. 25 of the French scale.

This instrument appears to possess one decided advantage over Mr. Holt's. The tube, instead of sliding upon a central wire between the blades, is provided with grooves on either side for the blades to play in, and thus, as shown in the cut, a transverse section of the instrument is circular instead of oval, and the rupturing force is spent equally upon the whole circumference of the canal.

As previously stated, rupture is adapted to such strictures of the sub-pubic portion of the canal, as are too irritable to admit of dilatation or which exhibit a strong tendency to recontraction. It may also be used to advantage in cases of retention of

Fig. 98.



Voillemier's rupture-instrument. D C, shaft of the instrument, split throughout the straight portion. F G, filiform bougie. E, cap to be applied in case the bougie is not used. A, rupturing tube. B, transverse section of the same, showing the grooves for the reception of the blades of the shaft.

urine dependent upon strictures in this situation, when fortunately an instrument, either preceded or not by a guide, can be passed through the obstruction.

Caustics.—Caustics in the treatment of stricture have been superseded to such an extent by other and more valuable means, that they have at present but few advocates, and I would fully endorse the following opinion of them expressed by Sir Henry Thompson: "I consider the application of nitrate of silver or of caustic potash to a permeable stricture to be unnecessary as a means of cure, since other and better modes of treatment for such contractions exist; and that 'impermeability,' so called, is a condition always to be overcome by the careful use of simple instruments, and not to be attacked by any caustic or escharotic agents whatever."

External Perineal Urethrotomy.—This operation may be required or deemed advisable under several circumstances, which may be stated in a few words.

1. In cases of impassable or tight stricture, complicated by retention or infiltration of urine or by abscess, immediate recourse to external perineal urethrotomy is often urgently demanded, and offers the best if not the only chance for the preservation of the life of the patient.

2. Under less pressing circumstances, the same operation may be required when repeated attempts have failed to pass the obstruction, when the stricture is extensive and of traumatic origin, or when numerous fistulous passages exist.

Such instances are, however, but few in comparison with the whole number of strictures met with, and the employment of external perineal urethrotomy as a general method of treatment, recommended by the late Mr. Syme, cannot be considered justifiable. Great irritability and resilience of the contraction were formerly regarded as indications for its use, but, in such cases, it has been supplanted by the improved methods of internal urethrotomy and rupture, and these will also be found sufficient in some instances of retention, in which perineal section was formerly resorted to.

At the time of performing this operation, the stricture may be found to present either one of three degrees of contraction.

1. It may be sufficiently patent to enable us to pass a grooved sound, which will serve as a guide to the knife introduced through the perinæum in its division of the obstruction. We then perform what is often called "Syme's operation," or "external perineal urethrotomy with a guide."

2. Failing in our attempts to pass the stricture by any instrument inserted through the natural channel, we may still be able to accomplish the same, after opening the urethra in front of the obstruction, and thus still avail ourselves of a guide passed from the perineal incision through the contraction. This method, although by no means new, has been perfected by Mr. C. G. Wheelhouse, of Leeds, and is called by English surgeons "Wheelhouse's operation."

3. Finally, neither of the above attempts having succeeded, the only recourse left is to open the urethra posterior to the stricture, which possibly may then be passed from behind forwards; or, in other instances, the

normal channel has become so obliterated that it cannot be traced, and a new and artificial channel must be formed. ("Cock's operation.")

Whichever of these methods may be called for, it is highly desirable, unless the urgency of the case forbids, that the patient should be prepared for the operation by a period of rest, during which he should be confined to the house, and, for the most part, to the horizontal posture, his secretions be regulated, and his system placed in as favorable a condition as possible. The perinæum should be shaved, and the rectum evacuated by an enema. At the time of the operation, the patient having been brought under the influence of ether, he is placed upon the edge of a table, facing a good light, in the position for lithotomy, with the hands bound to the feet by bandages, or by Pritchard's anklets, and an assistant supporting each knee.

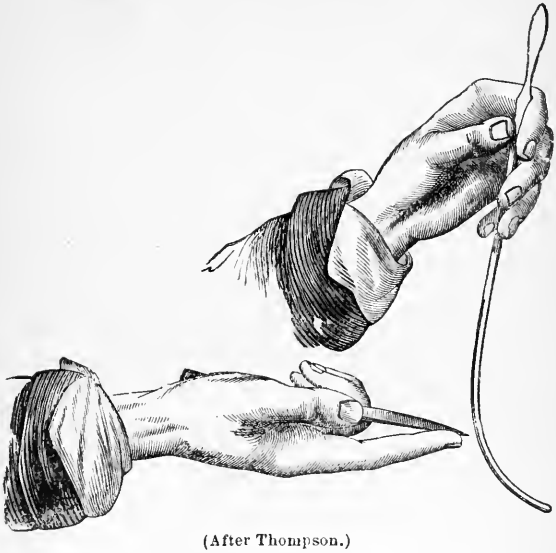
Fig. 99.

Syme's staff.

When Syme's operation is practicable, the staff bearing the name of this surgeon (Fig. 99) is introduced through the stricture, or, if this be found impracticable, a sound channelled on its convexity and tunnelled at its extremity, as represented in Fig. 80, should be passed down to the anterior face of the contraction, threaded if possible upon a fine whalebone bougie, which it may have been possible to introduce into the bladder, and which will serve as a guide to the sound after the incision in the perinæum has been made. The sound should now be entrusted to the assistant on the patient's left, who also elevates the scrotum out of the way of the operator. The staff is to be held accurately in the median line and its convexity made somewhat prominent in the perinæum. The surgeon, sitting upon a stool in front of the patient, enters his knife into the centre of the perinæum and makes an incision an inch and a half or two inches long, exactly in the median line, cutting down upon the groove of the staff; using this as a guide, the stricture beyond can be readily and freely divided on its lower aspect. It is generally recommended in books to make this division by successive strokes with the knife from behind forwards, as represented in Fig. 100, lest, if made in the opposite direction, the knife, after severing the stricture and ceasing to meet with resistance from the induration, unnecessarily wound the deeper tissues. As a matter of fact, however, I believe this rule is not observed; at least I have never seen it carried out, and have found others as well as myself accustomed to make the incisions in the opposite direction, *i. e.*, from before backwards.

A grooved director is now to be introduced into the bladder through the perineal incision; the staff is withdrawn and a full-sized sound or catheter inserted from the urethra and, guided by the director, into the bladder, to ascertain if the strictured portion of the urethra has been completely cut.

Fig. 100.



(After Thompson.)

When the stricture is found impassable and we cannot therefore have the assistance of a staff as in Syme's operation, a full-sized channelled sound is to be introduced as far as the anterior face of the obstruction and an incision to be made upon it from the perinæum, as in the previous operation. An effort should then be made to pass an instrument through the stricture by way of the perineal opening. For this purpose, the edges of the incision should be held apart by the fingers of assistants, or by means of hooks, or, better still, as proposed by Mr. Avery, a ligature may be passed through the urethral mucous membrane on either side, in order to afford a clearer field of view, and indicate the position of the channel; and the blood should be removed by constant sponging. The most desirable instrument to insert is a grooved director; if this cannot be passed, a fine flexible bougie, or even a bristle may be tried. Considerable time, patience, and perseverance are required in this part of the operation, which often occupies from fifteen to thirty minutes, but in most cases, one of the above instruments may eventually be passed and employed as a guide for the completion of the operation.

Mr. Wheelhouse,[1] of Leeds, has further methodized the steps of this operation and introduced some new instruments for the purpose, which are highly spoken of by English surgeons.

[1] British M. J., London, June 24, 1876.

The following are the special instruments required in Wheelhouse's operation.

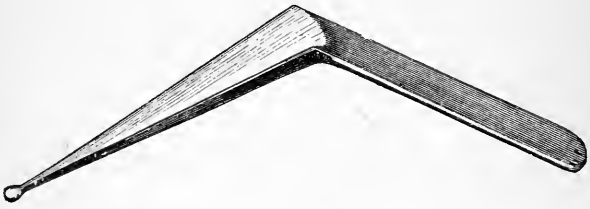
A staff, grooved to within a half-inch of its extremity, which terminates in a rounded button-like end (Fig. 101); two pair of straight forceps nibbed

Fig. 101.

Grooved staff with button like end.

at their points; a grooved probe-pointed director; Teale's probe-gorget (Fig. 102); a short silver catheter (No. 10 or 11) with elastic tube attached.

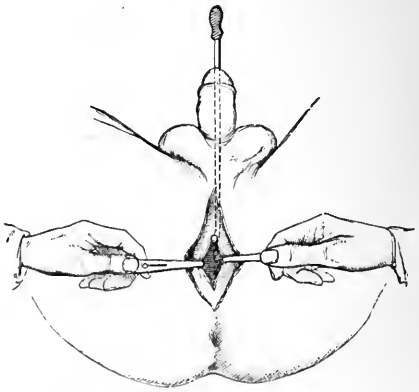
Fig. 102.



Teale's probe-gorget.

The patient having been placed in the lithotomy position, the staff is introduced, with the groove looking towards the floor of the urethra, and brought *gently* in contact with the stricture. The perinæum is then divided by an incision extending from opposite the point of reflection of the superficial perineal fascia to the anterior margin of the sphincter ani muscle. On reaching the urethra, that canal is to be opened *in the groove* of the staff, thus securing at least a quarter of an inch of healthy undivided tissue anterior to the stricture. The edges of the incision being held apart by the nibbed forceps, the staff is gently withdrawn and turned around so that the bottom may hook into the anterior angle of the incision. The urethra may thus be stretched open at three points and the operator may look into it directly in front of the stricture.

Fig. 103.



Wheelhouse's operation of opening the urethra.

The probe-pointed director is then passed into the urethra through the cut, and, even if the opening of the stricture cannot be seen, it usually

succeeds in finding the way. The director, having reached the bladder, is held with its groove downwards and along it the stricture is thoroughly divided. In order to insure the easy introduction of the catheter, the probe-gorget is passed into the bladder on the groove in the director, forming a metallic floor for the catheter to pass over. The short catheter, with the elastic tube attached, is then easily introduced from the meatus into the bladder; the gorget is withdrawn and the catheter fastened in and allowed to remain for three or four days, the urine being conveyed to a convenient distance by the elastic tube. On the fourth day the catheter is removed and is subsequently passed every second or third day, until the wound in the perinæum is healed.

There still remain cases in which both of the above-mentioned operations are impracticable, since no guide can be made to pass the stricture, introduced either from the meatus or the perineal opening. In such instances we may occasionally take advantage of a fistulous opening in the perinæum, through which we can, perhaps, insinuate a fine, olive-tipped, whalebone bougie, and upon this slide a fine silver tube which will relieve any urgent symptoms of retention present, and also greatly assist our efforts to trace out the natural channel. These fistulæ, however, would better be let alone, unless we can first be satisfied that the probe or bougie traverses their whole course and enters the bladder. Prof. Dittel, of Vienna, has, however, reported a few cases in which perineal fistulæ were so fortunately situated that a probe could be passed into the urethra behind the stricture and thence forward through it.

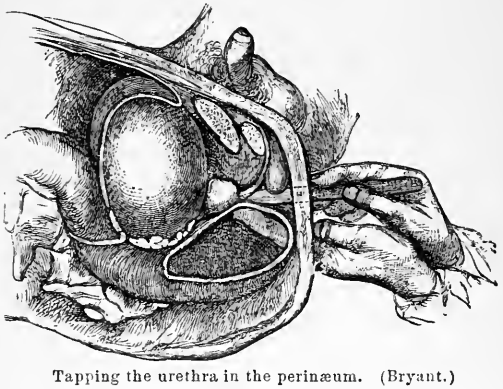
Only two further plans remain for adoption: either to carefully cut into the indurated mass of the stricture by successive strokes of the knife, in hopes of discovering the natural channel, or to open the dilated urethra behind the obstruction and then endeavor to pass a probe through it from behind forwards. During the latter operation, after each stroke of the knife, the parts should be carefully examined by the finger, and if a fluctuating point can be felt, it is probably the dilated urethra, and should be opened. In spite of all our efforts, it may be impossible to trace the contracted and thread-like remains of the normal passage, and we must content ourselves with opening the urethra back of the obstruction and establishing an artificial channel with the penile portion of the canal. This may be found eventually to supply the place of the original passage in quite a satisfactory manner.

In performing the operations above described, there is one anatomical point which should always be borne in mind, and that is the position of the opening in the triangular ligament through which the urethra passes. This is situated at three-fourths of an inch, or about a finger's breadth, below the arch of the pubes. It is often sought for too far backwards and too near the anus.

Cock's Operation.—Mr. Cock, of Guy's Hospital, advocates for the relief of retention of urine, the opening of the urethra behind the stricture at the apex of the prostate, in the following manner: "The patient being in the lithotomy position, the left forefinger of the operator is placed in the rectum,

with its tip at the apex of the prostate, the relations of which should be carefully ascertained. A double-edged knife is then plunged steadily, but boldly, into the median line of the perinæum, and carried in a direction towards the tip of the forefinger which lies in the rectum, while, at the same time, by an upward and downward movement, the incision is enlarged in the median line to any extent that is considered desirable. The lower extremity of the wound reaches to within about half an inch of the anus.

Fig. 104.



Tapping the urethra in the perinæum. (Bryant.)

The knife is pressed steadily onwards towards the apex of the prostate, until its point can be felt in close proximity to the tip of the left forefinger, and is then made to pierce the urethra by advancing it obliquely either to the right or left. The finger is still kept in the rectum, while the knife is withdrawn, and a probe-pointed director introduced through the wound into the urethra and passed into the bladder. The finger is then withdrawn and the director held in the left hand, while a canula or female catheter is slid along its groove into the bladder, where it is retained for a few days."[1]

Furneaux Jordan, of Birmingham, Eng., recommends opening the urinary track from the rectum and passing a soft instrument forward through the stricture and out at the external meatus, the other end being carried into the bladder. He states that in some instances he has found the distended bladder itself coming down as far as the anal sphincter, in which case this viscus may be incised with a bistoury, followed by the introduction of the finger and the passage of an instrument forwards from the internal meatus to the external.

Retrograde catheterism has also been performed by taking advantage of a supra-pubic opening into the bladder, through which an instrument is passed into this viscus and thence forward through the urethra until it is arrested by the stricture. Brainard, of Chicago, in 1849, punctured the bladder above the pubes for the express purpose of such a procedure, and has been followed by Volkmann and others.

[1] Quoted from Ashhurst's Surgery, 2d ed., p. 930.

The after-treatment of either of the above operations of external urethrotomy is simple. The patient should be put to bed with the thighs elevated and the bedclothes supported by a cradle. Pain may be relieved by suppositories of opium, and one should be introduced within the anus before the patient leaves the table. Subsequent hemorrhage sometimes occurs which it is difficult to arrest by ligature, since the thread does not retain a firm hold upon the gristly tissue of the stricture; it may, however, be effectually controlled by inserting a piece of compressed sponge between the edges of the wound, or firmly plugging it with lint, and bandaging the thighs together.

It was formerly the custom to tie a catheter in the bladder for twenty-four to forty-eight hours, but it is now believed, especially by Prof. Van Buren and others of our best American authorities, that this practice is not only unnecessary, but that it tends to favor urethral fever, and other unpleasant symptoms. If a catheter be dispensed with, the urine escapes through the incision for a few hours, but is found to pass mainly through the natural channel by the following day, when the perineal opening is closed by the swelling of its edges.

Very disastrous results have been known to follow the prolonged retention of a *metallic* catheter after this operation, the chief of which is ulceration of the mucous membrane and subjacent tissues in consequence of pressure of the instrument. This most frequently occurs at two points: one, that portion of the vesicle walls, which comes in contact with the extremity of the catheter; the other, the lower surface of the urethra just in advance of the scrotum, at the commencement of the sub-pubic curve, where the penis is upheld by the suspensory ligament, and where any straight instrument, like the shaft of a catheter, necessarily presses upon the inferior wall of the canal. Hence if any catheter is to be retained, it should be a flexible one.

It might be inferred from the opinion expressed on a previous page as to the permanence of the cure after free division in internal urethrotomy, that so free a division as is performed in external urethrotomy would require no further use of instruments after the healing of the wound and the apparent restoration of the urethra to its normal calibre. Experience, however, shows the contrary and demonstrates the necessity of the use of sounds at intervals, for an indefinite period varying in different cases, or otherwise a relapse is almost sure to occur. Wherein the difference, if any, lies between external and thorough internal urethrotomy, I am unable to explain.

When perineal section is followed by a fatal termination, it is in most cases due to pyæmia; sometimes to urethral fever, attended or not with suppression of urine; and at other times to hospital gangrene, erysipelas, or urinary infiltration.

Consequences of Operations upon Strictures.—*Hemorrhage* is not unfrequently an unpleasant accident following operations upon strictures, especially those of rupture and internal urethrotomy. It is not so much to be feared at the time of the operation as at some subsequent period, more particularly after the passage of urine or on the occurrence

of an erection at night. It shows itself usually within three or four days after the operation, but the patient, especially after internal urethrotomy, is not free from this danger for ten days or a fortnight—instances of its occurrence at this late period being now and then met with. Knowing the site of the stricture operated upon, the surgeon will be able to determine very nearly the situation of the bleeding point; moreover, if the latter be in the penile portion of the canal, the blood will flow continuously from the meatus, or, if in the portion of the canal posterior to the bulb, the blood may flow backwards and even distend the bladder with clots.

The liability to this accident emphasizes the necessity of keeping a patient quiet, and preferably in the horizontal posture for some days after the operation, and also of his having a faithful attendant. Should hemorrhage occur, it may often be controlled by the application of ice to the penis and the perinæum. If obstinate, and the bleeding point be situated in the pendulous portion of the canal, a moderate-sized catheter should be introduced and pressure be exercised by a bandage encircling the penis. When the source of the bleeding is more deeply seated, pressure may be most conveniently exercised upon the perinæum in the following manner: Place upon the perinæum a pad of sufficient thickness; tie a bandage firmly round the waist; finally, pass an elastic bandage by a number of turns from behind forwards and from before backwards, between the buttocks and over the pad, from the waist-bandage behind to the same in front.

A less convenient way is to use a crutch, its lower extremity resting against the foot-board of the bed, and its upper against the perinæum of the patient. Dr. Otis has also invented a tourniquet for the purpose (Fig. 105), and recommends that it should be applied loosely directly after the operation, so as to be tightened in a moment if necessary.[1]

Fig. 105.

Otis' perineal tourniquet.

Among the hæmostatics which may be given by the mouth in severe cases, ipecac and ergot are especially worthy of mention. Should the bladder become distended with blood-clots, it may be desirable to wash out this viscus with warm water injected through a catheter.

Curvature of the penis is met with in many cases following internal urethrotomy of the penile urethra. It may not be seen when the organ is at rest, but in a state of erection, the virile member becomes bent usually to one side or the other, or in some cases either upwards or downwards, and it may be to such an extent as to interfere with or entirely prevent sexual intercourse. The extreme advocates of internal urethrotomy are inclined to make light of this accident, which is, however, for obvious

[1] The multiplicity of the means advised to arrest hemorrhage is suggestive of the liability of its occurrence. (See Otis, op. cit. p. 280.)

reasons, very annoying and distressing to the patient. It may disappear spontaneously within a few weeks, but in some cases it continues for months and even for a year or longer. In the treatment of this accident, we have thought that some benefit was derived from supplying the patient with a straight sound and directing him to introduce it morning and night, and then to practise a certain amount of friction and of massage over it at the point of curvature. Dr. Otis states that in one instance of this deformity, which had lasted a year, he effected a cure by dividing the superior wall of the urethra in a diagonal line, using for the purpose a modification of his dilating urethrotome.[1]

Urethral fever is a still more formidable sequence of operations upon the urethra, any one of which may occasion it. The exciting cause may be simple over-distension of the urethra by a larger bougie than has before been used; abrasions or laceration of its walls by rough handling of the instrument; the application of caustic; or the employment of the knife in internal or external incisions. The patient is suddenly seized with a chill, headache, vomiting, acceleration of the pulse, and in severe cases with great prostration and delirium. These symptoms are most likely to ensue upon the first act of micturition succeeding the introduction of a sound, or an operation of rupture or urethrotomy; in other words, they follow, and appear to depend upon contact of the urine with an abraded surface, through which urea or putrid elements find entrance into the general circulation; in other instances they are apparently due to the shock impressed upon the nervous system alone. This combination of symptoms, which is known as "urethral fever," is but one form of surgical fever, in the etiology of which the absorption of septic matter from the neighborhood of wounds plays so important a part.

In most cases, urethral fever terminates in resolution, either with or without treatment, in the course of a few hours; but especially in persons affected with renal disease, and in some instances, without apparent cause, a typhoid condition with delirium sets in, abscesses may form in different parts of the body, and speedy death ensue. Complete suppression of the urine is an occasional symptom, and is to be regarded as of very serious import.

In order to conduct the treatment of stricture with safety, the general system should be in as favorable a condition as possible; the digestive organs in good order; and the patient should avoid excess both in diet and exercise. It is important also to abstain from any operative procedure during the persistence of raw and damp weather, or when the patient is fatigued or mentally depressed. If rigors occur after the operation, they should be met by the external application of heat and rubefacients, as bottles of hot water to the extremities, sinapisms to the spine and abdomen, hot blankets, etc.; and internally by stimulants, quinine, and opiates. A full dose of the latter should be administered at the outset, and a smaller quantity be repeated every few hours, so as to maintain a steady narcotic

[1] Op. cit. p. 290.

action and lull the irritability of the nervous system. The reaction which generally follows should not be treated by active depletion; a tendency to general depression soon supervenes, in which the vital powers must be supported by stimulants and nourishment until nature shall have eliminated the toxic materials which have found entrance into the system. The value of aconite, administered in minute doses after an operation, as a prophylactic, has already been alluded to.

Treatment of Retention of Urine.

Retention of urine chiefly occurs either during the acute stage of gonorrhœa, when it is due to inflammation and spasm; or at some period of organic stricture, when, in addition to the causes just mentioned, permanent contraction of the canal plays a more or less important part in its production. It is less frequent in the former cases than in the latter, and presents less difficulty in the way of treatment. Remedial measures must vary somewhat with the condition of the patient, and be determined by the judgment of the surgeon.

Relief may often be obtained by immersing the patient in a hot bath, the temperature of which should be raised to the neighborhood of 102° F. and this will probably require the addition of hot water after his entrance, since the bath cannot at first be borne at so great a degree of heat, and is moreover cooled by contact with the body. It is even desirable that a state of syncope should be induced, which will greatly favor the reduction of spasmodic action. In most cases, the patient will pass his urine during immersion; otherwise, he should be rendered insensible by ether, and a medium-sized catheter, as, for instance, No 15 (French), should be well warmed and oiled, and an attempt be made to introduce it, following the rules already laid down, adhering closely to the upper surface of the urethra, stopping for a moment whenever obstruction is met with, and endeavoring to overcome it by gentle but continuous pressure. If these measures do not succeed, and the symptoms are at all urgent, we have a ready method of speedy relief in puncture of the bladder above the pubes by means of an aspirator—a procedure which may be said to be devoid of danger, and which has removed from simple retention of urine nearly all of its former terrors.

But retention of urine most frequently occurs in patients with organic stricture, who, after exposure to cold, or after excessive indulgence in food and stimulants, suddenly find themselves unable to pass their urine. The bladder becomes distended, and before the aid of the surgeon is sought other complications may have taken place, as rupture of the urethra behind the stricture, infiltration of urine, the formation of an abscess, etc. As these conditions vary in different cases, so must the requirements of each be subject to the judgment of the surgeon.

A careful inspection should be made of the perinæum, since the retention may be due solely to the presence of an abscess or urinary infiltration, the evacuation of which will afford relief. When such collections form

posterior to the triangular ligament, the external symptoms may be very obscure, and assistance in the diagnosis will be gained by exploration through the anterior wall of the rectum by means of the finger introduced through the anus. If any swelling or doughy hardness can be detected, we should endeavor to reach it through a free incision made in the median line of the perinæum. This can do no harm, and is likely to be of essential service.

Fig. 106.

Thompson's "probe-pointed catheter."

The attempt is now to be made to relieve the bladder by the passage of a metallic or gum-elastic catheter through the stricture, and, in difficult cases, this may be best accomplished after first placing the patient under the influence of ether, which will greatly tend to relax spasm and relieve irritation. Previous acquaintance with the case will enable the surgeon to form some idea as to what instruments will be most likely to prove successful. Otherwise he will first proceed from moderate sized catheters, both metallic and flexible, to smaller ones and he will at least be able to inform himself as to the exact situation of the obstruction. If these instruments fail, he may still be able to pass a filiform bougie of gum, whalebone, or catgut, which will serve as a guide to a catheter in one of the several methods already mentioned; or, again, if only the point of one of these fine bougies can be insinuated within the orifice of the stricture, and allowed to remain for a few moments, a small stream of urine will often follow its withdrawal, and, by repeating the process, the entire contents of the bladder be evacuated.

In these cases, Thompson's "probe-pointed catheter" (Fig. 106) will often be found of service. This instrument is a catheter "combining tubular construction with minute size," the extremity of which can be made as small

as the finest metal probe, and is solid up to about two and a half inches from the point, where the eye (*) is situated; while the hollow shaft above gradually enlarges, first to No. 1, and then nearly to No. 2. A steel rod, capable of being screwed in during the introduction of the instrument, gives it solidity, and prevents the eye from becoming obstructed with mucus or blood. If the probe-pointed extremity can be passed through or fairly within the stricture, the hollow shaft can usually in a short time be made to follow, the necessary care being taken to avoid bending the point upon itself or engaging it in a false passage.

But attempts at catheterism may be prolonged to such an extent as to irritate and abrade the canal, even if no violence be used. Many cases also come under the care of the surgeon, in which instruments have already been employed to excess by unskilful hands, and in no gentle manner; and in which the urethral walls have been lacerated or false passages made. Hence instrumental interference may require to be suspended, or for a time deferred.

If the condition of the bladder will admit of delay, we may now resort to the hot bath carried to the verge of syncope, as previously recommended. We have also several agents, which have been much relied upon, especially before the invention of the aspirator, to induce micturition. The chief of these is opium, which was thus highly spoken of by Sir Benjamin Brodie.

"From half a drachm to a drachm of laudanum may be given as a clyster in two or three ounces of thin starch. If this should not succeed, give opium by the mouth, and repeat the dose, if necessary, every hour until the patient can make water. *According to my experience, the cases in which the stricture does not become relaxed under the use of opium, if administered freely, are very rare.* The first effect of the opium is to diminish the distress which the patient experiences from the distention of the bladder. Then the impulse to make water becomes less urgent; the paroxysms of straining are less severe and less frequent; and after the patient has been in this state of comparative ease for a short time, he begins to void his urine, at first in small, but afterwards in larger, quantities."

The muriated tincture of iron is also a valuable remedy in cases of retention, and used to be much employed, especially at the New York Hospital, in doses of fifteen to twenty drops every half hour. Some doubt has been thrown upon the action of this agent, from the fact that it is commonly administered in conjunction with opium, to which the credit in successful cases has been ascribed. I have used it alone in several instances with very favorable results, and am disposed to assign it a position second only to opium in the treatment of retention.

Retention of urine must not, however, be allowed to continue too long, since even in the absence of urgent constitutional symptoms, "it is certain that very mischievous consequences result from extraordinary distention (rupture of the urethra and extravasation of urine being passed over, as sufficiently obvious), in its effects upon the kidney, not merely in the way of temporary interference with the performance of its function as a depu-

rating organ, but in the lasting injury it is conceived that a few hours of extreme pressure and dilatation may exert on its structure." (Thompson.) The least suspicion of organic renal disease should make us doubly careful in this regard.

If, then, attempts at catheterism have been continued without success as long as can be regarded as consistent with safety, the question arises, Shall we attack the retention and the stricture at once by one and the same operation, or shall we now merely empty the bladder, leaving the stricture until a subsequent period, when it may be more amenable to treatment than at present? No absolute rule can be laid down for the decision of this question, since each case must be considered by itself; but it may be said in general, that if urethral abscess or urinary infiltration be evidently present, or even strongly suspected, the decided indication is to approach the bladder by way of perineal urethrotomy, and endeavor to relieve the retention and remove the obstruction at the same sitting. The different operations for this purpose have already been described.

In the absence of urinary infiltration and abscess, the retention of urine being the only pressing symptom, I conceive that, in most cases, it is best to be content with emptying the bladder and to let the stricture for the time being alone, provided, always, that the patient is within convenient reach of the surgeon, so that further measures can be taken at any moment if required. In country practice, where the surgeon is called a long distance from home, the case is obviously different.

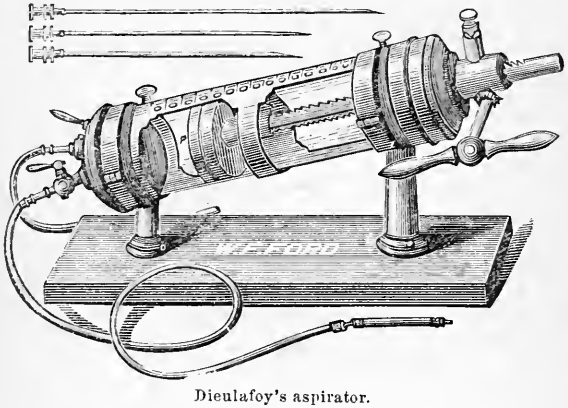
In the aspirator, already mentioned, we have fortunately an instrument which enables us, in a perfectly simple and harmless manner, to empty the contents of the bladder through a puncture above the pubes, and thus avert any danger so far as the mere retention is concerned; and this slight operation may be repeated, if necessary, in the hope that the inflammation and spasm will subside, and that a stricture now impervious will soon become pervious, or, at any rate, the most pressing danger will have been removed and time gained to prepare for a more serious operation, if required.

The aspirator, as originally invented by Dieulafoy, is represented in Fig. 107. This form is expensive, and is now generally supplanted by Potain's modification (Fig. 108), which is sold at less than one-third of the price of the former. Moreover, on an emergency, the surgeon himself can readily fit up an aspirator by attaching, by means of rubber tubing, a small trocar, provided with a stopcock to prevent the entrance of air, to the suction-end of any large syringe—preferably one of the India-rubber syringes of Davidson or Mattson. This plan was first suggested, I believe, by Dr. Gritti, of Milan.[1] Dr. Andrew H. Smith,[2] of New York, has also devised an impromptu aspirator, in which the suction is produced by the evaporation of ether. It consists of a pint bottle with a tight perforated cork, fitted with a glass tube, attached to which is rubber tubing with a needle. The bottle containing one or two drachms of ether is to be placed

[1] See Med. Rec., N. Y., 1876, p. 790.
[2] Med. Rec., N. Y., Aug., 1874, p. 438.

in hot water; when all the ether is vaporized, the rubber tube is to be adjusted and the trocar-needle inserted into the cavity to be evacuated.

Fig. 107.

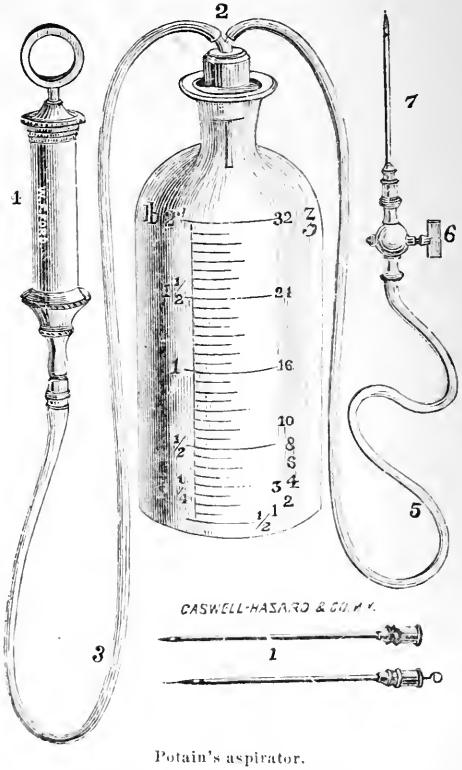


Dieulafoy's aspirator.

As already stated, the use of the aspirator appears to be devoid of danger, even if the trocar passes through a fold of the peritonæum. It would appear also that its frequent repetition is equally harmless, since, as believed, there is no authentic case on record in which mischief has been done. In one instance, Guyon[1] performed twenty-three aspirations upon the same patient in eight days, and "the most simple catheterization could not have been more harmless." It need only be added that this operation is almost free from pain, and does not require the use of an anæsthetic agent.

The use of the aspirator has almost if not quite superseded the old methods of puncturing the bladder. The latter, however, may receive

Fig. 108.



Potain's aspirator.

[1] Dieulafoy, Pneumatic Aspiration of Morbid Fluids, London, 1873, p. 102.

a few words of explanation, in case they should be called for in the absence of the proper means for aspiration.

Puncture by the Rectum.—This operation is inadmissible in case the prostate is much enlarged from hypertrophy or the presence of a tumor, on account of the danger of wounding this body; also if the bladder be greatly contracted, since the trocar may perforate its anterior as well as posterior wall. It may be performed with an ordinary curved trocar and canula, about eight inches in length, but it is an advantage to have the former grooved, so as to indicate with certainty by the flow of urine when the point has entered the bladder.

Fig. 109. Fig. 110.

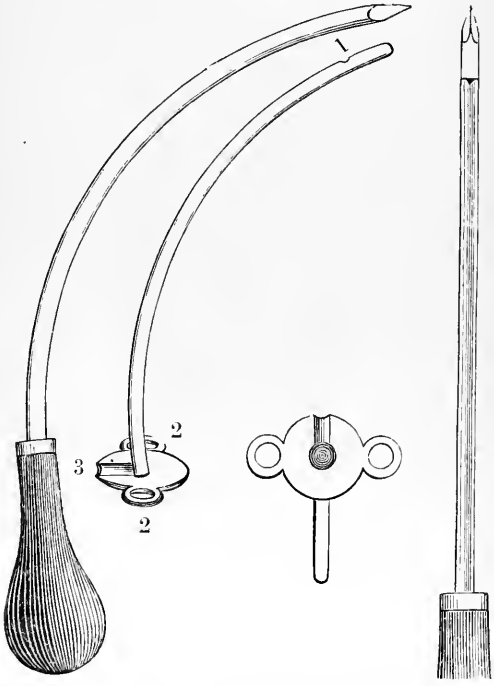


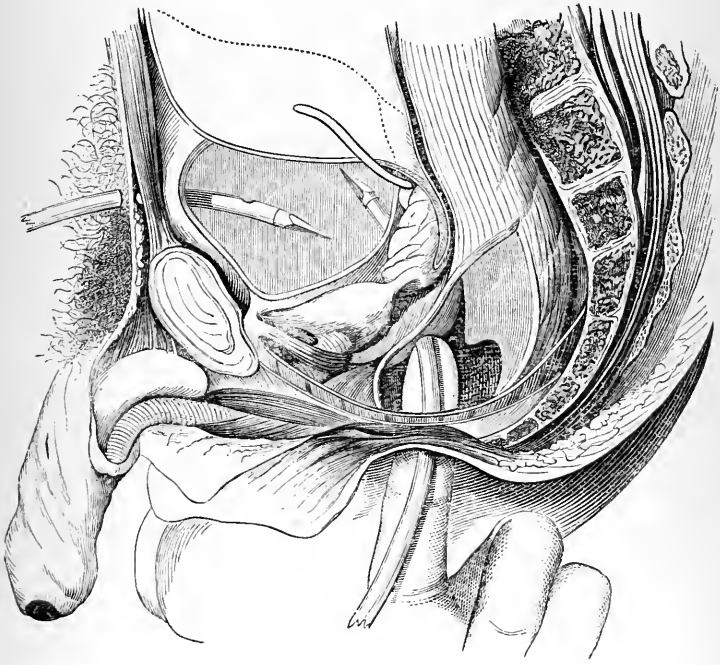
Fig. 109. Side view of canula and trocar. 1. Eye in the former communicating with the groove in the latter. 2. Rings for the purpose of attachment. 3 Channel for the escape of urine.

Fig. 110. Trocar seen on its convex aspect, and showing the groove, which is converted into a tube by insertion in the canula. (After Phillips.)

The patient is to be placed as in the operation of lithotomy, with an assistant supporting each extremity. The lower bowel having been emptied by an enema, the surgeon introduces his left forefinger, well oiled, into the rectum, and feels for the recto-vesical wall just back of the posterior margin of the prostate. A tap upon the hypogastric region with the opposite hand should communicate an impulse to the point of the finger in the rectum, and this is to be regarded as indispensable before proceeding with the operation. The canula and trocar are now to be introduced along the

finger as a guide, and, while an assistant compresses with both hands the lower part of the abdomen, the point is directed forwards exactly in the median line, and, by depressing the handle, made to penetrate into the bladder, the accomplishment of which may be known by its freedom in this cavity and the flow of urine. The canula, carefully kept in place during the withdrawal of the trocar, is to be fastened by a T bandage, and may be retained until the permeability of the urethra is re-established.

Fig. 111.



Recto-vesical and supra-pubic puncture. (After Phillips.)

The risks of this operation are: wounding the peritonæum or vesiculæ seminales; consequent peritonitis, or inflammation of the appendages and substance of the testicle; persistence of the opening; and abscess between the rectum and bladder. In practice, however, these results rarely follow. The peritonæum is too high up to be much exposed, and the vesiculæ seminales may be avoided by adhering closely to the median line. The recto-vesical puncture has been known to remain fistulous for life, but generally exhibits a strong tendency to close; and the formation of abscess is rare.

Puncture above the Pubes.—This operation, performed with an ordinary trocar, was a favorite with Abernethy, and, according to Dr. Wilmot,[1] was practised by Dublin surgeons in preference to recto-vesical puncture, but has not been so generally adopted in this country as the preceding

[1] Stricture of the Urethra, 1858.

method. It is entirely inadmissible when the bladder is contracted, and difficult of performance when the patient is corpulent; though in spare subjects, with the bladder much distended, its execution is very easy. The chief danger attending it is from infiltration of urine, which should be guarded against by making a free external incision, and by leaving the canula in place for twenty-four or thirty-six hours, and until lymph has been effused around it, before substituting a gum-elastic instrument. Fatal results have sometimes ensued from sloughing of the edges of the wound, and also from perforation of the peritonæum.

In performing this operation, the patient should be placed in a semi-recumbent posture, with the hair shaved from the pubes; an incision is to be made above the symphysis involving the integument and cellular tissue to the extent of about two inches in a vertical direction; the pyramidal muscles may now be separated with the handle of the scalpel, and the bladder felt for by a finger introduced into the wound; the trocar, either straight or slightly curved, with its concavity downwards, should be inclined towards the lower portion of the sacrum, and a gum-elastic catheter substituted for the canula at the end of one or two days.

Puncture through the Symphysis.—This operation has been too infrequently practised to admit of an expression of opinion regarding it. It was first proposed by Dr. Brander, in 1825, and since performed by him; by Dr. Leasure, of New Castle, Pa., and a few others. Its execution is very simple, consisting merely in introducing a trocar, by a rotatory motion, either with or without a previous incision through the integument, between the pubic bones, in the direction of the promontory of the sacrum, and afterwards inserting a piece of flexible catheter through the canula. It possesses the advantage, as suggested by Dr. Leasure, of enabling the surgeon, in the absence of other instruments, to relieve retention by means of a simple hydrocele trocar.

Opening the Urethra posterior to the Stricture.—This is best done in the manner described upon page 317, when speaking of "Cock's operation." At a meeting of the Clinical Society of London, Oct. 25, 1878, Mr. H. G. Howse reported a noteworthy case of traumatic stricture, in which Cock's operation, performed in order to open a way into the bladder, was unsuccessful in consequence of a displacement of the urethra from its normal position and the formation of a urinary *cul-de-sac*. Cystotomy from the perinæum through the prostate gave temporary relief, but the normal passage of the urine was not restored until a supra-pubic incision was made and a sound passed through this into the bladder and thence into the urethra, to serve as a guide for perineal section.[1]

[1] Reported in The Doctor, London, Nov. 1, 1878, p. 230.

Treatment of Extravasation.

The general principles upon which the treatment of extravasation of urine is to be conducted are: To give free exit by incisions to the escaped fluid and disorganized tissues; to support the vital powers by nourishment and stimulants; to remove and render inert the noxious products of decomposition by cleanliness and antiseptics. At the earliest moment that any external symptoms of extravasation can be detected—nay, before this, if constitutional shock and deep-seated pain lead to the suspicion of the escape of urine, although its presence behind the deep perineal fascia be indicated by no sign appreciable upon the surface—a free incision should be made in the median line of the perinæum, where there is but little danger of wounding important vessels. When the extravasation has attained more superficial parts, numerous incisions are required in the scrotum, and wherever else there is distention and a tendency to sloughing or gangrene.

We are generally called upon to sustain the sinking powers of life by the free exhibition of nourishment and stimulants; as beef-tea, brandy milk-punch, carbonate of ammonia, quinine, etc. Opium is of value when there is much pain or nervous irritability. Nothing can be done for the relief of the stricture during the continuance of the shock consequent upon rupture, but usually, as this passes off, catheterism may be successfully performed. In case this cannot be accomplished, and if the bladder be found on percussion to be still distended, owing to the small size of the rupture, it is desirable to resort to puncture at once, or to extend the incision in the perinæum to the urethra behind the obstruction. The discharge is fetid and ammoniacal from the first, and especially so as the disorganized tissues are cast off by suppuration; hence frequent ablutions, poultices with the addition of Labarraque's solution, or bags of powdered charcoal, and antiseptic lotions are required.

Treatment of Urinary Abscess and Fistula.

Urinary abscess, as already observed in the present chapter, may arise from ulceration of the urethra and consequent escape of urine, often in minute quantity, into the cellular tissue, in which case it communicates with the canal from the outset; or it may be produced by simple irritation of the neighboring parts, and, although isolated at first, eventually open into the urethra. In both cases the sooner the abscess is evacuated by external incision, the better; in the former, in order to quiet the constitutional disturbance which ordinarily ensues, and prevent the extension and burrowing of matter; in the latter, to effect the same purpose, and also to avoid, if possible, any lesion to the urethral walls and the formation of urinary fistulæ; for when once the urine has found an abnormal outlet, it acts as a constant irritant, and renders difficult the closure of the passage either by nature or by art. When matter is pent up behind the triangular

ligament, it is often exceedingly difficult to detect its presence by external examination; there is usually, however, even in obscure cases, some degree of hardness and tenderness on pressure, and if its existence is rendered probable by the general symptoms, as a chill, nausea, rapid pulse, etc., an incision should at once be made in the median line of the perinæum in front of the anus; even if pus be not at first found, a passage will be formed for its subsequent exit, and the tension of the parts will be relieved. In some exceptional cases, urinary abscess assumes a chronic character, and is attended by little febrile excitement or inconvenience; thus, a small tumor, formed by an abscess communicating with the urethra, sometimes exists for months before being discovered by the patient or surgeon, unless a careful examination of the perinæum be made.

Urinary fistulæ, in most cases, contract and close spontaneously when the stricture has been thoroughly dilated, especially if the general condition of the patient be maintained at a proper standard of health. Assistance may be derived from stimulating applications to the sinus; as of nitrate of silver, nitric acid, tincture of cantharides or iodine, etc. The end of a probe may be coated with nitrate of silver and passed along the fistulous track; one of the tinctures just mentioned, either pure or diluted with water, may be injected: and plugs of compressed sponge may occasionally be inserted to advantage. The method, however, we have found to be most successful, is first to thoroughly cauterize the fistulæ, then wait for two days, after which the urine is drawn off with a soft catheter every time the desire to pass water is felt and the patient should be taught to do this for himself.

Fistulæ in front of the scrotum frequently require plastic operations, a description of which may be found in works on general surgery.

Proposed Set of Urethral Instruments.

The following rather generous set of instruments will be found sufficient, in nearly all cases, for the exploration, and for the immediate treatment, of affections of the genito-urinary organs. Since the surgeon is often called from home in cases of emergency, it is well to have these instruments fitted into trays (two are sufficient, each about thirteen by twelve inches). These trays may rest upon cleats in one or two drawers of the office table. A hand valise is provided, into either side of which one of the trays will fit, so that the surgeon, when hurriedly called out, has only to transfer the trays from the drawers to the valise, and he is sure of having all his instruments with him. Without this arrangement, he is usually subjected to the expense and annoyance of having a double set of instruments, one for office and the other for outside use.

Maisonneuve's urethrotome (Fig. 92).

Holt's or Voillemier's rupture instrument (Figs. 97, 98).

Author's silver catheter, size No. 7, French, with filiform bougie conductor (Fig. 82).

Six filiform bougies, with screw-heads which will nicely fit any and all of the above.

Thompson's probe-pointed catheter (Fig. 106).
Otis's straight dilating urethrotome (Fig. 95).
Catheter-gauge, either Charrière-filière (Fig. 60), or Handerson's gauge (Fig. 62).
Tape-measure.
Set of acorn-pointed sounds, seven and a half inches long, Nos. 12 to 40 (Fig. 70).
Six acorn-pointed sounds, curved, alternate Nos. from 24 to 34 (Fig. 71).
Otis's (Fig. 75), or Weir's urethrometer (Fig. 76).
One or two meatometers, ranging from Nos. 16 to 34 (Fig. 73).
Twelve steel, nickel-plated sounds, Nos. 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, and 36, their points conical and tapering to two sizes smaller than the shaft, and of Thompson's short curve.
Thompson's searcher for stone.
Two silver-catheters, Nos. 8 and 22, Thompson's curve.
One compound catheter (Fig. 63).
Prostatic catheter.
Thompson's urethral forceps.
Potain's aspirator (Fig. 108).
Curved trocar and canula for puncture of the bladder (Fig. 109).
Syme's staff (Fig. 99).
Silver grooved director, 9 in. long.
Otis's staff for Jaque's flexible catheter (Fig. 65).
Probe-pointed meatotome (Fig. 84).
Phimosis forceps (Fig. 26).
Sands's artery forceps.
Strong, blunt-pointed scissors (Fig. 25).
Ear-syringe of hard rubber, the nozzle of which unscrews and allows Taylor's phimosis nozzle (Fig. 25) to be attached.
Straight bistoury and tenaculum.
Box containing vaseline.
" " needles and ligatures.
" " suppositories of morphine and belladonna.
" " styptic cotton.
A few fine flexible bougies, whalebone bougies, flexible catheters and Jaque's catheter (Fig. 64).
Hypodermic syringe.
Thermometer.

N. B.—The danger of communicating disease from one patient to another by means of urethral instruments, especially those whose grooves or joints may harbor septic matter, should never be forgotten. All instruments should be scrupulously cleansed, and metallic ones be plunged for a few minutes into boiling water, before they are used again. Moreover, the lubricant employed should contain a disinfectant, as, for instance, ten drops of the "impure carbolic acid" to each ounce of oil or vaseline.

CHAPTER XXV.

SEXUAL HYPOCHONDRIASIS.

No small proportion of the patients who apply at the office of the venereal specialist, are afflicted only with hypochondriasis relating either to the appearance or the functions of their genital organs. These patients may be divided into two classes: first, those who are ignorant of what the appearances of the genital organs normally are, or how far these appearances vary in sound persons, or who are ignorant of the influences which affect the function of these organs in all men, even the most healthy. This class of patients, if blessed with common sense and confidence in their medical adviser, need only information to set them all right.

But there is a second class of such patients, unfortunately the more numerous, whose minds are really unsound in reference to their sexual organs; who are unwilling to accept the statement of their physician that there is nothing the matter with them; who go on brooding over their imaginary trouble; who fall the ready victims of quacks; and who, after leading a miserable existence, a burden to themselves and their friends, sometimes become the inmates of a lunatic asylum, or seek a suicide's death. If such patients cannot be made to listen to reason, and a manly spirit cannot be roused up in them, there is no hope for them, for neither medicine nor surgery can cure them. I propose to mention some of the grounds of complaint which the subjects of sexual fear or hypochondriasis most commonly set forth to their physician.

With some, the complaint is almost ludicrous, as, for instance, that one testicle hangs lower than the other—a condition which obtains with the great majority of men; or the patient thinks that his penis or testicles are smaller than they ought to be, even when they are of very fair dimensions; or he complains of an itching or crawling sensation in the parts, which is not strange while his thoughts are constantly directed upon them. Again, it is the cheesy excretion which forms in the furrow at the base of the glans; a few herpetic vesicles appearing from time to time, or a slight eczema of the penis or the eczema marginatum which is so often developed in the inguinal fold, that makes him unhappy. A prominent professional man applied to me a few years ago for a little follicular abscess on the sheath of the penis, which he kept open by constantly picking at it. His mind was perfectly clear on every other subject but was insane on this. He imagined he had syphilis and had communicated it to his wife and children. After a few months he committed suicide. Again, enlargement of the scrotal veins, or varicocele, is a fruitful source of terror to many men.

This, indeed, may exist to such an extent as to seriously incommode the patient and to demand surgical interference; but, in a moderate degree, it is of trivial moment, and may be relieved by wearing a suspensory bandage.

But nocturnal emissions are the complaint of most of the subjects of sexual hypochondriasis, and these they will probably ascribe to masturbation, which they ignorantly practised for a time in former years, until they had visited one of the vile "Musæums of Anatomy" which infest our cities, and, either there or elsewhere had read the terrible pictures of the dire effects of this habit, which quacks are wont to conjure up. Their emissions did not occur until after they had abandoned self-abuse, and hence, with illogical reasoning, they "must be due to that practice." Even men in adult life, who have been left widowers after years of unimpaired sexual power, will ascribe nocturnal emissions due to their present continence, to early indiscretion. The subjects of nocturnal emissions will tell you that, after each emission, they feel weak and exhausted; that they have pain in the back; and that they find their memory failing. They are apt to imagine, also, that the natural moisture of the urethra is semen; that the viscid fluid which oozes from the canal on sexual excitement is semen, and that they pass semen on straining at stool or in their urine—the latter being shown by some shreds which it contains when first passed or by the sediment which is formed on standing.

Now these men are to be told some plain truths. Nocturnal emissions occur independently of the practice of masturbation. Some of the most frequent cases I have ever seen have been in men who had never committed self-abuse. They are incident to early manhood, especially between the ages of fifteen and thirty, and are less frequent as life advances. At this period, the genital functions are most active; the secretion of semen is constantly going on, and must find vent somewhere, like a loaded rectum or a distended bladder. For a man in the prime of life, and living continently, not to have an occasional nocturnal emission, is a rare exception. The frequency of these emissions will vary and yet be consistent with health, and will depend somewhat upon the purity of the thoughts of the individual, and upon whether the sexual desires have already been excited, as by masturbation, illicit sexual intercourse, or the marriage state. Hence masturbators and widowers will be more exposed to them than those who have been continent from their youth up. With regard to their frequency, it may be said in general, that once a month or once a fortnight is most common, but they may take place as often as two or three times a week without detriment to the health. They are very apt to occur in groups—and this is a point to be mentioned to patients—*i. e.*, he may be free from them for several weeks and then will have two or three on successive nights or the same night.

In ninety-nine cases out of one hundred, these emissions require no medical or surgical treatment. The chief danger from them lies in the patient's attaching undue importance to them, in dwelling upon them, and

making himself miserable over them. If he can be induced to give his mind and body pure thoughts and healthy exercise, and to look upon their occurrence as a physical necessity, nature will take care of the rest.

It is now many years ago since a young man, who, like most young men, had not been entirely free from self-abuse, picked up a small pamphlet written by the late Dr. Bell, superintendent of the McLean Insane Asylum, in which the sin and degradation, and the evils of masturbation were set forth. He at once abandoned the habit, but nocturnal emissions occurred and became a terror to him. He called upon Dr. Bell, and his first words, after announcing his mission, were to thank him for writing the pamphlet he had read. To his surprise, Dr. B. replied that he was sorry he had ever written it; that the first edition was exhausted, and that he would never allow another to be published. "Why?" "Because I believe that what I said of the *possible* evils of masturbation and nocturnal emissions was overdrawn, and has done more harm by the fears it has excited in young men, than a continuance of the practice itself would have done." "Well, what medicine shall I take?" "No medicine whatever" (second surprise of the young man). "I shall only lay down some hygienic rules for you to follow. You must expect your nocturnal emissions to occur from time to time, but must not mind them. They will be less and less frequent as you grow older, and, if you ever get married, they will cease." The young man had strength of mind enough to appreciate this advice and follow it. He found every word of the doctor's prognosis in his case to come true, and in hundreds of such cases which he afterwards met with in practice when himself a physician, the same advice, when accepted and followed, always proved successful.

As intimated above, matrimony might be regarded as the best prescription in cases of nocturnal emissions, and it *is* the best prescription whenever practicable under such conditions of mutual attachment, etc., which are necessary to make married life happy. To marry simply for the sake of sexual intercourse, is likely to lead to greater unhappiness than can ever be caused by nocturnal emissions.

Illicit sexual intercourse, as a substitute for matrimony, is never to be recommended; first, because it is morally wrong, and the physician would take upon himself a fearful responsibility in advising it; and second, because the excesses which fornication always leads to, have an effect directly opposite to the one desired. In an admirable lecture[1] on sexual hypochondriasis, Sir James Paget says: "Many of your patients will ask you about sexual intercourse, and some will expect you to prescribe fornication. I would just as soon prescribe theft or lying, or anything else that God has forbidden. If men will practise fornication or uncleanness, it must be of their own choice and on their sole responsibility. We are not to advise that which is morally wrong, even if we have some reason to think a patient's health would be better for the wrong-doing. But in the cases before us, and I can imagine none in which I should think differ-

[1] Clinical Lectures and Essays by Sir James Paget, London, 1875.

ently, there is not ground enough for so much as raising a question about wrong-doing. Chastity does no harm to mind or body; discipline is excellent; marriage can be safely waited for; and among the many nervous and hypochondriacal patients who have talked to me about fornication, I have never heard one say that he was better or happier for it; several have said they were worse; and many, I know, have been made worse."

In all cases of frequent nocturnal emissions, the genital organs should be examined, and, whether phimosis exists or not, if the prepuce be long and redundant, circumcision is to be recommended (see chapter on Phimosis). A very marked varicocele may also render surgical interference desirable.

The hygienic rules to be given to the patient are very simple. It is better that the most substantial meal in the twenty-four hours should be taken at noon; the supper should be light, and food and drink be entirely avoided in the evening; the bedchamber should be well ventilated, a hair mattress preferred to a feather bed, and much covering avoided; the patient should sleep upon his side and not upon the back; a small pillow placed between the knees, so as to separate the thighs and prevent the scrotal organs from becoming heated, is sometimes desirable; and the patient should rise as soon as he wakes, emissions occurring most frequently during the semi-consciousness of the early morning nap. Tobacco in every form should be prohibited, since it not only increases the general irritability of the nervous system, but appears to have a direct influence in diminishing the tone of the genital organs and thus favoring seminal emissions. Above all, as already stated, the mind of the patient should be distracted from his complaint by constant occupation, and his general health be promoted by a plain but nourishing diet and by daily out-door exercise, not carried to fatigue, since it is found by experience that when the strength is exhausted an emission is more likely to occur. Many of these patients also have constipated bowels, and means should be taken to secure a daily stool.

As a rule, no other measures than the above are required. It is to be understood, however, that any weakness of the genital organs is often only one manifestation of a general weakness and irritability of the nervous system, which may require the administration of tonics, a change of climate, etc. For this purpose I have found the two following prescriptions of good service:—

℞. Ferri et Quiniæ Citrat., ʒiij . . . 12
Strychniæ Sulph., gr. j 06
Acidi Phosphoric. dilut., ℥ss . . . 15
Syrp. Aurantii, ʒij 80
Aquam, ad ʒiv 145

M. et sig.—A teaspoonful (5.00) in water after each meal.

℞. Strychniæ Sulph., gr. j 06
Acidi Phosph. dilut. ℥iij 90

M. et sig.—A teaspoonful (5.00) three times a day after eating.

The tincture of the chloride of iron and also ergot have been supposed, and I think justly so, to have a special tonic effect upon the genital organs, but they must be given in large doses, as for instance from half a drachm to a drachm (2.00–4.00) of either the tincture of iron or the fluid extract of ergot (Squibb's) in water after each meal. They may be combined as in the following prescription;—

℞. Tr. Ferri Chloridi, ℥iij . . . . . 90|
Ext. Ergotæ fl. (Squibb's), ℥iij . . . 90|
M. et sig—.A teaspoonful (4.00) in water after each meal.

As a direct means of diminishing the frequency of the emissions, however, the following is often found to be most efficacious:—

℞. Potassii Bromidi, ℥j . . . . . 30|
Tr. Ferri Chloridi, ℥j . . . . . 30|
Aquæ, ℥iij . . . . . 90|
M. et sig.—From one to two teaspoonfuls (4.00–8.00) in water after each meal and at bedtime.

Mention has already been made of the advisableness of circumcision when the prepuce is long. It may also be found upon the introduction of a sound that the urethra is over-sensitive, especially in the prostatic region. In such cases, the introduction of a cold sound of full size, at first every third or fourth day and afterwards with greater frequency, will generally afford relief to the hyperæsthesia. I sometimes inject into the prostatic urethra about ten drops of a solution of nitrate of silver of the strength of twenty grains (1.30) to the ounce (30.00) of water, by means of my deep urethral syringe or Guyon's flexible catheter and syringe. The severe cauterization with the porte-caustique of Lallemand, should, by all means, be avoided. In one severe case of nocturnal emissions occurring several times every night, Prof. J. H. Pooley[1] made a perineal incision, similar to that for median lithotomy, into the urethra just at the apex of the prostatic gland, and diverted the urine from its natural channel. The result was successful, but whether due to the mental or physical effect of the operation may be a question.

A few words are still necessary with regard to the special complaints made by these patients to their medical adviser, and which have for the most part been enumerated. Trifling as they may appear to him, they should yet be fully explained to them. The lassitude and backache which they experience after an emission, is nothing more than any person of impaired nervous power would feel after a long walk or other exercise. Their "loss of memory" is purely imaginary. They should be told that the natural condition of the urethra is one of moisture, like the inside of the mouth; that the amount of moisture will vary at different times; that it is especially liable to be increased by the erethism, occurring either with or without the knowledge of the patient during the hours of sleep, and hence is most perceptible in the morning on rising; that it is perfectly natural in men, as in the lower animals, to have the end of the penis smeared

[1] N. Y. J. Med., vol. xxviii, 1878, p. 302.

with a clear, viscid fluid when under sexual excitement (nature's object probably being to facilitate intromission); that a cloud or sediment will form in the most normal urine when allowed to stand for a few hours, and that no pair of optics ever born, unassisted by the microscope, could discover the presence of semen. But even should it occur, as it sometimes does, that a fluid actually containing spermatozoa is pressed out from the canal, especially on straining in passing a hard stool, it is nothing more than that overflow from the vesiculæ seminales to which continent persons in robust health are liable. Spermatozoa left in the canal after such exertion, and particularly after a wet dream during the night, will naturally be washed away by, and be found in, the urine the next time it is passed.

The picture that I have given of masturbation and seminal emissions is very different from the one drawn by Lallemand and by the charlatans of the present day, who, in their circulars, represent impotence, disease of the heart, consumption, paralysis, insanity, and idiocy as a few of the consequences of self-abuse, which can only be cured by some nostrum of which they hold the secret. Masturbation is injurious, degrading, and beastly enough, not to require to be painted in any colors which are not consistent with truth. I have taken occasion to make inquiries of some of the most eminent physicians of our insane asylums, as to what extent masturbation should be regarded as a cause of insanity, and they have expressed the decided opinion that it was mental weakness that led to masturbation and not masturbation that led to mental weakness and insanity.

Paget's words on this point are worth quoting: "You may teach positively that masturbation does neither more nor less harm than sexual intercourse practised with the same frequency in the same conditions of general health and age and circumstance. Practised frequently by the very young, that is, at any time before or at the beginning of puberty, masturbation is very likely to produce exhaustion, effeminacy, over-sensitiveness and nervousness; just as equally frequent copulation at the same age would probably produce them. Or, practised every day, or many times in one day, at any age, either masturbation or copulation is likely to produce similar mischiefs or greater. And the mischiefs are especially likely or nearly sure to happen, and to be greatest, if the excesses are practised by those who, by inheritance or circumstances, are liable to any nervous disease,—to "spinal irritation," epilepsy, insanity, or any other. But the mischiefs are due to the quantity, not to the method, of the excesses; and the quantity is to be estimated in relation to age and the power of the nervous system. I have seen as numerous and as great evils consequent on excessive sexual intercourse as on excessive masturbation; but I have not seen or heard anything to make me believe that occasional masturbation has any other effects on one who practises it than has sexual intercourse, nor anything justifying the dread with which sexual hypochondriacs regard the having occasionally practised it. I wish I could say something worse of so nasty a practice; an uncleanliness, a filthiness forbidden by God, an unmanliness despised by men."

There are other complaints of the sexual hypochondriac, into which we have not the space fully to enter. I refer particularly to those odd caprices

which these organs sometimes exhibit under varying mental emotions,—even in the most robust and healthy individuals. Perhaps the most frequent complaint is that of too speedy ejaculation, which may take place on attempting intercourse with any woman or with some one woman in particular, especially if the attempt be the first one with her. Here the mind is chiefly at fault: over-anxiety to perform the act well is very likely to lead to its being performed badly. It occurs less frequently in married life than in single, and is a defect which diminishes with age, as old men well know. If art can do anything to hasten its cure, it will be by means already mentioned; circumcision if the prepuce be long; the cold sound in cases of irritability of the prostate, ergot and the tincture of iron internally; last, but not least, matrimony, or, in lieu of that, some other object in life than sexual gratification.

Cases of absolute impotence in men of good health and who have not greatly abused their powers, must be rare; I can recall but three or four in many years of practice. These I have treated with almost every remedy which I had ever heard of, but I never found any benefit accrue to the patient. Most frequently the impotence is merely imaginary. It is safe to tell any man who has erections at night that he is not impotent. Matrimony is the remedy for this imaginary evil, but, like the boy who did not want to go into the water until he first knew how to swim, the patient desires to be satisfied beforehand of his competency. This he cannot do by trial with women of the town: the conditions under which such attempts are made are obviously so different from those of married life as to require no comment.

Finally, the satisfactory accomplishment of the sexual act will be influenced by the merest whim or fancy. One man will be told by a friend some story of his sexual weakness, and, with this in his memory, he, too, for a time will find himself defective. A coarse word or some personal remark made by a woman may take away all desire for her, while the power remains the same with others. Excessive desire, especially with gratification long delayed, may also temporarily deprive a man of his power. Roubaud[1] relates a story of a young Frenchman living in the country where he was initiated into the pleasures of Venus by a governess, who was a blonde, and always wore when she met him English boots, corsets, and a silk dress. When old enough, it became desirable for family reasons that he should be married, but he found himself impotent except under the above named conditions: the woman, at the time of connection, must be dressed, must be of a blonde complexion, must wear English boots, corsets, and a silk dress, in which case his powers were as great as could be desired. Under the pretence of giving him a powerful medicine, Roubaud administered a "placebo" which cured him.[2] This story is here told to show how much a man's powers are influenced by his mental condition, and to enforce the importance of paying attention to the *morale* as well as the *physique* in the treatment of disorders of the genital functions.

[1] Traité de l'impuissance et de la stérilité, 3d ed., 1876, p. 371.

[2] This story reminds one of another concerning a sailor, who was so accustomed to passing his water over a railing into the sea, that, when on shore, he could only relieve his bladder by piddling into a well.

PART II.

THE CHANCROID AND ITS COMPLICATIONS.

CHAPTER I.

THE CHANCROID, OR SIMPLE CHANCRE.

I ADOPT the name of "chancroid" to designate the "contagious and local ulcer of the genitals," the history of which has been given in the Introduction of the present work.

Among the most important names which have been given it, especially in modern times, are the "simple," "soft," "non-infecting," or "non-indurated chancre" by various authors; the "chancrelle" by Diday; and the "chancre" by Hebra, Zeissl, Reder, and others of the modern German school. Hence the student will observe, when reading German authors, that "a chancre" spoken of, means what we here call "chancroid." What we here call a "true chancre" is designated by the Germans as "the initial lesion of syphilis," as it truly is. The nomenclature followed in this work is, however, the one usually adopted in this country.

Most modern French authors designate this disease as the "simple chancre," in contradistinction to the "syphilitic chancre," the initial lesion of syphilis; and, unless the term "chancroid," now so commonly recognized, be adopted, this name appears to be the most acceptable. Lancereaux calls it "*false* or *local syphilis*." Its secretion may be taken up by the lymphatics and conveyed to the nearest ganglion, there to set up inflammation and the formation of matter possessing the same power of reproduction as the secretion of the sore itself; but its farther progress is arrested within the ganglion; it never gains access to, nor contaminates the general circulation; and, since its influence is thus confined to the neighborhood of the point of implantation of the virus, it must be regarded as a local disease.

THE CHANCROIDAL POISON.—In the Introduction to the present work, reasons have been set forth to show that the chancroid is not dependent upon a *specific virus*, in the same sense that we attach to the word "virus" when speaking of syphilis or variola. That it possesses a contagious element or poison is unquestionable, but we believe that this poison, under certain conditions and especially when the products of simple inflammation have

undergone decomposition and are inoculated upon persons in a debilitated state, *is capable* of being generated *de novo*, and may then be transmitted to other individuals.[1] That such an occurrence is *frequent* in sexual intercourse we do not claim, and we expect to find a chancroid in that person of the opposite sex with whom a patient applying to us with a chancroid has had intercourse; but that it may and does take place, however rarely, the experiments already detailed appear to leave no doubt. Moreover, this *supposition*—if any one prefers to call it so—better explains the different degrees of severity in venereal ulcers, the apparent union of a chancroid and chancre ("mixed chancre"), and other facts of clinical observation, than can be done in any other manner we know of. It also explains why the chancroid has been known among all nations and at all times of which we have any record, since wherever there have been inflammatory products to be inoculated, *there* the chancroid could originate and be perpetuated.

The only vehicle of this poison is the secretion of the ulcer itself and that of a virulent bubo or virulent lymphitis attendant upon it. We may go further and assert that the poison does not exist in the more fluid portion of the secretion, but in the contained pus-globules, since, as proved by Rollet's experiments, if chancroidal pus be freed from its globules by filtration, the remaining fluid is innocuous. This will explain, on anatomical grounds, why the chancroid always remains local in its action and never affects the general system, because pus-globules, as such, are probably incapable of entering the general circulation, and can only be absorbed after undergoing disintegration. We shall see, further on, the difference between this poison and that of syphilis, which latter is found in many of the fluids, independently of the presence of pus, and contaminates the general economy.

An important characteristic of the chancroidal poison is the facility with which it may be reinoculated upon the person from whom it was taken, or upon almost every other person. This rule, however, is not so invariable as Ricord and others assert, and is subject to exceptions which have been brought to light chiefly by Prof. Boeck and other advocates of "syphilization."

In the first place, the susceptibility varies somewhat in different persons, as it does in different parts of the body in the same person. It is not true, as Ricord once stated, that "all persons are equal before the point of the lancet."

Again, the susceptibility to inoculation may be impaired, or even lost temporarily, during the occurrence of any acute febrile attack or great depression of the vital powers. Thus, in several of our former cases of "syphilization" at Charity Hospital, an intercurrent attack of diarrhœa, of a severe cold, and in one instance, of variola, rendered attempts at inoculation fruitless, until the attack had passed off.

[1] "It is easy," says Dr. Sanderson (Lectures on Septicæmia), "to prepare a putrid infusion of muscle possessing such toxic properties that *less than half a grain* of it introduced into the blood of a dog, will produce death."

Farther, if a series of successive inoculations be made, the resulting sores will gradually become smaller and smaller until they become so minute as not to afford sufficient matter for reinoculation, or they fail altogether. In such cases, matter may still for a time be inoculated upon other parts of the body, but ultimately the patient acquires an immunity against the action of the poison. The same effect is observed after the repeated application of any irritant, as croton oil, cantharides, or tartar emetic, to the surface of the body, and in both cases there is reason to believe that the immunity is only of temporary duration. (See Treatment of Syphilis by Repeated Inoculations.)

Neither the microscope nor chemical analysis reveals to us the intimate nature of chancroidal pus, or any points of difference between it and pus from ordinary inflammation. Several enthusiasts, at different times, have imagined that they had discovered a parasite, upon which the virulence of the secretion depends; thus, M. Donné regards the essential principle as the *vibrio lineola*, M. Didier ascribes it to certain animalculæ, and Prof. Salisbury, of Cleveland, Ohio, who, by the way, recognizes no distinction between the chancroidal and syphilitic virus, has advanced the theory of a vegetable parasite, which he calls *crypta syphilitica*. The little value to be attached to these views is well shown in a paper by Prof. Wood, published in the *American Journal of the Medical Sciences* for Oct. 1868, and repeated microscopical examinations, made by myself, assisted by able microscopists, at Blackwell's Island, have failed to show any foundation for Prof. Salisbury's statements.

When kept from contact with the air at a moderate temperature, the chancroidal poison is said to preserve its power of contagion for a considerable length of time. Ricord states that he has inoculated it with success after preserving it in glass tubes hermetically sealed for seventeen days. Sperino relates an instance of its preservation, which, however, one cannot help doubting. A lancet which had been employed in artificial inoculation had been laid aside for seven months, when it was observed that a small quantity of dried pus had been left upon its point. The instrument was moistened, and three punctures made with it gave rise to as many chancroids. If exposed to a high degree of temperature, or if mixed with alcohol, an acid, or alkali, the chancroidal poison becomes innocuous. If frozen and then thawed, it may still be inoculated. Dilution with from six to ten times its quantity of water does not destroy its potency; but it is said that if two inoculations be made, one with diluted and the other with pure matter, the ulcer produced by the former will be smaller, although just as persistent as the one from the latter.[1] M. Puche even states that he has produced chancroids by inoculation with a drop of pus diluted with half a tumblerful of water. Mixture with any of the normal secretions of the body, or with vaccine, gonorrhœal, or syphilitic matter, does not impair its power; it may thus be transmitted in the process of vaccination, and its communi-

[1] Reder, Pathologie und Therapie der venerischen Krankheiten, Wien, 1863, p. 142.

cation in common with the syphilitic virus gives rise to the double inoculation, improperly called a "mixed chancre."

On the other hand, the late Prof. Boeck[1] emphatically denied the ready preservation of chancroidal matter, and stated that when dried it almost always lost its virulent power, which could only be preserved, and even then merely for a few days, by keeping it fluid and hermetically sealed from contact with the air. Some experiments which I made during Prof. Boeck's visit to New York seemed to confirm this statement. I allowed chancroidal matter to dry on slips of glass, and after the lapse of twenty-four hours moistened it and inoculated it, but without success in a single instance.

The question whether the chancroid is capable of transmission to the lower animals, has attracted the attention of various observers. Hunter experimented upon dogs and asses, and arrived at the conclusion that they were not susceptible to the action of the matter which he employed, and which must have been, in some instances at least, chancroidal. M. Ricord, in his notes to Hunter, also says: "I have taken pus in every possible condition, and attempted to inoculate with it dogs, cats, rabbits, guinea-pigs, and pigeons; and, in no case, in spite of the variety of my experiments, has it been possible to communicate the disease." More recently, however, successful inoculations of chancroidal matter have been performed upon a number of the lower animals, by MM. Auzias-Turenne, Diday, Robert de Welz, and by M. Basset, and the secretion of the sores thus produced has been again inoculated upon other animals and upon man. Thus M. Diday inoculated himself upon the skin of the penis with the secretion of a chancroid which he had succeeded in developing upon the ear of a cat; the inoculation was followed by a chancroid which took on phagedenic action, and was attended by a bubo in the groin that suppurated and lasted for about six months.

It has been objected to these experiments, especially by M. Cullerier, that the matter was simply deposited in a wound made in the integument of the animal, and was thence removed and successfully inoculated, without really taking effect at the first point of its insertion. M. Cullerier says: "I shall not believe in a true inoculation until a suppurating sore has been produced which can be repeatedly washed, so as to be freed from the pus which produced it, and which yet can be subsequently reinoculated either upon the animal itself or upon man." We are assured, however, that these precautions were taken in the case of M. Diday and his cat, and also in the successful inoculations of M. Basset, performed in 1860; and we, therefore, have reason to believe that the lower animals are susceptible to the action of the chancroidal poison, though probably to a less degree than man. Inoculations with the true syphilitic virus have, on the contrary, invariably failed.

[1] Boeck (Erfahrungen über Syphilis, 1875) gives a large number of experiments relative to the preservation and inoculation of the secretion of venereal sores, but his results are to a certain extent vitiated by the fact that he makes no distinction between the chancroid and the true chancre.

To those who are inclined to repeat the experiment of the inoculation of the secretion of a chancroid upon the lower animals, I would say, that success is not likely to be attained, unless a wound be made in the integument, or, better still, a portion of the derma be removed, and a pledget of lint soaked in the virus be bound upon the part for twenty-four to forty-eight hours.

An eminent syphilographer of Turin, M. Ricordi, has (1868) reported a series of inoculations upon rabbits with the secretions both from the chancroid and the trûe chancre, the result being the same as above mentioned, viz., success with the former and failure with the latter.[1] In one experiment with chancroidal matter, a bubo was produced the pus of which was inoculated with success upon a second rabbit. This occurrence of a virulent bubo in the lower animals has not been before observed.

Contagion.—Contagion is said to be *direct* or *mediate:* "direct" when the matter is transferred immediately from one person to another in the act of coitus or other intimate mode of contact; "mediate" when some foreign substance, itself unaffected by the virus, serves as a vehicle for its transmission. An attempt has been made by certain authors to assign different laws for each of these two modes of contagion. It has been said that the act of coitus involved a physiological process, or a state of erethism, which rendered the conditions and the effect of contagion distinct from those which obtain when the virus is communicated by an inert and senseless body, as, for instance, the point of a lancet. Such a distinction is wholly unphilosophical and groundless, and deserves to be ranked with the stories of Munchausen.

In whichever mode communicated, certain conditions are requisite for the poison to take effect. Its application to the sound external integument, hardened by exposure and friction, is as innocuous as would be the deposit of vaccine virus upon the skin without previous puncture. The surgeon frequently soils his fingers with the secretion of chancroids, and this with impunity so long as their surface is intact.

Unless it gains access beneath the epidermis or epithelium, its effect is null; but as soon as this is accomplished, like a seed it begins to germinate, and by its own increase and multiplication, and by the ulceration of the surrounding tissues, a chancroid is developed. Hence one favorable condition for contagion to take place is the presence of an abrasion, as is frequently occasioned by violence during coitus, and through which the virus may penetrate. But no matter how the solution of continuity has been produced, nor how large or minute its size—it may be a rent or tear, or the superficial ulceration underlying a herpetic vesicle; it may be a chancre, the initial lesion of syphilis, or a secondary symptom like a mucous patch—it affords a door of entrance sufficient for successful inoculation.

But the question naturally arises whether this law is absolute. Is it

[1] Ann. univ. di med., Milano.

reasonable to suppose that in all of the numerous cases of simple chancre, some solution of continuity must have existed, without which contagion could not have taken place? Is it not possible that in some instances, at least, the virus may have permeated the external layer of the skin or mucous membrane, without any denudation of the epidermic or epithelial layers? I am not disposed to answer this question positively in the negative; it is one which physiologists are better entitled to solve; yet several considerations would lead me to believe that there is no necessity of explaining on the theory of endosmosis, certain cases of contagion in which no solution of continuity can be discovered. The epithelial layer of the mucous membranes is much thinner and much more readily removed than the epidermis of the external integument. Continued moisture, as is seen in cases of an elongated prepuce, is alone sufficient to produce a superficially excoriated surface; the effect is hastened if the moisture be combined with purulent matter, with the natural sebaceous secretion of the part, or with filth. The door of entrance may be merely microscopic, not visible to the naked eye; if it is only large enough to admit a single pus globule, it will serve the purpose of contagion. It would, therefore, seem sufficient to suppose, with Ricord, in cases of inoculation without apparent solution of continuity, that the virulent pus has at first acted like a common irritant, until the surface had become denuded at some minute point, which would enable it to exercise its power. If it has gained entrance within the open mouth of a follicle, the same effect will be accomplished the more readily.

Instances of mediate contagion with the chancroidal are less common than with the syphilitic virus. Patients occasionally transfer the matter from one part of the body to another upon their fingers. A boy at present under my care with chancroids on the penis, has produced a similar ulcer on his leg by scratching a pimple in that situation. After the operation for phimosis in our venereal hospitals, the wound is not unfrequently inoculated by the use of cutting instruments, *serres-fines*, sponges or towels, smeared with chancroidal pus. Fournier states that one of his patients contracted a chancroid upon his finger by washing his hands in water which had been used a few moments before by a friend for the purpose of cleansing his penis which was affected with chancroids. The seats of water-closets *may* unquestionably serve as the medium of contagion, although not to the extent that is alleged by patients, the frequency of whose assertion to this effect has led to the remark that "only clergymen contract venereal diseases in that way."

It has occasionally been noticed that a man would contract a chancroid from a woman, who, upon examination, was found to have nothing the matter with her, but who was discovered to have had intercourse a short time previously with some man who had this disease; and the question has arisen whether chancroidal pus might not be deposited by one man in the vagina, to be picked up by another without the woman herself being affected; her genital organs thus serving merely as the medium of contagion. Thus Ricord reports a case in which a married pair invited a friend, an officer, to dinner. Everything went on in an unexceptionable

manner till near the close of the repast, when it was discovered that there was no cheese in the house, and the husband went out to purchase some. The officer took advantage of his absence and abused the rights of hospitality. A few days after the husband broke out with a chancroid, and applied to Ricord for advice. Ricord examined the wife and found her free from disease, but obtained a confession of her exposure with the officer, who happened at the same time to be under Ricord's treatment for chancroids.

To test the possibility of such an occurrence, M. Cullerier instituted the following experiment:—

Louise Vaudet entered the Lourcine Hospital Oct. 10, 1848, to be treated for an ulcer of grayish aspect and with sharply cut edges in each groin, which had already persisted without treatment for a month. There was considerable surrounding inflammation, which was subdued by rest and poultices, when the genital organs and anus were carefully examined and found to be free from ulceration. The vagina was reddened and smeared with an abundant muco-purulent secretion, but its mucous surface was intact and the os uteri healthy. The inguinal ulcers were dressed with charpie moistened in aromatic wine, and vaginal injections of a solution of alum ordered; under which treatment the sores and vaginitis rapidly improved.

Nov. 25, after finding on a second examination that the mucous membrane of the vulva and vagina was, as before, intact, and after inoculating without success the vaginal secretion, M. Cullerier collected upon a spatula a considerable quantity of pus from the ulcers in the groins and deposited it in the vagina. The patient was then directed to walk about under surveillance lest she should touch the parts, and at the end of thirty-five minutes was again placed upon the bed, and some of the fluid found in the vagina was inoculated upon her thigh. The vagina and vulva were then freely washed with water, dried, and washed a second time with a solution of alum. Two days after, the inoculation had produced the characteristic pustule of a chancroid, which was left another twenty-four hours to confirm the diagnosis, and then destroyed with Vienna paste. Repeated subsequent examination showed that no ulceration had been caused in the vagina, which was not even more inflamed than before. In two months the patient left the hospital cured of both her vaginitis and inguinal ulcers.

In a second case in which this experiment was performed, the pus was allowed to remain in the vagina for nearly an hour and did not take effect.[1]

Tarnowski[2] has repeated these experiments in a number of instances with the same result.

It would thus appear that in rare instances the sound vagina may play the part of a mere medium of contagion, and the same may possibly be true of the genital organ of the male.

According to Auspitz,[3] who cites his authorities, mediate contagion was

[1] Quelques points de la contagion médiate. Mém. Soc. de chir. de Paris, quoted in Leçons sur le chancre, p. 255.

[2] Vorträge, p. 55.

[3] Die Lehren vom syph. Contagium, p. 89.

known to Widemann, Vella, Fernel, Thierry de Hery and Ambrosius Paré, de Blegny, Astruc and Swediaur.

Frequency of the Chancroid.—Of the three venereal diseases, gonorrhœa is undoubtedly by far the most frequent, as shown by the experience of every surgeon, and numerous cases of this disease are treated by patients themselves who never appear for advice or consultation.

The frequency of the chancroid as compared with that of the true chancre is not so readily determined; indeed we have reason to believe that it has varied at different periods, and we know that it varies in different classes of society.

At the time when a distinction between the chancroid and chancre first began to be recognized, it was the universal testimony that the former was much more frequently met with than the latter.

Bassereau's notes of patients presenting themselves at M. Ricord's clinique in 1837 and 1838 would even show the immense disproportion of thirty chancroids to one true chancre, which is almost incredible, but the former must at any rate have been greatly in the majority.[1]

M. Puche prepared a table of all the venereal ulcers resulting directly from contagion which entered the Hôpital du Midi during ten years (1840–1850) and formed a total of 10,300, of which 8045 were chancroids and 1955 chancres;[2] in other words, the ratio of the former to the latter was nearly as 4 to 1. The statistics of other observers represented the ratio as somewhat less, as, for instance, 3 to 1 or 2 to 1; but all concurred in showing the decidedly greater frequency of the chancroid especially when the observations were made in hospitals frequented by the lower classes of society.

Now, taking this very same hospital, the Hôpital du Midi, in 1869 and 1870, Mauriac (op. cit.) observed the curious fact that these figures were almost reversed; the chancroid was in the minority; and it bore the ratio of 1 : 1.8 to the true chancre; in other words, *there were nearly two chancres to every chancroid.*

But observe what took place in the same hospital in 1870-1 during the war with the Germans and the siege of Paris. Statistics at such a time were, as might be supposed, less perfectly kept, but they were sufficient to show that in 1870 the chancroid was to the true chancre in the ratio of two to one, and in 1871 in the ratio of three to one, thus reversing again the tables of their comparative frequency. Mauriac says: "After the reign of the Commune, our wards, which had been occupied during the siege by the wounded, were filled with venereal patients, and the greater part of them with simple chancres" (chancroids).

In the years succeeding the Franco-German war, the ratio of the chancroid once more gradually diminished until in 1874 it reached the lowest

[1] Rareté actuelle du chancre simple, par Chas. Mauriac, Médecin de l'hôpital du Midi, Paris, 1876, p. 17.

[2] Fournier, Leçons sur le chancre, p. 15.

figure it has ever been known to attain, and was, compared with the true chancre, as one to six and four-tenths; in other words, there was only one chancroid to six chancres recorded on the Register of the Hôpital du Midi during that year. In the following year, it was a little more, viz., one to five.

Doubtless some errors crept into the above statistics, but making every reasonable allowance for the same, they unquestionably show a gradual decrease of chancroidal ulcers in comparison with true chancres. It should be stated that Mauriac's statistics are confirmed by those from other large cities, as Lyons. I have no accurate statistics of my own to offer, but I cannot be mistaken in asserting that I meet with the chancroid much less frequently than I did twenty-seven years ago, when I was commencing practice.

To what is this gradual decrease in the frequency of the chancroid owing? It is impossible, I think, to give a perfectly satisfactory reason. Mauriac, who believes in the existence of a specific chancroidal virus, ascribes it to the gradual extinction of this virus in consequence partly of the police regulations controlling prostitution in Paris, and partly owing to the fact that a chancroid rarely escapes observation, and, once cured, does not reappear; whilst, on the contrary, syphilitic lesions are less likely to attract the notice of the patient, and are of constant recurrence. It is hardly necessary to state that the increase of chancroids during the siege of Paris is more readily explainable on the ground of the great laxity of morals and the inattention to cleanliness that prevailed at that time.

Again, the comparative frequency of the simple and syphilitic chancre depends in a measure upon the position in the social scale to which patients belong, since, as shown by the observations of MM. Martin and Belhomme,[1] and those of M. Fournier,[2] in the better classes of society the chancre is much more frequent than the chancroid. M. Fournier says: "In private practice *the simple chancre is rarer than the syphilitic chancre.* I have been especially struck with this difference, which may be expressed in figures as follows:—

Simple chancres	82
Syphilitic chancres	252

"Thus it is a curious fact which may have some interest in a prophylactic point of view, that *the simple chancre, which is common in the lower classes, becomes rarer and rarer, relatively to the syphilitic chancre, in proportion as we rise in the social scale.*" M. Fournier would explain this fact, on the ground that men of the lower classes most frequently contract venereal diseases from old prostitutes who are already protected by one attack of syphilis from another, but who are still subject to chancroids; while the women who are sought after by the higher classes are commonly younger and fresher, and hence more likely to be affected with true chan-

[1] Traité de pathologie syph. et vén., p. 127.

[2] N. Dict. de méd. et de chir. prat., Paris, t. vii, p. 67.

cres or secondary symptoms, and to convey syphilis to those with whom they have connection. The different habits of the upper and lower classes of society must also have an influence.

Seat of the Chancroid.—The chancroid is most frequently seated in the neighborhood of the genital organs, simply because these parts are most exposed to contagion and not in consequence of any peculiar aptitude which they possess. If chancroidal matter be inserted beneath the epidermis of any other part of the body, a chancroid is equally the result. Nor is this the limit to its seat; it is also found within various mucous canals—as the urethra, vagina, and rectum—opening upon the surface, at as great a depth as these passages can be explored by the senses during life, and post-mortem examinations have been supposed to prove the possibility of its presence in the bladder, though such instances are questionable. The whole external integument, and whatever portions of the mucous membranes are accessible to the implantation of the poison, are therefore exposed to become its seat. The frequency with which it is met elsewhere than upon the genitals, depends in a great measure upon the habits and cleanliness of persons exposed to contagion.

The most reliable statistics as to the seat of the chancroid, in the two sexes, are those of Fournier[1] and Debauge,[2] the former confining his observations to men, the latter to women.

I. FOURNIER'S TABLE (MEN).

Chancroids of the glans or prepuce	347
" on the sheath of the penis	21
" on various parts of the penis, as, for instance, occupying the prepuce and sheath, the sheath and the glans, etc.	24
" on the penis (exact situation not recorded)	25
" " meatus	11
" within the urethra	5
" of the scrotum	3
" on the pubes	3
" " fingers	2
" " upper and inner portions of the thighs	2
" of the anus	1
" " anterior thoracic region	1
Total	445

[1] N. Dict. de méd. et de chir. prat., Paris, t. vii, p. 72.

[2] Thèse de Paris, 1858, p. 62. Statistics collected in the service of M. Bonnarie, at the Hospice de l'Antiquaille, Lyons.

II. DEBAUGE'S TABLE (WOMEN).

Chancroids on the fourchette or fossa navicularis	78
" " labia majora	19
" " " minora	16
" of the meatus (of these 19 extended within the urethra)	21
" in the neighborhood of the meatus	2
" of the vestibule	4
" " clitoris	1
" at the entrance of the vagina (just external to the carunculæ, and between the carunculæ and the labia minora)	17
" of the vagina, behind the carunculæ	7
" " uterine neck	1
" " margin of the anus	23
" in the groove between the nates	5
" of the perinæum	5
" on the internal surface of the thighs	5
" " hypogastrium	2
Total	206

In reviewing these tables, it is worthy of observation how large a majority of chancroids are genital and "peri-genital," or those situated upon or in the neighborhood of the genital organs in both sexes; indeed "extra-genital" chancroids, or those at a distance from the genitals, are mentioned only as rare exceptions. As we shall see hereafter, there is a marked difference in this respect between the chancroid and the true chancre, the latter being found in a much larger proportion upon distant parts of the body. This difference is accounted for by the fact that the chancroid is transmitted almost exclusively in sexual intercourse, while the initial lesion of syphilis, arising as it may from either a primary or a secondary lesion, finds many other modes of origin than the mere act of coitus.

The chancroid is said not to be confined to the normal tissues of the body, but also to affect pathological growths. In a case related by Prof. Breslau, of Zurich, "a simple chancre was developed upon a mass of epithelial cancer attached to the cervix uteri, and the virulent nature of the sore was demonstrated by the successful inoculation of the pus upon the patient's thigh." This case must, however, be received with some reserve, now that we know that the secretion of lesions other than chancroidal may sometimes be auto-inoculated.

A singular exception to the rule that all portions of the body are equally prone to contract a chancroid has been noticed, viz., that this ulcer is rarely met with in practice upon the head, face, or buccal cavity, where, on the contrary, the initial lesion of syphilis is not uncommon. At one time this fact excited no little discussion, since it was supposed to conflict with the distinct nature of the chancroid and syphilis, and to favor the idea that the seat of the contagion exerted an influence either for or against contamination of the general system, and hence that the chancroidal and syphilitic poisons were one.

The important bearing of this question led to an extensive investigation for the purpose of ascertaining if the alleged exemption was founded on fact. Fournier[1] took a prominent part in this labor, and, from a diligent search through medical works, and inquiry of those who made a special study of venereal diseases, was able to collect 150 cases of venereal ulcers upon the head and face, all of which, however, with the exception of 5, were chancres. These five exceptional cases, in which the ulcer was supposed to be a chancroid, had been observed by MM. Ricord, Venot, Devergie, Bassereau, and Diday; but Ricord confessed that his case, an ulceration at the base of one of the superior incisor teeth (figured in his *Iconographie*, pl. 21), was unreliable, and the other four were thought to be imperfectly reported; and thus there could remain no doubt of the rarity of the chancroid upon the region in question.

It has been since ascertained that the chancroid can be developed upon the head and face by artificial inoculation. Puche[2] and Rollet[3] have inoculated its virus with success upon different parts of the head in 20 instances; Bassereau[4] and Prof. Huebbenet,[5] of Kieff, upon the lips and cheeks in five; Robert[6] upon the temple, nose, and lips in three, and in all the sore so produced was entirely free from induration, and was not followed by secondary symptoms—a fact which utterly demolishes the argument of the "unitists."[7]

Still farther, at least two instances of the occurrence of chancroids upon the cephalic region have been met with in clinical experience, in which every precaution appears to have been taken to establish the diagnosis. The first is reported by Fournier himself, from the notes of M. Puche, of the Hôpital du Midi; the sore was situated upon the lower lip, and artificial inoculation of its secretion upon the patient's abdomen, as well as an accidental inoculation upon the patient's thumb, proved successful; no general symptoms showed themselves within seventy-four days from the appearance of the ulcer, during which period the patient was kept under observation.[8] In the second case, observed by M. Rofeta,[9] at Palermo, a serpiginous chancroid, of two years' duration, was situated upon the face, and its secretion was inoculated in five places by M. R. upon himself, with

[1] Étude sur le chancre céphalique, Union méd., Paris, fev. et mars, 1858.

[2] Nadau des Islets, De l'inoculation du chancre mou à la région céphalique, Thèse de Paris, 1858.

[3] Gaz. Méd. de Lyon, Dec., 1857.

[4] Buzenet, Du chancre de la bouche, Thèse de Paris, 1858, p. 41.

[5] Union méd., Paris, 20 mai, 1858.

[6] Nouveau traité des mal. vénériennes, Paris, 1861, p. 380.

[7] Robert's reply to this, that a chancroid may be forced upon the tissues of the head and face by artificial inoculation, but that the same tissues will develop a syphilitic ulcer even from the chancroidal virus, when contaminated *in coitu*, appears to me weak and puerile. What possible difference upon the development of the sore can it make whether the virus is deposited by the surgeon's lancet or by the penis in connection *ab ore?*

[8] N. dict. de méd. et de chir. prat., Paris, t. vii, p. 76.

[9] Gaz. méd de Lyon, 9 juin, 1867, p. 275.

the effect of producing five chancroids, which have not been followed by any symptoms of syphilis during eighteen months that have since elapsed.

I shall content myself with this brief sketch of the discussion relative to the "cephalic chancre," which for a time attracted no little attention, but which assumes less importance now that it is known not to conflict with a duality of poisons. Its only practical bearing is this: that the rarity of the chancroid upon the head and face, furnishes strong ground of belief that any venereal ulcer met with upon this region is syphilitic.

THE CHANCROID FROM INOCULATION.—Thanks to the ease with which the chancroid may be inoculated upon the person bearing it and the safety with which this operation may be performed, we have the rare opportunity of developing this disease at pleasure, and watching its progress from its very commencement. We may plant the seed and observe its growth, and thus obtain a knowledge of its natural history, which we may afterwards compare with the various stages and varieties met with in practice.

Artificial inoculation is usually performed upon the person from whom the matter is taken, and is then called *auto-inoculation;* when practised upon another person it is called *hetero-inoculation.*

How is the operation performed? Some portion of the external integument should be selected which is sufficiently open to observation, and where, if the inoculation prove successful, the sore is least likely to attain a considerable size, or to affect the neighboring ganglia in case its early cauterization, as soon as the purpose of the inoculation has been accomplished, should fail to destroy it.

The experiments of the advocates of syphilization show that the sides of the chest, below the nipples, best fulfil these indications. In this situation chancroids rarely attain a large size, and the axillary ganglia are too far removed to be readily affected.

M. Clerc recommends an ordinary pin as the preferable instrument to be employed, for the following reasons: it is always at hand and may always be had clean; it is not formidable to the patient; it is not likely to make a deep wound, and we find that a superficial insertion of the virus affords greater security against large and troublesome sores.

But for convenience no instrument is better than the common lancet; only be certain of its cleanliness. Moisten its tip with the purulent secretion, and place the point perpendicularly upon the spot you wish to inoculate; with a slight impulse the point is made to penetrate to the derma; the instrument is turned once round on its axis and withdrawn; any remains of the pus upon the instrument is smeared over the orifice of the puncture, and the operation is completed in less time than it has taken to describe it. No after-care is required.

The evidence of a successful inoculation is usually apparent on the following day; sometimes not until after the lapse of two, three, or even four days. The point inoculated is of course reddened from the outset; if the inoculation "takes," a pustule, surrounded by an inflammatory areola, appears within the time just mentioned, and on removing the epidermis

an ulcer is found, penetrating the whole thickness of the skin, its edges abrupt, jagged, and undermined; its outline circular; its floor of a grayish color, and presenting slight elevations and depressions, best seen through a magnifying glass.

If, on the other hand, the pustule be left unbroken, the contained matter concretes and forms a scab of conical form, which increases by additions to its circumference and covers the ulcer beneath, which is being further developed.

The tendency of this ulcer is to extend, at first rapidly, and afterwards more slowly, for several weeks; then comes a period during which no increase is perceptible, and the sore appears stationary; and finally the process of repair is set up, usually commencing at the circumference, and the ulcer closes, leaving a cicatrix which is more or less permanent according to the depth and extent of the preceding ulceration.

As soon as all doubts are removed, the sore should be destroyed, by first removing its secretion and then applying a strong caustic, as the carbo-sulphuric paste, or fuming nitric acid.

From this experiment, which has been performed in many thousand instances with the same result, we are justified in inferring:—

1. That the chancroid has no period of incubation; that the pathological process is set up the moment the poison is introduced beneath the epidermis.

2. That the chancroid first appears as a pustule, but that it essentially consists in an ulcer underlying the elevated epidermis, and presenting the characteristics above stated.

3. That the course of a chancroid may be divided into three stages: the progressive, stationary, and reparative.

4. That the chancroid is capable of healing spontaneously, without the intervention of art.

We shall presently see how far these conclusions are confirmed by cases met with in practice. There should be no marked difference, since the circumstances attending the inoculation and contagion are the same, except that in the former we take care to remove all disturbing influences, and leave the disease to pursue its regular course.

The Chancroid from Contagion.—*Development.*—The first point that claims our attention is the time of development of the chancroid after exposure; in other words, is there an absence of a period of incubation with the chancroid from contagion, as we have found to be true of the chancroid from inoculation? This question becomes more complex as soon as we turn to cases met with in practice; since patients have often had several recent connections, and we cannot tell with certainty which was really the infecting one. Even if there has been but one exposure after a long period of continence, we are still obliged to rely upon the statements of unprofessional persons, often careless in their habits, in our attempts to ascertain the exact time of the appearance of the sore. Their testimony can include only what they themselves have observed, and not necessarily what has actually taken place. The chances are that many of

them will *post*-date the appearance of the ulcer, which was entirely unexpected, and consequently not observed at its commencement.

Yet with this liability to error, we find in the main that the testimony of patients confirms the results of artificial inoculation, and that they represent the time after exposure when their ulcers had attained sufficient size to attract their attention as having been but a few days. Thus, in fifty-two cases in which there had been only a single connection for a long period (three to five months or more), Fournier found that the patients assigned the date when they first noticed their chancroids as follows :—

	Cases.
The first day after exposure	6
The second day after exposure	2
The third day after exposure	9
From the third to the fourth day	4
The fourth day	3
The fifth day	1
The sixth day	3
From the seventh to the eighth day	13
The ninth day	1
The tenth day	2
The eleventh day	1
The thirteenth day	2
From the thirteenth to the fourteenth	3
From the seventeenth to the twentieth	2
Total	52

It appears from this table that the existence of the chancroid was recognized by the patient in 24 cases, from the first to the fourth day ; in 17 cases, from the fourth to the eighth day ; and in 11 cases after the eighth day ; hence that in 41 cases out of 52, or in about 4 cases out of 5, it was seen during the first week, and in only 11 cases at a later period.

With regard to these eleven exceptional cases, Fournier also states that the sore, at the time it was discovered, presented such a degree of development as to show that it had already existed for a number of days, ranging probably from five to twelve.

Taking into consideration the inadvertence and the incapacity of patients as observers, we are therefore justified in concluding that there is the same absence of incubation with the chancroid from contagion that we know to exist with the chancroid from inoculation. And as stated by Ricord, there is still another circumstance to be taken into account ; when the virus is deposited upon the sound integument or mucous membrane, it cannot immediately take effect ; it has first to act as a common irritant, eroding the surface and destroying the epidermis or epithelium ; and only when this is accomplished can it exercise its specific action. But this preparatory work requires time, and by so much delays the appearance of the ulcer. In this manner we can readily explain the rare instances in which the evolution of a chancroid has taken place after an interval of several days following exposure. In point of fact, it has no period of incubation, whether produced by contagion or inoculation.

As we shall see hereafter, this constitutes one important means of diagnosis between the chancroid and the true chancre.

In practice we do not often see the initial pustule of the chancroid, which has usually been ruptured before the patient comes under observation, or the virus may have inoculated some previous solution of continuity; and in such cases we find at the outset either a scab formed by concreted pus when the ulcer is situated upon the external integument, or an open sore when it occupies some moist surface, as the balano-preputial fold or the mucous membrane of the vulva. A rent or abrasion is not necessarily inoculated at once to its full extent; a single point may at first exhibit the characteristic appearance of a chancroid, and the remaining portions be only gradually involved.

Period of Progress.—A chancroid, when fully formed, is usually circular in outline; its edges are abrupt and sharply cut; its floor is uneven and covered with a grayish secretion; the discharge is abundant and purulent; its base presents to the touch the normal suppleness of the underlying tissues; the tendency of the sore is to extend and enlarge its area.

Several circumstances may render the outline of a chancroid other than circular. If a rent or abrasion has been inoculated, the resulting ulcer will naturally at first assume a corresponding shape. If two or more contiguous ulcers have united, the outline may be quite irregular. Certain situations may modify the form of the chancroid; thus, those met with in the furrow at the base of the glans are more oval than circular, probably owing to the facility with which the virus flows along this groove, and macerates and inoculates the tissues in the transverse direction; for a similar reason, chancroids at the margin of the anus and prepuce tend to follow the folds of these orifices. Moreover, the ulcer would appear to extend in whatever direction the tissues are most lax and most readily permeated by the virus; thus, if a chancroid be seated in part upon the glans and in part upon the prepuce, its increase is the more rapid upon the latter, and its outline loses the circular form.

The edges of a chancroid are abrupt and sharply cut simply because the ulcer penetrates the whole thickness of the skin or mucous membrane. The sore is, as it were, punched out of the integumental layer; and as the ulceration readily encroaches upon the lax cellular tissue beneath, the edges are often undermined, and consequently slightly elevated or even everted; during the period of progress they are also somewhat jagged, as if gnawed by the erosion, and are surrounded by an areola which varies in width and depth of color according to the degree of the attendant inflammation.

The floor of the ulcer is uneven, studded with minute elevations, "worm-eaten," and covered, especially at the centre, with a pseudo-membranous secretion of a grayish-yellow color, which cannot be removed without violence. This layer is made up of the disorganized tissues. Under the microscope, it is found to consist: "1, of the elastic fibres of the derma; 2, of the other elements of the integument or mucous membrane, more or

less changed, and reduced, for the most part, to an amorphous and granular mass; 3, of numerous pus-globules." (Cusco.)

The discharge from a chancroid is somewhat abundant, and decidedly purulent; not the pure, creamy pus, however, which we see in the acute stage of gonorrhœa, and from which it may be readily distinguished, but thinner, and often mixed with organic detritus or streaked with blood. Mr. Henry Lee, of London, regards the presence of pus-globules, as shown by microscopical examination, in the secretion of a venereal ulcer free from irritation, as diagnostic of the chancroid. As previously stated, the pus-globules are the vehicle of the chancroidal poison, and the secretion often gives rise by inoculation to successive chancroids in the neighborhood. The condition of the tissues around and beneath a chancroid is one of the most important elements of diagnosis between it and a true chancre. In the former the parts preserve their normal softness and suppleness, unless subjected to some irritant, or attacked by simple inflammation. Inflammatory engorgement, however, is not well defined like the specific induration of the initial lesion of syphilis, but gradually subsides into the normal suppleness of the neighboring tissues; it is also less firm, and of a more doughy feel, and disappears shortly after the cessation of the inflammation which occasioned it. The application of any astringent lotion, or caustic, as nitrate of silver, potassa fusa, nitric acid, and especially corrosive sublimate or chromate of potash, may cause hardness which so closely resembles specific induration, that it cannot be distinguished from it, except by its shorter duration; and, for the time being, the diagnosis must be founded upon other symptoms. In short, as regards the condition of its base, the chancroid does not differ from any simple wound, which, when free from irritation, is soft and supple, but which may became engorged from any of the ordinary sources of inflammation. The fictitious hardness which sometimes surrounds a chancroid is often found after the application of caustics or astringents to mere vegetations, herpetic exulcerations, or other solutions of continuity.

The pain and uneasiness occasioned by a chancroid are usually only moderate, though greater than those attending the true chancre. They are the more severe the more rapidly the ulcer extends, and are heightened by any stretching and laceration of the tissues, or by the application of irritant dressings or lotions. They diminish and disappear as the reparative stage sets in.

The duration of the progressive stage of the chancroid is very variable, and depends very much upon the mode of treatment, the faithfulness of the patient in attending to the sore, and also upon his general condition. It is rarely less than four or five weeks, unless cut short by treatment, and it may be prolonged for months or years by the causes alluded to, or especially by the supervention of phagedæna. The size which the ulcer may attain is subject to equal variations, and dependent upon the same causes; it rarely exceeds that of a twenty-five cent piece, in the absence of phagedæna which has no limit to its action.

Stationary Period.—The progress of a chancroid gradually slackens

and finally becomes imperceptible. For a while the ulcer appears to be stationary. It makes little difference whether this period of inactivity is real, or whether it is merely apparent, as some authors would have us believe; the fact remains the same, that the progressive force of the virus seems to be spent, and the ulcer remains for a while *in statu quo*, prior to any signs of healing. It is evident that this, like the progressive stage, must be variable in its duration in different cases, and subject to the same influences.

Reparative Stage.—This stage is marked by several changes in the appearance of the ulcer. The inflammatory areola, if such has existed, disappears, and the neighboring tissues assume a healthy aspect. The floor of the ulcer also "clears up;" its grayish covering becomes thinner, and is soon replaced by florid granulations which spring up over certain portions of the sore, generally towards the circumference. The edges lose their reddish color, and are less prominent; they can no longer be everted, but become adherent to the subjacent tissues; and their margin, which was "sharply cut," becomes sloping. No decided diminution in the area of the ulceration can be expected until the loss of substance is supplied by granulations. The patient often complains that his sore is no smaller, while the surgeon can see that its floor is approaching the level of the surrounding surface, and that its progress is all that could have been anticipated. But at last, a fine and delicate cicatricial membrane, which is best seen with a magnifying glass, extends from the margin upon the surface of the ulcer. Or, in exceptional cases, this membrane first shows itself at some point within the circumference. Macerated by the discharge, it has a whitish look, and resembles a fragment of lint which has not been removed at the last dressing; but at the subsequent visits of the patient it is found to be still present, gradually increasing in size until it becomes continuous at some portion of its periphery with the margin of the sore, and it thus contributes towards the final closure of the wound.

It was at one time supposed that a chancroid was contagious only during its progressive and stationary periods, and that its virulence ceased either with, or soon after the commencement of the reparative stage. Fournier's experiments, however, have shown that such is not the case, and that even when the ulcer is already far advanced towards cicatrization, the thin and barely purulent secretion from its surface may sometimes be inoculated with success, as shown by the following table:—

Fournier's inoculations during the reparative stage.	Result positive.	Result negative.
1. This stage fairly established	9	3
2. This stage well advanced	3	0
3. This stage nearly completed	2	5

It is thus evident that it is never safe to allow patients with chancroids to indulge in sexual intercourse until the ulcer has completely closed.

The work of cicatrization being once accomplished, however, the chancroid is at an end; without a fresh contagion there can be no subsequent relapse or reopening of the sore with its former virulence, as is sometimes

seen with the true chancre. The cicatrix may be torn or abraded at will, only a simple wound can be reproduced, and not a virulent ulcer, and this simply for the reason that there is no constitutional infection behind the local sore to regenerate the virus.

The scar left by a chancroid varies in its character and its permanency according to the extent and depth of the ulceration, and also, in a measure, according to its situation. As a chancroid is usually more destructive in its action than the chancre, so the former is much more likely than the latter to be followed by a cicatrix. Upon the external integument this cicatrix is often permanent; upon a moist mucous membrane it frequently fades away and soon becomes effaced, unless the ulceration has produced a loss of substance which has not been filled up during the reparative stage.

Number of Chancroids.—Patients are much more frequently affected with several than with a single chancroid. Thus, in 327 cases, observed chiefly at the Hôpital du Midi, only 63 patients had a single ulcer, or about one in five. Of the remaining 266, there were—

Presenting two	50
" from three to six	152
" " six to ten	45
" " ten to fifteen	8
" " fifteen to twenty	5
" " twenty to twenty-four	6
Total	266

Of 118 men who were admitted at the Antiquaille Hospital, Lyons, M. Debauge found—

Presenting a single ulcer	50
" two	22
" four	11
" five	11
" from six to ten	17
" " eleven to fifteen	6
" twenty	1
Total	118

Sometimes the chancroid is multiple from the first; more frequently it becomes so by successive inoculation of points in the neighborhood of its original site. The first ulcer pours out an abundant secretion, and its presence confers no immunity against others. We shall see hereafter how opposite is the case with the true chancre, the initial lesion of syphilis.

The chancroid is multiple from the outset only when several points have been inoculated at the time of contagion. It is evident that certain regions will militate either for or against successive inoculation. Thus, if the sore be situated upon the external integument, as the sheath of the penis, the virus is not likely to find a door of entrance within the hardened epidermis of the surrounding surface. On the other hand, if it be seated at the base of the glans, its secretion will extend along the furrow, mace-

rate the thin epithelium, and will generally occasion successive inoculations, especially in cases complicated with phimosis.

M. Clerc[1] states that successive chancroids are generally mild in their character compared with the original sore; that they usually occupy a less extent of surface, and that they tend to heal more speedily; and I think, judging from my own observation, that this rule will be found to be true generally, although not invariably.

Condition of the neighboring Ganglia.—In the majority of cases of chancroid, or, as nearly as we can determine by statistics, in about two cases out of three, the neighboring lymphatic ganglia remain intact throughout the whole course of the disease. In the remaining minority, these bodies take on inflammatory action, either *first*, as the result of the extension of simple inflammation from the local ulcer along the course of the lymphatics, or *secondly*, in consequence of the absorption and conveyance to the ganglion of the chancroidal virus. In the former case (inflammatory or simple bubo), resolution is possible without suppuration; in the latter (virulent bubo), suppuration is inevitable. Of 207 cases of chancroid observed at the Hôpital du Midi in one year, 65 were attended with bubo, and 142 were not.[2] Of 140 patients in the service of M. Rollet, at Lyons, 57 were free from inguinal reaction, while 83 had buboes, of which 60 were virulent.[3] We shall see hereafter that the initial lesion of syphilis is always attended with *induration* of the nearest lymphatic ganglia, which rarely become inflamed and suppurate, and it cannot be too often impressed upon the mind of the student that an examination of the ganglia in the neighborhood of a venereal ulcer affords assistance of the highest value in distinguishing a chancroid from primary syphilis.

Varieties of the Chancroid.—There is a form of the chancroid called by M. Clerc the *exulcerous*. In this variety, the sore is little, if at all, depressed below the level of the surrounding surface, and consequently its edges are not perpendicular and sharply cut. Otherwise its appearance is the same as already described; its floor is irregular, and covered with a grayish secretion; its discharge abundant and purulent, and its base soft. This variety is sometimes observed on the margin of the prepuce, in cases of phimosis with concealed chancroids at the base of the glans.

Again, the chancroids may vegetate above the surface, and constitute one form of what has been described as the *ulcus elevatum*.

When the virus has gained entrance within a follicle, and inoculated its internal surface, the chancroid may at first appear like a pustule of acne indurata. Ulceration soon commences at a minute point upon the surface, and gradually extends until it lays open a sore presenting the usual characteristics of a chancroid. This variety is known as the *follicular form*. Cullerier depicts a number of such sores upon the external surface of the

[1] Traité pratique, p. 182.

[2] Fournier, op. cit. p. 34.

[3] Debauge, op. cit. p. 72.

labia majora and inner surface of the thighs.[1] This is an important variety of the chancroid, liable to be overlooked, and should be borne in mind by the student.

The *ecthymatous* form is nothing more than a chancroid which, from exposure to the air, has become covered with a scab, composed of its dried secretion. It is evident that this form is not likely to be met with except upon the external integument.

The form of the chancroid may be modified by its seat, as will be described in the next chapter.

Diagnosis of the Chancroid.—In the great majority of cases, a chancroid is readily recognized by a practised eye, from its various symptoms already described; yet there is not a single one of these symptoms which may not be found in lesions of an entirely different nature.

It was formerly supposed that an unfailing and absolute test of a chancroid was to be found in its experimental inoculation upon the person bearing it; if auto-inoculation properly performed was successful, it was inferred that the sore *must be* a chancroid; if unsuccessful, it could not be. We cannot now rely upon this test so implicitly, for reasons that will be obvious to the reader of the preceding pages; at the same time, the *ready* auto-inoculation of any sore affords a strong ground of probability that it is of this nature.

The method of performing artificial inoculation has already been given, and I have only to add a few precautions concerning it. In the first place, while this experiment is of great practical value, and, if properly performed, usually devoid of danger, yet it should not be rashly resorted to, and should only be employed either for the benefit of the patient or the interests of science. In careless hands, very troublesome and even serious results have been known to follow. I have myself seen two such cases; one in the New York Hospital, in which artificial inoculation, performed before the patient's entrance, had given rise to an extensive ulcer upon the thigh of several years' duration; and another similar case in the Pennsylvania Hospital, Philadelphia. Other cases are reported in works on venereal. Such evil results may, I believe, be avoided by observing the following simple rules:—

1. Avoid artificial inoculation in all cases of phagedenic ulcers, and in all persons of a broken-down constitution, for fear that the inoculated point may take on ulcerative action which will be beyond the control of caustics.

2. Avoid artificial inoculation, unless you are reasonably certain of having the patient under your continued observation. Hence this method of diagnosis may be used much more freely in hospitals than in private practice.

3. Select as a site for the inoculation some portion of the integument, as the chest, where experience proves the occurrence of phagedæna to be rare.

[1] Cullerier and Bumstead's Atlas, Pl. ix, fig. 1.

4. Make your incision no deeper than the surface of the vascular layer of the skin, for a reason previously given.

5. Thoroughly cauterize the inoculated point with a strong caustic, as nitric acid or the carbo-sulphuric paste, as soon as the diagnosis of a resulting chancroid can be made.

The value of this test depends, of course, upon the thoroughness of its application. Unless the matter be implanted under the requisite conditions, it cannot take effect.

Other points of distinction between the chancroid and those lesions most apt to be mistaken for it now claim our attention.

An abrasion due to violence during coitus will be recognized by the patient himself—unless intoxicated—either at the time of its occurrence, or during those reflective moments which follow the exposure.[1] Independently of its history, an abrasion may often be recognized by the jagged outline of its edges and by the appearance of its surface and its secretion, differing as they do, from those of a chancroid already described. Subsequent neglect, a low condition of the general system, the accumulation of filth or even of the natural secretion of the part, may perpetuate the solution of continuity thus made, and transform it into an ulcer which can with difficulty be distinguished from a chancroid; and the diagnosis can only be made either by artificial inoculation or by waiting for farther developments, at the same time paying attention to cleanliness and to general hygiene. "But," it may be said, "an abrasion occurring at the time of coitus may have served as the door of entrance either to the chancroidal or syphilitic poison." Very true; and consequently when a patient seeks advice, a few days after coitus, with a solution of continuity evidently due to violence, the surgeon can only estimate its present but not its future character. Under such circumstances, a guarded opinion only should be given, as for instance, "You have torn yourself in the sexual act; but whether you have been inoculated or not through the rent, I cannot say; time will determine." A mere abrasion or tear, in a healthy constitution, and under conditions of cleanliness, will heal in the course of a few days; while an abrasion inoculated with the chancroidal virus will extend and assume the character of a chancroid.

An eruption of herpes usually appears on the first or second day after exposure, is attended with itching, and consists of a number of small vesicles which are arranged in one or more groups affecting the form of a circle. The contained fluid soon becomes turbid, and if the epidermis be ruptured or removed, a superficial ulceration is found beneath. With attention to cleanliness and the interposition of a piece of dry lint between the glans and prepuce, the vesicles or erosions will usually heal in the course

[1] There is an old adage bearing on this point commencing "*Omne animal post coitum triste est*," etc., which the able reviewer of the last edition of this book in the Am. Jour. Med. Sci. corrects me in having attributed to Aristotle, of whom, however, it would have been worthy. The reviewer is shocked at the allusion to this adage in a scientific book, and I will therefore refer to his own article in the Am. Jour. Med. Sci., Jan. 1871, where he gives the text in full.

of a few days. Their circular arrangement, small size, watery contents, superficial character, the pruritus which they occasion, and their speedy cicatrization, present a marked contrast to the symptoms of the chancroid. Again, in many cases, we find on inquiry that the patient has been subject to herpes, which recurs upon the slightest provocation, as after coitus with any woman however pure, or after dining out or indulgence in wine, and in some instances without apparent cause.[1] The discovery of this fact should put us upon our guard, and lead us to resort to other means of diagnosis in doubtful cases. The diagnosis between herpes and the chancroid may, therefore, be said in general to be easy; but, as noticed by Fournier, there is a rare form of herpes consisting of a single and somewhat excavated ulceration, which very closely resembles a chancroid, and which in some instances cannot be distinguished from it except by inoculation.

I shall defer the consideration of the diagnostic signs of the chancroid and chancre until I come to speak of syphilis.

With regard to mucous patches, which are so often seated upon the genital organs, their superficial character, the history of the case, and the coexistence of other secondary symptoms are commonly sufficient to enable us to distinguish them.

There is another class of cases, fortunately uncommon, in which the diagnosis is less easy, and which sometimes occasion much annoyance. I refer to old syphilitic patients, who have probably advanced to the tertiary stage of the disease. These men occasionally make their appearance with an ulceration closely resembling a chancroid, with sharply-cut edges, a grayish excavated floor, an abundant purulent secretion, and a soft base, which I have seen most frequently in the furrow at the base of the glans where it tends to undermine the integument of the penis. It also occurs on the surface of the glans and at the meatus. The glands of the groin are not affected. On inquiry you find that the patient has not presented any syphilitic symptoms for months or even years, and examination of other parts of the body may fail to show any evidence whatever that the poison is still active. Very likely, also, the man is of dissipated habits and has frequently been exposed of late in promiscuous intercourse, so that chancroidal contagion is highly probable. All the circumstances, therefore, except, perhaps, the fact that the sore is solitary in a region where the chancroid is almost always multiple, point to the simple chancre; and yet if you treat it as such with caustics, cleanliness, astringent lotions, etc., you fail utterly, but it heals under the mixed constitutional treatment of iodide of potassium and mercury.

I have one patient in mind, in whom these symptoms occurred some four to six times during a period of several years, the last time six months after his marriage, during which I have reason to believe that he had not been exposed to contagion. Another instance is that of a medical man, who has had three attacks of the kind. When I first met with these cases, I

[1] Dr. A. Doyon has written an interesting monograph on this form of herpes, entitled De l'herpès récidivant des parties génitales, Paris, 1868.

was quite at a loss regarding them, but further study of numerous cases has shown them to be ulcerated gummata of the glans.

In arriving at a diagnosis of the chancroid, as well as of other venereal diseases, especially in their early stages, the value of the confrontation of patients should not be forgotten. The recipient can have no other disease than that possessed by the giver, in whom the symptoms are probably more marked, because they have had a longer time for development.

I would also call the reader's attention to the possibility of the double inoculation of the chancroidal and syphilitic poisons, or to what has been improperly called the "mixed chancre," which we shall consider hereafter; and again to the occasional development of a chancroid upon the old induration of a chancre, which is very apt to lead to error in the diagnosis, on account of the hardness of the base of the sore.

After all, cases do occur, in which auto-inoculation is impracticable, and in which the diagnosis is for a time impossible. A degree of rapidity and facility in diagnosis with regard to venereal diseases, is often demanded by patients and even by physicians, which it is simply unreasonable to expect. The specialist is expected to be able to decide at once in all cases, from a single examination, and often with a very imperfect knowledge of the history, whether a given sore is a chancroid, a chancre, an herpetic ulceration, etc. Now, the same latitude should be allowed here as obtains in other diseases. Doubtful cases will occur, with regard to which the most experienced specialist must for a time be undecided, and he will, if an honest man, confess his ignorance rather than assume knowledge which he does not possess.

It is important to distinguish between the chancroid and epithelioma or cancer of the penis. I was called in consultation by a country physician, to see a case of supposed venereal ulcer of the glans penis. The patient was a married man, and, the diagnosis of his doctor having become known, his reputation was ruined. I found it to be a case of epithelioma, and amputated the organ.

Epithelioma is more frequent than true cancer, in the proportion of five to one (Demarquay). In the majority of cases, it commences in the glans or prepuce, and may extend to the corpora cavernosa or involve the whole penis. The glands in the groin are subsequently engorged, and become deeply and extensively ulcerated.

Epithelioma usually commences as an irregular warty excrescence, which soon ulcerates, and presents, at first, superficial erosions covered with sanious matter. There follow deep and irregular excavations and cauliflower excrescences. The surrounding skin is tumefied and scattered over with tubercles, which in their turn become degenerated and add to the extent of the disease. "By pressure upon these papillary tumors, plugs of flattened or cylindrical epithelial cells, resembling the sebaceous matter of comedones, can be squeezed out." (Klebs.)

True cancer may be either of the scirrhous or encephaloid form, but more frequently the latter. Lebert says that in most cases the form is intermediate between the two. True cancer may at the same time affect

distant organs, while the influence of epithelioma is never seen beyond the inguinal glands. In a large majority of cases, these affections occur in persons who have permanent phimosis, either congenital or accidental.

The distinction between epithelioma and true cancer on the one hand and the chancroid and truly syphilitic lesions on the other, is not always easy. The amount of pain is *not always* a reliable sign, for this may be absent for some time even in true cancer. The diagnosis, however, may usually be made out from the history of the case, from the appearance of the surface, base, and edges of the ulcer, and from its progress. In doubtful cases, the patient should have the benefit of a trial of treatment adapted to venereal ulcerations (whether chancroidal or syphilitic) before amputation is resorted to.

Prognosis of the Chancroid.—The chancroid, aside from its complications, is of less serious import than either the chancre or gonorrhœa; less so than the chancre, because it does not depend upon and is never followed by constitutional infection, and less so than gonorrhœa, because it does not result in deep-seated urethral contractions. A chancroid at the meatus will indeed probably produce a stricture at this point, but one which is amenable to treatment and unattended with danger.

The presence of complications may add seriously to the gravity of the disease. Phimosis may result in gangrene and loss of the prepuce. Lymphitis or adenitis may confine the patient to his bed for months; and, above all, the occurrence of phagedæna may involve the destruction of important tissues or organs, or be the source of misery and suffering for many years. These complications will be described in another chapter.

The chief point, however, which commonly excites the anxiety of the patient is with regard to constitutional infection, and of this the surgeon may assure him there is no danger.

Pathological Anatomy.—Kaposi[1] gives the following description of the microscopical appearances of the "soft chancre" (chancroid):—

"Microscopical examination of a perpendicular section, including the margin, the inflamed parts in the neighborhood, together with a portion of the floor and the inflamed base of the ulcer, shows that the portion of the skin occupied by the chancroid, consists of two parts, which have evidently undergone different anatomical changes.

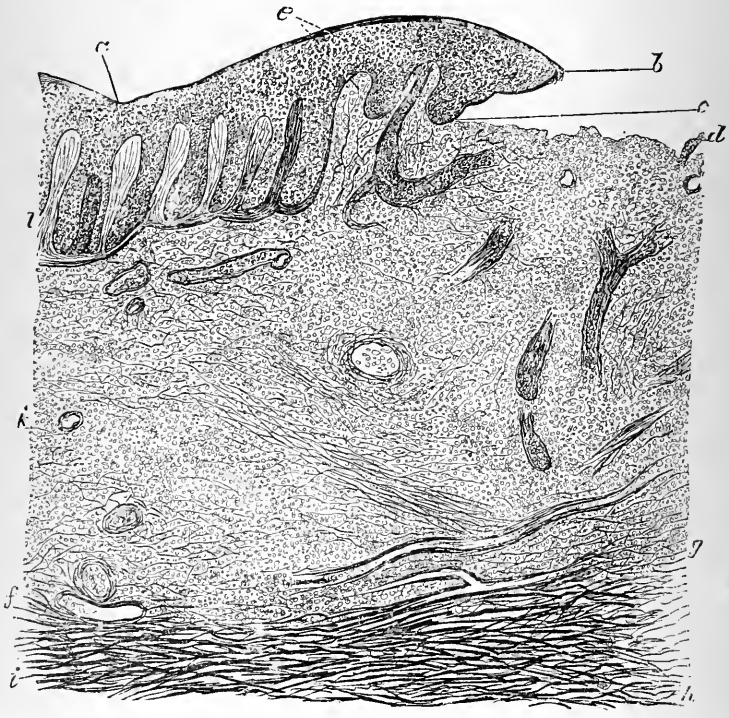
"From the floor of the ulcer (Fig. 112, *cd*) to a considerable depth in the corium is a uniform and uncommonly thick cell-infiltration, which terminates sharply at the line *fg*. This infiltration is continued beneath the intact papillæ of the margin of the ulcer (*el*), and laterally far beyond the limits of its floor (*k*). The tissue bordering on the infiltrated mass (*fg*, *hi*) is composed of loose meshes, and exhibits scattered cells with a large nucleus, that is well brought out by carmine.

[1] Syphilis der Haut und der angrenzenden Schleimhäute, 1 Lieferung, s. 42, Wien, 1873.

"In the swollen margin (*ab*) a number of the papillæ (*e*) lying nearest to the floor of the ulcer are thickened and closely infiltrated with cells. The layer of Malpighian cells between these papillæ is thickened.

"The floor of the ulcer (*cd*) is formed by the exposed, cell-infiltrated corium, and is destitute of papillæ. Both the corium and papillæ, wherever infiltrated with cells, exhibit numerous enlarged vessels, the most of which are bloodvessels, but a few are lymphatics.

Fig. 112.



Section of a chancroid. Hartnack, oc. 3, obj. 4. (After Kaposi.) *ab*, swollen margin of the chancroid. *cd*, floor of same. *bc*, epidermis. *c*, undermined border. *cd*, *fg*, tissue infiltrated with small cells and traversed by several dilated vessels. *fg*, *hi*, tissue subjacent to the base of the chancroid, composed of large œdematous meshes free from cellular infiltration. *e*, enlarged papillæ infiltrated with cells. *k*, continuation of the tissue infiltrated with cells beneath the papillæ at the margin of the ulcer, which still remain intact.

"Under a high power, the cell-infiltrated portion consists of a close network of partly narrow, partly broad, bundles of fibres with faint contours, in which is deposited a great number of nucleated and evenly distributed cells, some of them very large and resembling lymph-corpuscles, and others smaller. The cells lying near the floor of the ulcer and the neighboring parts are mostly small and irregular in outline, with scattered nuclei. Free nuclei and nucleoli are also found in large numbers.

"In the deeper tissues the cells have generally the appearance of inflammatory-cells, but there are also many smaller ones.

"Of great interest is the remarkable thickening of the walls of the vessels, the cavities of which appear to be enlarged both in the infiltrated and the neighboring œdematous portions.

"The degeneration of the tissue and of the infiltrated cells takes place only in the upper portion, and to an extent which is but limited in proportion to the extent and depth of the infiltration. Interstitial abscesses do not exist. We have not found any characteristics which would enable us to distinguish the cell-infiltration of the corium and papillæ or the subsequent degeneration of the same from similar processes of simple origin."

TREATMENT OF THE CHANCROID. *Prophylaxis.*—The use of a condom will protect those parts which it covers from contagion, but the neighborhood of the root of the penis, as the scrotum and pubes, will still be exposed. As Ricord was wont to express it in his lectures, "carrying an umbrella over the head in a rainstorm will not prevent the feet from getting wet." Whether any such protective covering has been used or not, the genital organs should be assiduously cleansed after any suspicious connection, especially in those folds, as in the furrow at the base of the glans, where contagious matter is most likely to be deposited.

General Treatment.—The internal use of mercury has no beneficial influence whatever upon the chancroid, which continues in a state of stubborn persistency, or even progresses, after the system is fully under the influence of this mineral. This statement is not a mere inference from the distinct nature of the chancroid and syphilis, but is founded upon experience. I was fully convinced of the fact by personal observation, and ceased to employ mercury for "soft chancres," several years before the distinction between the two species was recognized. Since abandoning it in my own practice, I have had numerous opportunities of observing other surgeons administer mercurials for the chancroid, and my former opinion has only been confirmed.

In most instances no *general* treatment is required, except that which common sense would dictate, and which has for its object to place the patient in a healthy condition and thereby enable nature untrammelled to accomplish the work of cure. For this purpose, the secretions should be attended to; a plain but nourishing diet administered; and congestion and inflammation avoided by maintaining a comparative state of quietude. Nocturnal erections are not only painful but interfere with cicatrization, and should be controlled by the means mentioned when speaking of chordee.

Abortive Treatment.—This treatment has for its object the removal or destruction of the virulent ulcer, and the substitution for it of a simple wound, the tendency of which shall be to heal. The removal of the ulcer is accomplished by cutting instruments; its destruction by the more powerful caustics.

Practically, we find that the *excision* of a chancroid is rarely successful. However carefully the sore and the surrounding surface may have been cleansed of its secretion before the operation, the fresh wound usually be-

comes inoculated; either the incision has not been carried wide enough from the "sphere of specific action," or in spite of our precautions, some of the virus has remained upon the surface; and we now are worse off than before, because we have a large virulent ulcer instead of a small one. For this reason, excision should be employed only in certain situations, as in cases of chancroids upon the margin of the prepuce or the free border of the labia minora, where the knife or scissors can be carried wide of the ulcer, and the bleeding surface should be freely cauterized, so that it may for a time be protected by an eschar.

Destructive cauterization is much more frequently employed than excision; *but is only adapted to the early stage of the chancroid*—say within the first five or ten days of its existence—when it may act as a true "abortive" method, cutting short the duration of the ulcer, preventing inoculation of parts in the neighborhood, and averting all danger of ganglionary reaction. A few years ago it was much more frequently resorted to than at the present time, and patients were subjected to much suffering from which they might have been spared. The chancroid under proper attention to cleanliness and mild local applications, will in the great majority of cases soon take on reparative action, and with the discovery of the healing power of iodoform, we are now able to obtain even better results than formerly, when cauterization was the rule and not the exception in treatment. In private practice, I do not recollect having applied a strong caustic to a chancroid five times within a year. *Let it be understood then, that destructive cauterization as an abortive method is recommended solely in the earliest stage of the chancroid.*

If applied sufficiently early, it prevents the occurrence of virulent buboes by removing the source from which the poison enters the lymphatics; but if deferred until a bubo has commenced, the latter goes on to suppuration unchecked, and may furnish inoculable pus in the same manner as if the chancroid had been allowed to remain. Even the simple bubo is often benefited by destruction of the ulcer and undergoes resolution.[1]

Destructive cauterization is impracticable when the chancroid cannot be fully exposed, as in consequence of phimosis, concealment within the urethra, os uteri, etc. It is inadmissible in ulcers situated directly over the urethra either in the male or female on account of the danger of opening this passage; for a similar reason, in chancroids of the deeper portions of the vagina, the walls of which are in contact with the bladder, rectum, or peritonæum; in those upon the margin of the meatus, from the fear of the cicatrix occasioning stricture; and, finally, in all cases in which the presence of other ulcers in the neighborhood, which cannot be subjected to the same treatment, would expose the wound after the fall of the eschar to a second inoculation.[2] Thus it would be useless to attempt the destruction of a chancroid upon the margin of the prepuce in a case of phimosis

[1] Rollet, Gaz. méd. de Lyon, March 1, 1858.

[2] De la méthode destructive des chancres, par M. Dron; Annuaire de la syph. et d. mal. de la peau, Paris. Année 1858, p. 202.

with concealed chancroids within, since the secretion from the latter would be sure to inoculate the wound after the slough comes away.

If the application of the caustic has been successful, a healthy granulating wound will be left on the fall of the eschar. If the sore still present the appearance of a virulent ulcer, even only over a portion of its surface, the caustic should be reapplied.

Choice of a Caustic.—Works upon materia medica inform us that the nitrate of silver is superficial in its action, and incapable of affecting the tissues beyond the surface to which it is applied, yet this is the caustic selected by the great majority of the profession for the purpose of destroying a chancroid! Let a patient with a rent, abrasion, or ulceration following suspicious intercourse, apply to any one of four doctors out of five, "as doctors run," and his sore will be daubed with a stick of *lapis infernalis*. With what result? The part is irritated and the patient's suffering increased; the symptoms are obscured and an accurate diagnosis rendered for a time difficult or impossible; if the sore heals, the nitrate has the credit of destroying a chancroid, or, perhaps, of "preventing constitutional infection;" at any rate the patient's mind is relieved by the idea that "something has been done," and the surgeon may flatter himself that *he* has *done* his duty. I feel tempted to apply to this indiscriminate and senseless mode of practice the adjective which, in Latin, is given to the "lapis" employed!

The stick nitrate of silver is capable of destroying a chancroid only in the very earliest stage of its development, and even then cannot be relied upon with the same certainty as the stronger caustics. Still it has been used with success by Ricord and others for the destruction of the sore resulting from a successful artificial inoculation. If employed for this purpose, the epidermis covering the pustule should be removed, and the cavity thoroughly cleansed of its secretion. A sharpened crayon of the nitrate should then be bored into the surface of the underlying ulcer, or a small fragment from the extremity of the crayon be broken off and be fastened in place by means of a strip of adhesive plaster. This dressing may be removed at the end of forty-eight hours, and the wound be subsequently protected by plaster or a bandage.

Of the strong caustics which are of more general application, the most noteworthy are the sulphuric and nitric acids, chloride of zinc, Vienna paste, the pernitrate of mercury, and the actual cautery.

Of these, frequent trials have led me to give the preference to sulphuric acid, in the combination which has been so highly recommended by Ricord, Cullerier, and others, and which is known as the "carbo-sulphuric paste." This paste is easily prepared by simply saturating willow charcoal with strong sulphuric acid. The ingredients should be mixed in a glass-stoppered bottle, which should be kept standing in a tumbler to receive the moisture which is apt to collect around the stopper and flow over upon the sides of the bottle. The paste is to be applied by means of a glass rod, or a glazed crockery spatula. The advantages of this paste are the facility with which it enters every nook and crevice of the ulcer, the thorough-

ness with which it does its work, and especially the fact that it forms a dry scab, which, together with the slough beneath, is very adherent, and often remains until the sore is nearly healed. Meanwhile, the secretion is so diminished that the dressings require but infrequent changes, and the danger of successive inoculations in the neighborhood is materially lessened. The chief objection to it is the pain produced by its application, which is decidedly greater than that from nitric acid. A patient who had recently tried both at a short interval, told me he thought "the paste hurt him eight or ten times as much as the acid," but the former accomplished what the latter had failed to do.

Nitric acid is preferably applied by means of a glass rod with a rounded extremity; a "drop bottle," with a tapering glass stopper, the point of which extends nearly to the bottom of the flask, is still more convenient; but a simple piece of wood, as an ordinary lucifer match, will answer. Brushes of fine glass are objectionable, since the filaments are liable to break off upon the surface of the sore and excite irritation. The pain is for an instant severe when the acid first touches the ulcer, but becomes much less acute on subsequent applications, of which there should be several in order to render the destruction complete. I usually occupy several minutes in making these applications, watching the effect produced, and judging by the changes which take place in the tissues when enough has been applied. Any residue should be carefully removed or neutralized by an alkali, and the neighboring surfaces be protected from contact by the interposition of dry lint. A water dressing may be substituted as soon as suppuration takes place.

The liquor hydrargyri pernitratis may be applied in a similar manner; I am not aware, however, that it possesses any advantages over nitric acid, and it is attended with some danger of producing salivation or even alarming symptoms of mercurial poisoning, although the surface to which it was applied may have been quite small in extent. Such an occurrence is rare, but none the less to be avoided, as may be seen from a case reported in the London Lancet for Jan. 3, 1874, p. 41.

Potassa cum calce made into a paste and spread upon the chancroid, where it is allowed to remain from five to fifteen minutes, is another convenient means of applying the destructive method.

A valuable caustic, judging from the high encomiums bestowed upon it by many French surgeons, especially of the Lyons School, is to be found in "Canquoin's paste," composed of equal parts of chloride of zinc and flour, which was first recommended for the destruction of the chancroid by MM. Rollet and Diday.

The use of the actual cautery in the treatment of chancroids had been almost abandoned, when it was recently revived by Dr. Henry G. Piffard,[1] of New York, who employs a piece of platinum wire bent upon itself and brought to a white heat by a small galvano-cautery battery. In seven cases to which it was applied at the Charity Hospital, the duration of the

[1] Archives of Clinical Surgery, Nov. 1876.

lesion varying from a few days to several months, the average time required for the healing of the sores is said to have been eleven and a half days—surely a very satisfactory result. Paquelin's thermo-cautery is also a convenient apparatus for the purpose.

Local Applications.—As already remarked, most chancroids will heal under attention to cleanliness and suitable local applications and dressings.

A point of no little importance is to place the ulcer under such conditions as to favor a return of blood from the part. Thus, if it be seated on the genitals, and especially if it be of considerable size, it will be well to keep the patient in the recumbent posture with the hips elevated by means of a pillow. If it be on the penis, this organ should be kept elevated upon the abdomen both during day and night. Friction of the clothes and nocturnal erections should, if possible, be avoided.

It is evident that the form of dressing must vary with the situation of the sore. If the latter is seated between two opposed layers of mucous membrane, as in the balano-preputial fold or within the vulva, a dry dressing will be the best, and will be kept sufficiently moist by the secretion of the part. If the sore is upon the external integument, the dressing must be kept wet, otherwise it will adhere to the surface; the patient will shrink from changing it as often as is necessary; and the violence done to the ulcer by its removal will open new fissures to be inoculated by the virus.

The advantages of dry lint are not generally appreciated. *There is no better dressing for most chancroids situated upon mucous membranes.* Obtain the "patent lint" so called, and tear it into shreds: place a mass of this charpie over the ulcer and draw the opposite fold of mucous membrane over it. The "prepared absorbent cotton," now obtainable of druggists, is also excellent. The sore is thus isolated, and the lint absorbs the discharge as fast as it is secreted; of course the dressing should be changed before it becomes soaked. The only obstacle in the way of this form of dressing is the false idea of the patient that some "wash" is required.

Patients often inquire whether they should cleanse the sore at the time of changing the dressing. I commonly tell them that it is better, with a piece of soft lint and without friction, to absorb any moisture or discharge upon the surface around the sore, but to let the sore itself alone. If the dressing is changed with sufficient frequency, the ulcer will not require any extra cleansing.

With chancroids upon the external integument we must use some lotion to keep the lint moist; but this object is attained with much greater ease in some situations than in others. If the sore is on the body of the penis, it is easily covered with a fragment of lint soaked with whatever lotion is employed; a narrow strip of rag moistened with water is then wound around the organ, a similar strip of oiled silk is added, and the whole retained in place by a double-tailed bandage. With chancroids upon the margin of the prepuce the dressing is apt to slip off, but may be kept in place by means of an ordinary condom. With sores upon the external

surface of the labia majora, upon the perinæum in both sexes, etc., the ingenuity of the surgeon may be taxed to keep them moist and clean.

As a local application to the surface of the ulcer, nothing has been found equal to iodoform. It acts as a sedative to relieve pain and irritation, and, of still greater importance, it clears off the sloughy surface of the sore and covers it with "healthy" granulations. It should be reduced to a fine powder by trituration, either with or without the addition of an equal quantity of sugar of milk, which facilitates its minute subdivision, and be sprinkled at each dressing over the surface of the sore, until the latter has assumed a granulating appearance, when it should be omitted. Still more convenient is a solution of iodoform in ether, one-half drachm or a drachm of iodoform to an ounce of ether (which partially removes the unpleasant odor). This is to be painted over the ulcer with a camel's hair brush. The ether evaporates, and leaves a thin yellowish pellicle of iodoform on the surface. Dr. John Ashhurst, Jr., recommends it in the following form:—

℞. Iodoformi ʒss 2
Glycerinæ ʒvj 30
Spt. Vini Rect. ʒij 8
M.

The only objection to the use of iodoform is its bad odor, but this must be endured for the sake of the benefit it affords. I have tried it with the addition of an equal part of tannin, as recommended by Dr. Cole, of Hot Springs, Ark. This mixture is indeed much less odorous, but it cakes on the surface of the sore and does not act well. In the following preparation the smell of iodoform is almost entirely masked:—

℞. Iodoformi ʒss 2
Ung. Petrolei ʒj 30
Ol. Menth. Pip. gtt. vj 40
M.

When the objection to the smell of iodoform is insuperable, I order:—

℞. Hydrarg. Chloridi Mitis ʒij 8
Hydrarg. Protiodidi ℈ij 2 60
Cretæ Precip. ʒj 30
M.

Whichever of these applications has been made, the subsequent dressing is to be applied according to the rules above given—dry lint to chancroids situated on moist mucous membranes; wet lint covered with oil-silk to those on external surfaces.

Next to iodoform, a solution of the nitrate of silver, about fifteen grains to the ounce, is probably the best application, the lint which is to be placed upon the sore having first been soaked in it. Other formulæ are as follows:—

℞. Acidi Carbolici ʒi–ij . . . . . 4—8
Aquæ Oj 500
M.

℞. Balsam. Peruvian. ℥ss 15
Argent. Nit. Cryst. vel
Cupri Sulphat. gr. iij 20
M. (Zeissl.)

℞. Ferri Potassio-tart. ℥ss 15
Aquæ ℥vj 180
M. (Ricord.)

℞. Acidi Tannici ℈j 1 30
Aquæ ℥vj 180
M.

℞. Liquoris Sodæ Chlorinatæ ℥j . . . 4
Aquæ Puræ ℥ij 60
M.

℞. Acidi Nitrici Diluti ℥j. 4
Aquæ Puræ ℥viij 250
M.

℞. Vini Aromatici ℥j 30
Aquæ ℥iij 90
M.

A formula for a convenient substitute for the French aromatic wine may be found on page 204. The strength of these lotions must be adapted to the sensibility of the part, which varies in different cases. They should never be so strong as to excite pain or produce irritation.

The black wash, composed of from one to three scruples of calomel to four ounces of lime-water, is a favorite application with many surgeons. The dark-colored sediment in this mixture is an oxide of mercury, and is inert unless it affords mechanical protection to the sore. In my opinion, black wash is a less cleanly and less desirable lotion than those before mentioned. A solution of the disulphate of quinine (gr. j ad ℥j) with just enough dilute sulphuric acid to dissolve it is recommended by Mr. Nunn (London Lancet).

A fact too little known, or too little appreciated by the profession, is that ointments of whatever kind are not only useless but positively injurious on account of their tendency to become rancid. They should never be employed unless, from the position of the sore, or from the necessarily long intervals between the dressings—as at night or during a journey—the evaporation of a water dressing cannot be prevented, even with the assistance of oiled silk and glycerine.

Mercurial ointment, although very commonly used in Sigmund's wards in Vienna, is, in my opinion, especially objectionable. Zeissl also regards it with disfavor, and prefers the glycerite of starch. One of the following formulæ may be used in the rare instances in which an unctuous dressing is required:—

℞. Ung. Petrolei ℥j 30
Tincturæ Opii ℥j 4
Calomelanos gr. xxxvj 2 35
M.

℞. Balsami Peruviani,
Olei Ricini, āā ℥j 30
M.

R. Ung. Petrolei ℥j 30
Pulv. Opii ℥j 4
M.

Before one dressing is soaked with the discharge, another should be substituted. If the first adhere to the surface, it should be carefully moistened before attempting its removal, in order to avoid any abrasion, which, by subsequent inoculation, would increase the size of the sore. The dressing of most uncomplicated chancroids need be renewed only two or three times a day, but phagedenic ulcers require a much greater frequency.

During the progress of cicatrization, exuberant granulations may spring up and require repression by pencilling with a crayon of nitrate of silver. A superficial application of this agent is also beneficial in relieving the irritability and pain of some ulcers in the progressive and stationary periods.

Other applications than those now mentioned may be required. For instance, in chancroids attended by much inflammation, leeches to the groins or perinæum, and poultices or sedative lotions, may be of service. Pain should be relieved by the exhibition of opium in large doses internally, and by its application externally.

CHAPTER II.

PECULIARITIES DEPENDENT UPON THE SEAT OF CHANCROIDS.

The seat of a chancroid often modifies the symptoms and necessitates changes in the treatment.

Chancroids upon the Integument of the Penis.—The majority of venereal ulcerations following suspicious connection, and seated upon the integument of the penis, are chancres and not chancroids; why, I do not know; but it behooves the surgeon to look sharply to his diagnosis with ulcers in this region. The rule is far from being invariable, for I have met with many cases of simple chancres situated between the preputial orifice and the root of the penis and even upon the pubes. Chancroids upon the integument of the penis often originate in a follicle, and when first noticed resemble a pustule or small abscess (*follicular chancroids*, see p. 358). Not unfrequently they extend to the loose cellular tissue, and undermine the skin around a small external opening through which the pus can be made to well up on pressure. The mobility of the integument over the concealed chancroidal cavity interferes with cicatrization and prolongs the duration of the ulcer. The cavity, first, thoroughly cleansed of matter, should be cauterized by means of a sliver of wood (as a lucifer match) dipped in strong nitric acid; or sometimes it becomes necessary to enlarge the external opening even at the risk of inoculation of the edges of the wound. The ulcer having been thoroughly exposed and freely cauterized, should be kept moist by the application of wet lint, a layer of oiled silk, and a retentive bandage, in the manner previously indicated.

Chancroids of the Frænum.—Chancroids of the frænum are especially painful, persistent and exposed to hemorrhage. They may commence either upon the free margin or at the base of the bridle. In the former case a rent or fissure, the result of violence during coitus, has probably been inoculated; and the resultant chancroid gradually eats away the whole bridle, and hollows out a narrow longitudinal groove upon the under surface of the glans, giving great annoyance, long persisting, and resisting ordinary modes of treatment. Again, they may proceed from chancroids in the neighborhood, which exhibit a remarkable tendency to involve the bridle, if situated near it. In this case the base of the frænum is first attacked and often becomes perforated from side to side; the chan-

croidal opening gradually enlarges, extends to the free margin, and, as in the former case, probably destroys the whole bridle. The frænum is copiously supplied with blood and exceedingly sensitive; hence, ulcers of this part are very liable to bleed and give rise to much suffering. Their persistency and destructive tendency are due to the frequent rupture of the longitudinal fibres of the frænum, occasioned by the constant motion to which it is exposed, in walking, handling the penis during micturition, in erections, etc. Minute rents are thus caused in the sore which become inoculated and increase its depth; and ulcerative action goes on until the whole bridle is destroyed, including the portion buried in the under surface of the glans; and hence the fossa already referred to. Occasionally they extend to the urethra and give rise to a urinary fistula. In the treatment of these ulcers, the patient should be directed to avoid all motion of the part which will stretch the frænum; the glans should not be uncovered except to dress the sore, and even then no further than is absolutely necessary to insert the dressing. If the chancroid threaten to destroy the whole bridle, time will be gained by accomplishing the same at once by means of caustic. When perforation has taken place, the remaining portion of the bridle should be divided with scissors, and the raw surfaces freely cauterized. The flow of blood in this operation is often troublesome, and should be avoided by previously passing a double ligature through the opening and tying a thread at either extremity of the frænum, all of which should be removed. Diday heats one blade of a dull pair of scissors over a spirit lamp, and passing the opposite cold blade through the opening to serve as a support, thus divides the frænum by the actual cautery.[1] The galvano-caustic wire would seem well adapted to this purpose.

Sub-preputial Chancroids.—These are almost always multiple; they suppurate freely and are quite destructive in their tendency. Three conditions of the prepuce may obtain:—

1. This envelope may be so large as to be readily retracted.

2. The prepuce may be naturally tight, or it may be œdematous from attendant inflammation, so that the sores are with difficulty exposed, and the attempt occasions rents in their surface, and considerable pain to the patient.

3. There may be complete phimosis, either congenital or supervening as a complication of the disease.

In the last case, the sores are more effectually "concealed" than if situated within the urethra or vagina, and, indeed, cannot be exposed at all except by an operation. The discharge which collects in the balano-preputial fold before escaping from the orifice, may usually be distinguished from that of balanitis. It is of a different color and less homogeneous, and is often streaked with blood and mingled with organic detritus. The

[1] Du chancre primitif du frein de la verge; Gaz. hebd. de méd., Par., Oct. 19, 1855, p. 749.

exact situation of the ulcers may sometimes be detected by palpation, whenever the inflammation of the surrounding tissues is sufficient to convey the impression of hardness to the fingers applied to the external surface of the prepuce, and also by the pain excited by pressure.

Chancroids are apt to appear upon the margin of the preputial orifice in consequence of successive inoculation from the discharge of those within, and they present a few peculiarities worthy of notice. Thus they are often *exulcerous*, or superficial, their floor being nearly or quite on a level with the surrounding integument, a fact, which has been attributed to the constant irritation to which they are subjected from the sub-preputial discharge and the urine. The same cause frequently occasions a fictitious induration of their base, so that they may be mistaken for true chancres. They sometimes appear as rents or fissures in consequence of their occupying the folds of the orifice, and they are then, as it were, doubled upon themselves, so that two portions of their surface are in apposition. Any attempt to destroy them by cauterization will fail, so long as the ulcers beneath the prepuce remain open and secrete inoculable pus.

Sub-preputial chancroids are especially exposed to become complicated with balanitis, abscesses between the two layers of the prepuce, phagedæna, and gangrene. Several neighboring ulcerations may unite and form a large sore, which may result in the destruction of more or less of the glans, or, by extending along the furrow at its base, nearly enucleate this organ.

The treatment varies according to the presence or absence of phimosis. When the prepuce can be kept retracted *without becoming œdematous*, and incurring danger of paraphimosis, the ulcers may be cauterized and dressed like chancroids upon the external integument of the penis. They will thus heal much more readily than if the prepuce be kept forward.

In cases of partial phimosis, in which retraction of the prepuce can be effected only with pain and violence, it is better to allow it to remain forward and treat the ulcers as if the phimosis were complete. Destructive cauterization is here, of course, impossible, and attention to cleanliness, the use of astringent lotions, and in cases attended with inflammation, hot hip-baths and rest are the only means of relief. The balano-preputial fold should be thoroughly cleansed with injections of tepid water, repeated from three to six times a day, according to the copiousness of the discharge by means of a syringe with a nozzle long enough to reach the base of the glans. An astringent or slightly caustic lotion may afterwards be thrown in; one of the best for the purpose is a solution of nitrate of silver, from five to ten grains to the ounce of water. This application is not contra-indicated even by the presence of inflammation, since its effect is found to be sedative. Abscesses occurring between the layers of the prepuce must be opened.

The reader is referred to Chaps. III. and IV., of Part I. of this work for a fuller account of the treatment of balanitis and phimosis complicating the chancroid.

Sub-preputial chancroids, especially when accompanied by chancroids

of the preputial orifice, are often followed by such an amount of permanent contraction of the prepuce as to render exposure of the glans difficult or impossible. In these cases it is better, after the sores have healed, to resort to circumcision, otherwise the abnormal condition of the parts is a constant source of annoyance, interfering with cleanliness and exposing to repeated attacks of balanitis and herpes.

Urethral Chancroids.—Chancroids are not unfrequently met with at the meatus, occupying either a portion or the whole of the margin of this orifice, and they occasionally occur within the fossa navicularis, which is richly supplied with follicles whose mouths afford ready entrance to the poison. In this manner a number of small follicular chancroids may arise in the fossa, which in consequence of the ulceration of the intervening walls subsequently form a sore of considerable size, and this has been known to extend into the subcutaneous cellular tissue and undermine the integument of the penis even up to the pubes (Zeissl).

I have never met with chancroids in any deeper portion of the canal, and the possibility of their existence is doubted by most authorities of the present day, including Zeissl. Ricord,[1] indeed, presented to the Academy of Medicine, of Paris, two specimens of ulcers affecting the deeper portions of the urethra and even the bladder, of which he has given plates in his Atlas, and in his Notes to Hunter on Venereal. These he believed to be chancroids, on the ground that he had successfully inoculated the secretion coming from the patient's urethræ before death. With our present knowledge, we cannot now regard this proof as conclusive; and, even at the meeting of the Academy referred to, a number of the members present expressed their belief that the ulcerations were tubercular. We conclude that the existence of urethral and vesical chancroids, except at or near the meatus urinarius, is not proven. A case of tuberculosis of the urethra simulating urethral chancre, was published by Emanuel Soloweitschick in the Archiv für Derm. and Syph., vol. ii, p. 1.

Any lesion confined to the lips of the meatus is of course visible to the unassisted eye. For exploration of the fossa navicularis, Toynbee's ear-specula may be used, the uniform calibre of which permits of their introduction for about an inch, and if the patient be placed in direct sunlight, or reflected light be used, an excellent view of the lining membrane for this distance may be obtained. Any short endoscopic tube, will, of course, answer the same purpose. Dr. T. Skeene, of Brooklyn, has recently invented one (Fig. 113) which has some advantages.

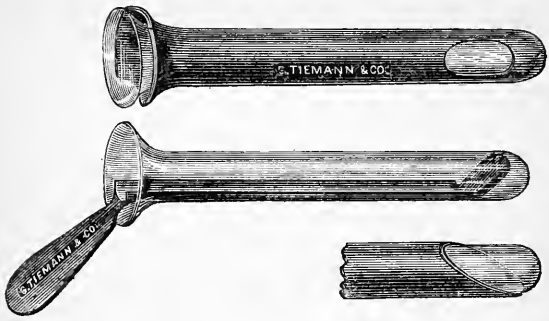
No special treatment, other than that described in the previous chapter, is required. The dressing, with perhaps a thread attached to facilitate its withdrawal, should be renewed after each act of micturition. If contact of the urine be painful, this may partially be relieved by holding the penis in a glassful of warm water during the act.

These ulcerations may eat away the lips on either side, finally leaving the urethral opening funnel-form in shape. Still more frequently a stricture

[1] Bull. Acad. de Méd. 1838, t. ii, p. 506.

at or near the meatus is formed during the process of cicatrization. To prevent this a pledget of lint or a piece of a bougie about an inch long,

Fig. 113.



Skeene's endoscope.

smeared with some ointment, and retained in place by an appropriate bandage, should be kept in the canal while the sore is healing. Even with this precaution, "slitting the meatus" will often be required subsequently.

Chancroids of the Female Genital Organs.—Upon the external and integumental surface of the labia majora, chancroids often assume the appearance of pustules or abscesses, in consequence of the virus having inoculated the internal surface of one or more of the follicles (follicular chancroids); and there is frequently more or less œdema of the subcutaneous cellular tissue, as evinced by the swelling and hardness of the labia. When the pustule breaks, the underlying ulcer, if exposed to the air, becomes covered with a scab and resembles ecthyma.

Chancroids are also common on other portions of the vulva; on the internal surface of the labia majora, where they occasion pain and difficulty in walking; on the labia minora; and in the neighborhood of the clitoris and meatus. Their base is engorged from the irritation of the urine and vaginal discharges, which likewise renders them difficult of cure. Those situated at the meatus often penetrate the urethra for some distance, giving the orifice an infundibuliform shape, or, by destroying the posterior wall of the canal, throw its opening backwards into the vagina. When attacked by phagedæna, as not unfrequently happens, the loss of tissue may result in great deformity and inconvenience.

Vulvar chancroids are, however, much more common at the fourchette than elsewhere, partly in consequence of its dependent position where contagious secretions gravitate, and partly owing to the rents and abrasions to which it is exposed in sexual intercourse, and to its being neglected in the ordinary attentions to cleanliness. They have been attributed to inoculation of discharges from the deeper parts of the vagina, and have consequently been regarded as affording a strong probability of the existence of chancroids upon the os uteri. These ulcers often assume the form of fis-

sures, like chancroids of the preputial orifice and of the anus, and for the same reason.

Examination of the vulva and lower part of the vagina is greatly facilitated by passing one finger up the anus and pressing the recto-vaginal wall forwards.

Chancroids often occupy the interspaces between the caruncles, where they may readily be overlooked unless carefully sought for. In the lower portion of the vagina, chancroids are generally irregular in their outline, and often invade the walls of this passage for a certain distance internally, and the vulva externally. Among low prostitutes especially, they may open a communication with the rectum, forming fistulæ which are difficult or impossible to close after the healing of the sore. I am informed by my friend, Dr. Emmet, that the ordinary operation for recto-vaginal fistulæ, when such fistulæ were due to venereal ulcerations, has always failed, even in his skilful hands. As we ascend the vagina, chancroids are less frequently met with. They are least uncommon in the lower third, and are exceedingly rare in the upper two-thirds.

They are oftener seen on the cervix uteri, but their occurrence even here is a rarity. Among 332 cases of venereal sores of the female genital organs, including both chancroids and true chancres, observed by Klink,[1] eight were situated on the cervix and one on the deeper portion of the vagina. Klink remarks that French authorities regard their existence upon the cervix as much more frequent than do the German; while, on the other hand, the French look upon a chancroid of the upper part of the vagina as an extreme rarity, yet the Germans think it not of such *very* uncommon occurrence. He, although a German, thinks the French are in the right.

It has been observed, as might be expected *à priori*, that in chancres on the cervix, the contagion was often derived from a man having a sore situated on the *glans* penis, and especially at the meatus.

These ulcers upon the cervix may be single or multiple. They may occupy one or both lips of the os, or involve a large portion of the cervix. They occasion little or no pain. Similar sores are usually present at the vulva. They are commonly accompanied by catarrhal inflammation of the vagina, often by inflammation of the womb. They are prone to take on phagedenic action and destroy a portion or the whole of the cervix; in one case mentioned by Bernutz[2] pelvic peritonitis was induced. They may extend into the cervical canal, and, according to Desprès,[3] even into the uterine cavity. When seated upon the margin of the *os externum*, their cicatrization results in a firm stricture of this orifice.

Can a chancroid exist so far within the cervical canal as not to be visible and not to present any evidence of its presence upon vaginal examination with a speculum? It can, if we may credit the following case:—

[1] Vrtljschr. f. Dermat., Wien, 1876, p. 542.

[2] Traité des mal. de l'utérus, t. ii, p. 117.

[3] Traité iconographique de l'ulcération et des ulcères du col de l'utérus, Paris, 1870.

"In March, 1840, a woman from the neighborhood of Arles, aged 22, and remarkably beautiful in form and appearance, was thoroughly examined in the usual manner, by Prof. Lallemand, and no symptom of venereal disease discovered. This examination was made at the request of an officer who complained that she had infected him; and several similar complaints being subsequently made by others, she was sent to the police station, where she was again examined by M. Delmas in the presence of a considerable number of students. The neck of the uterus still appeared healthy, but on pressing it with the speculum, it discharged a muco-purulent fluid, which was inoculated in four places upon the patient's thigh, *with the effect of producing four well-marked chancroids.*"[1]

We shall see hereafter when considering the true chancre, that one of its most prominent symptoms, viz., induration of its base, which is almost always present in men, is often poorly marked or even absent in women. It may hence be inferred that the exact diagnosis of venereal ulcers in women, as to whether they are chancroids or chancres, is frequently difficult or even impossible, unless indicated by the condition of the inguinal ganglia or the occurrence of secondary symptoms at the usual period. This difficulty is increased when the sore is situated upon the cervix, since the normal consistency of this part is so great as readily to mask to the touch any induration, especially of the parchment form, of the base of the ulcer.

The treatment of chancroids of the female genital organs does not differ materially from that already laid down. The application of the speculum to venereal diseases, introduced by Ricord, has rendered these ulcers nearly as accessible as if situated upon the external integument. Almost the only modifications required in the treatment are due to the difficulty of maintaining and changing with sufficient frequency the local dressing, and to the danger in certain regions of resorting to destructive cauterization.

With chancroids about the vulva the stronger caustics may be used with the same freedom and the same benefit as in the male sex. It requires no little care and attention to keep the dressing in such immediate contact with the sore as to be of any service, but this may still be accomplished by means of a T bandage, or by the ingenious contrivance with regard to which women beyond the age of puberty need no instruction. Here, as elsewhere upon the female genital organs, the dressing soon becomes soaked with the natural or abnormal secretion of the parts, and requires more frequent changing than in the male.

With chancroids situated upon the walls of the vagina, destructive cauterization should be used with great caution, for fear of opening communication with the rectum, urethra, or bladder, or in the deeper portion of this passage, of inducing peritonitis. This objection does not apply to chancroids of the cervix, which may be thoroughly cauterized through a speculum. If the patient can be seen often enough, the sore may be isolated and its secretion absorbed by the insertion of a tampon of lint either

[1] J. Soc. de méd. prat. de Montpel., 1845; and Gaz. méd. de Paris, 1845, p. 670.

dry or medicated; but this requires a visit at least once in twenty-four hours, and may, therefore, be impracticable in private practice. The best substitute is the *frequent* use by the patient herself of copious vaginal injections, either disinfectant or astringent, as a solution of carbolic acid, nitrate of silver, alum, tannin, etc.

Chronic Chancroid of Prostitutes.—Among public women, especially those of the lowest class, there is a form of chancroid which is often seen in our public hospitals, and which is entitled to be regarded as a variety of the simple chancre. Examples of it are always to be found in the venereal wards of Charity Hospital, Blackwell's Island. It was first noticed by MM. Boys de Loury and Costilhes,[1] and more recently by Rollet,[2] of Lyons, who speaks of it under the head of phagedæna, and whose description I shall chiefly follow.

"Chronic chancroids may be seated upon any portion of the genital organs, but especially at the posterior commissure of the labia majora. There is also another point where they are very frequent, viz., at the entrance of the vagina, on either side of the urethra, in the furrow external to this canal. These ulcers often acquire a considerable size, less, however, than serpiginous chancroids, whose progress is always more rapid. In most cases, no difference can be recognized between the appearance of a chronic chancroid and a chancroid of the ordinary type; but it is found on inquiry that the ulceration has persisted for an unusually long time, and that it is indolent—a character, however, which must not be regarded as belonging exclusively to this variety, since an acute chancroid, occupying the mucous membrane of the vagina, is often free from pain. Yet we find women with chronic chancroids of the genital organs either multiple or of large extent, the existence of which they do not even suspect, since they experience no inconvenience from them.

"There is rarely any inflammation, but usually an infiltration of the surrounding tissues. The surface of the ulcer is of a pale color, and often covered with a somewhat firm secretion, beneath which the tissues are also hardened; hence the name given them by M. Sperino of *callous and chronic vulvo-vaginal chancres.* This variety is usually met with in women from thirty to forty years of age, who are debilitated, of a pallid complexion, and exhausted by their excesses."

M. Rollet thinks, with reason, that other affections than chancroids have been included under this name; for instance, that a mere rent in a debilitated subject may terminate in a chronic ulcer under the irritation of filth, contact of the urine and vaginal secretion, and frequent indulgence in sexual intercourse.

The callous condition of the surrounding tissues has appeared to me to be the greatest obstacle in the way of their cure. I have treated them successfully at Charity Hospital, when their situation, as in the furrow

[1] Des ulcérations chroniques, ou chancres chroniques des parties génitales de la femme. Paris, 1845.

[2] Traité des mal. vén., Paris, 1865, p. 186.

between the nates, permitted; by putting the patient under the influence of ether, excising the hardened and hypertrophied masses of tissue, and freely applying the actual cautery to the fresh wound as well as to the surface of the ulcer. But there are other cases at the above-named institution, in which the situation of the sore at the entrance of the vagina does not admit of such heroic treatment, and in which the patients make their appearance from time to time during a period of years, leaving the hospital whenever they are somewhat improved, and returning when their condition is again so aggravated that they cannot carry on their trade. In many such cases, powdering the surface of the ulcer several times a day with iodoform or with the persulphate of iron (Monsel's salt) will be found to have an excellent effect.

Hypertrophy following Chancroids of the Female Genital Organs.—Hypertrophy, especially of the labia majora, is frequently seen in women who have been the subjects of venereal ulcerations, and is regarded by Gosselin (*Arch. gén. de méd.*, Dec. 1854, p. 684) as so exclusively the effect of chancroids, that its presence is sufficient to justify the conclusion that a woman has been thus diseased. We see the same effect in the thickening of the prepuce in the male following sub-preputial chancroids, to which I have already referred.

Chancroids of the Anus and Rectum.—Chancroids of the anus and rectum may occur in either sex from unnatural coitus, but are more frequent in women owing to the facility with which these parts are soiled with the secretion of sores situated upon the vulva. When seated upon the margin of the anus, they may readily be mistaken for fissures. They are best exposed in women by passing a finger into the vagina and pressing the vagino-rectal fold out through the anus. They are attended by much pain, especially during the passage of the feces, which should always be rendered liquid before going to stool by a mucilaginous injection. It is sometimes advisable after clearing out the bowels, to thoroughly cauterize the sore, and to confine the patient to bed and a low diet, and administer opiates for the purpose of preventing any further stools until cicatrization has taken place.

M. Tardieu[1] calls attention to the fact that in cases of the communication of chancroids (and the same is true of chancres) in unnatural intercourse, the ulcer is usually found upon the same side in both of the guilty parties —upon the right or left side of the penis in the one, and upon the corresponding side of the rectum in the other. This, of course, is the reverse of what holds good in natural coitus, in which a sore upon one side of the penis or vulva is most apt to be inoculated upon the opposite side of the other sex.

Chancroids of the folds of the anus, even when cured—as virulent ulcers —may terminate in fissures, which are still difficult to heal, in consequence of the frequent passage of the feces, and the spasmodic contraction of the

[1] Étude médico-légale sur les attentats aux mœurs, 1867, p. 206.

sphincter ani. In such cases the only certain means of relief is to be found in the well-known forcible dilatation or rupture of the sphincter, employed in ordinary cases of fissure of the anus.

Rollet advises repeated cauterization of the fissure with nitrate of silver, and a dressing of the following ointment:—

℞.	Glycerinæ ℥j	38
	Amyli ℥ss	15
	Zinci Oxidi ℥ij	8

This treatment may possibly succeed in mild cases.

Chancroids of the anus and rectum not unfrequently escape observation from the natural reluctance of patients, especially women, to have this part of the body examined; and, indeed, the surgeon himself is often content with an inspection of the external orifice of the alimentary canal, when a digital examination would reveal the presence of a chancroid in the rectum. Chancroids in this situation often take on phagedenic action and open a communication with the vagina.[1]

[1] Des chancres phagédéniques du rectum, par le Dr. A. Després, Arch. gén. de méd., mars, 1868.

CHAPTER III.

THE CHANCROID COMPLICATED WITH EXCESSIVE INFLAMMATION AND WITH PHAGEDÆNA.

Excessive inflammation terminating in gangrene gives rise to the inflammatory or gangrenous chancroid; and phagedenic ulceration, in several different forms, to as many varieties of the phagedenic chancroid.

Inflammatory or Gangrenous Chancroid.—The inflammation attendant upon a chancroid is sometimes so excessive as to terminate in gangrene, and produce a slough of the surrounding tissues, like that caused by the application of a powerful caustic. Age is said to be a predisposing cause, as is undoubtedly a constitution originally defective, or one debilitated by excess of any kind, and especially by the habitual use of alcoholic stimulants. Among exciting causes, are to be mentioned mechanical constriction, violence, indulgence in coitus, excessive exercise, want of cleanliness, and retention of the secretion upon the surface of the sore, the use of improper dressings, as fatty substances, and especially mercurial ointment. The supervention of some acute disease may also produce it. M. Sperino found this complication occur in many of the chancroids which he inoculated upon persons who were afterwards attacked with fever, and particularly with intermittent fever, which was very common in the neighborhood of his hospital, at Turin, situated in a marshy district.

But this complication is most frequently met with in cases of congenital or accidental phimosis, in which the sore is imprisoned beneath the prepuce. The inflammation progresses rapidly and soon terminates in gangrene. The slough may be limited to the tissues surrounding the ulcer, and involve only the internal layer of the prepuce; in which case the chief evidence of the occurrence of the complication is found in the ichorous appearance and fetid odor of the discharge from the preputial orifice, and the ultimate effect may be to produce adhesions of greater or less extent between the glans and its envelope.

In other cases, both layers of the prepuce are involved. The extremity of the penis becomes swollen and œdematous, resembling a club or the clapper of a bell; a dark violet-colored spot appears, either with or without phlyctenulæ upon its surface, generally upon the dorsal aspect, and involves more or less of the prepuce. If the *arteria dorsalis penis* become corroded, dangerous hemorrhage may ensue, which, as shown by experience, is not always arrested by ligature of the artery. If the slough is limited in extent, the glans penis often protrudes through the opening

formed, while the preputial orifice remains intact, and the virile organ has the appearance of being bifurcated at the extremity. In other instances the whole of the prepuce comes away, but the progress of the gangrene is usually limited at the furrow at the base of the glans, and the patient is circumcised as accurately as if by the surgeon's knife.

Paraphimosis complicating chancroids may result in a similar manner, and produce a slough of the whole or a part of that portion of the prepuce (its mucous layer) lying in front of the constricting ring, together with more or less of the glans.

After the fall of the slough, there remains only a simple wound destitute of virulent properties.

It is evident that excessive inflammation, which is due to simple causes, is a mere complication of the chancroid, and does not in itself change its nature; but its effect, when it terminates in gangrene, is exactly the same as that produced by the application of a strong caustic, viz., the tissues surrounding the ulcer are involved in the slough to an extent exceeding the sphere of the specific influence of the virus. Consequently, the remaining wound presents all the characteristics of any simple sore, and its secretion is not inoculable.

Inflammatory or gangrenous chancroids are included by most English writers among the phagedenic, but there would appear to be sufficient reason to follow the classification adopted by the French, and consider them as distinct. Buboes are rare in connection with this variety.

Inflammatory chancroids are to be treated by confining the patient to bed, low diet, mild purgatives, leeches to the groin or perinæum—never on the penis itself—the local application of cold or evaporating lotions, or, at a later stage, of warm poultices, as of chamomile flowers, recommended by Dr. Hammond as the best (op. cit. p. 36) and other antiphlogistic measures, so long as the acute symptoms continue; but if gangrene supervene tonics and stimulants are in most cases required. If the case be complicated with phimosis and the ulcer be concealed beneath the prepuce, the prepuce should at least be slit up by means of a bistoury carried along a director introduced from the orifice, care being taken to extend the incision to the furrow at the base of the glans. I think it desirable, however, to avoid, if possible, these incomplete operations, which leave the penis in a condition of deformity, and I therefore resort to complete circumcision in many cases, and especially when the foreskin is unnaturally long. If the slough of the tissues surrounding the ulcer has already formed, there is no danger of inoculation of the edges of the wound; and even if the gangrene is only commencing and the wound should become inoculated, the fresh ulceration will commonly heal as rapidly as the subpreputial chancroids, and the patient will be left in a much better condition than when only a partial operation has been performed. Fuller directions may be found in the chapter on phimosis.

Mr. William Lawrence, whose experience has been very extensive, has the following remarks upon the indications for an operation: "To determine whether the prepuce should be divided or not is sometimes a diffi-

cult matter of diagnosis. The degree of redness, swelling, and pain will not enable us to decide. The propriety of the measure depends on the condition of the sore which we cannot see. The discharge from the orifice of the prepuce must assist our judgment in doubtful cases. An ichorous or sanious state of discharge, with fetor, indicates sloughing; and in such circumstances the division ought to be performed. If the discharge should be purulent, even though somewhat bloody, and the glans tender on pressure, we may be contented with leeches, tepid syringing, and mild aperients."[1]

If gangrene shows no tendency to self-limitation, destructive cauterization should at once be employed.

Phagedenic Chancroids.—In the chancroid, as commonly observed, the process of ulceration is generally slow and limited in extent, and advances with nearly equal rapidity in all directions; whence the sore maintains a rounded form, and does not involve the tissues to any great extent or depth. Phagedenic chancroids, on the contrary, are characterized by their more rapid, extensive, and irregular progress; though these characters vary greatly in degree in different cases.

The following remarks are intended to apply to phagedæna, not only when it attacks the original ulcer, but also when it affects a virulent bubo or virulent lymphitis, which are in reality chancroids of the glands or of the lymphatics.

These remarks, so far as the symptoms are concerned, are also applicable to cases of phagedæna attacking the initial lesion of syphilis, in which the indurated base of the sore is commonly destroyed. But, it should be noticed, a true chancre is less frequently affected with phagedæna. In most such instances that I have seen, the induration remaining after the healing of the original sore has itself become ulcerated and taken on phagedenic action.

Induration of the ganglia, in the rare instances in which it terminates in suppuration, is never followed by phagedæna. *Phagedæna attacks a bubo only when the latter is virulent and due to a chancroid.*

In the mildest and most frequent form of phagedæna, the sore merely extends in surface and in depth slightly beyond its ordinary bounds; this is sometimes observed at all parts of the circumference, but generally at one part more than another, so that the circular form is lost and the outline becomes irregular, but yet the ulcerative action is not excessive.

Serpiginous Chancroid.—Phagedæna may stop here, or it may go on to form a serpiginous chancroid which is slow in its progress, but to the extent and duration of which there is no limit. The edges of the sore in this variety are thin, livid, and œdematous, and so extensively undermined that they fall upon the ulcerated surface or may be turned back like a flap upon the sound skin; they are often perforated at various points, and are very irregular in their outline, resembling a festoon. The surface of the

[1] Lectures on Surgery, London, 1863, p. 399.

sore is uneven, and covered with a thick pultaceous and grayish secretion, through which florid granulations at times protrude and bleed copiously upon the slightest touch. Serpiginous chancroids are not attended by much constitutional reaction. They exhibit a predilection for the superficial cellular tissue, and are inclined to extend in surface rather than in depth. They sometimes undermine the whole skin of the penis as far as the pubes, or make their way down the thigh nearly to the knee, or upwards upon the abdomen, or follow the course of the crest of the ilium. They often advance on one side while they are healing upon the opposite. Their progress may appear to be arrested and the sore nearly cicatrized, when rapid ulceration again sets in and destroys the newly-formed tissue. Their secretion is copious, thin, and sanious, and preserves its contagious properties through the many years that the ulcer may persist. They leave behind them a whitish and indelible cicatrix, resembling that produced by a deep burn.

This sore may be mistaken for the serpiginous ulceration of tertiary syphilis. It is distinguished from it by the fact that it commences with a chancroid—usually seated upon the genitals—or with a suppurating bubo in the groin; that from this point of origin it extends by a continuous process of ulceration, the course of which is evident from the foul cicatrix which it leaves behind; and that it never overleaps sound portions of the integument. Moreover, the fluidity of its secretion does not favor the formation of scabs, and its contagious properties are manifest if inoculated upon the person bearing it.[1]

Sloughing Phagedenic Chancroid.—A third variety is called the sloughing phagedenic ulcer, and is characterized by the greater acuteness, rapidity, and depth of the destructive action. Its symptoms closely resemble those of hospital gangrene. There is considerable constitutional disturbance, a full and hard pulse, furred tongue, and other symptoms of fever. The pain is often excessive, and almost insupportable. The ulcer extends chiefly to dependent parts in the neighborhood, which are infiltrated by its copious and foul secretion. It respects no tissue whatever, and its ravages are sometimes terrible; the glans, penis, or labia may be wholly destroyed, and the testicles entirely laid bare. Fatal hemorrhage has been known to occur from ulceration of the *arteria dorsalis penis*. The sloughing phagedenic chancroid is most common among the intemperate and lowest class of prostitutes, and also among persons visiting hot climates or exposed to various hardships. It was this variety which decimated the English troops in the Peninsular war, although venereal diseases were at the time comparatively mild among the natives.

Phagedenic chancroids are not unfrequently attended by buboes, which generally take on the same destructive action as themselves.

Fournier's confrontations, already referred to, prove that the phagedenic chancroid is not always transmitted in its kind, and that hence it cannot depend upon a distinct poison. This does not, however, conflict

[1] Bassereau, op. cit. p. 475.

with the fact that contagious matter possesses noxious properties proportionate to the degree of its putrescence, when such has taken place. We have an instance of this in the disastrous effects of wounds acquired in the dead-house. Witness also the mortality in the town of Westford, Mass., in the spring of 1860, following vaccination with scabs originally pure, but which were dissolved in water and exposed to air and heat until they were decomposed.[1] In most cases, however, phagedæna is doubtless dependent upon some form of constitutional cachexia, the exact nature of which is not always apparent. The abuse of mercury in the treatment of venereal ulcers is another cause, which was more frequent a few years since than now, and the improved practice of the present day may account in a measure for the partial disappearance of this variety.

Treatment of Phagedæna.—The general treatment of phagedenic ulcers should be based upon a knowledge of the cause of the destructive action when this can be ascertained. Phagedæna most frequently occurs in persons debilitated by various causes, as intemperance, irregularity of life, want, or a residence in damp, unhealthy apartments; in these cases, nourishing food, the ordinary comforts of life, and the mineral or vegetable tonics are required. Scrofula is another fruitful source of phagedæna, and calls for preparations of iodine and other antistrumous remedies. Moderate doses of opium repeated at short intervals, so as to keep the patient gently under its influence, are often of essential service in allaying pain, and in controlling the progress of the disease. Numerous observers have called attention to the beneficial effect of this agent upon ulcerative action, and have ascribed to it a decidedly tonic influence. Rodet reports several cases of serpiginous chancroids which resisted a great variety of means, but which yielded to opium. This surgeon commences with about one grain of the extract of opium morning and night, and gradually but rapidly increases the dose so that the system may not become habituated to it before its therapeutic effect takes place. He prefers two large doses in the twenty-four hours to smaller ones more frequently repeated, in order that digestion may go on unimpeded in the intervals. Light wines are largely administered at the same time, and are said to correct any tendency to constipation.

In many cases it is impossible to discover the cause of phagedæna. The general condition of the patient is good; all his functions are duly performed; and yet his ulcer continues to extend. In such cases our chief reliance must be placed upon local applications and deep cauterization, and the general treatment must be experimental.

Ricord placed great reliance on the potassio-tartrate of iron, which he called the "born enemy of phagedæna." He administered it internally in doses of two teaspoonfuls to a tablespoonful of the following mixture three times a day after meals, also applying a lotion of the same salt to the ulcer:—

[1] Boston M. and S. J., May, 1860.

℞. Ferri et Potassæ Tartratis, ℥ss . . . 15|
Aquæ, ℥iij . . . . . 90|
Syrupi, ℥iij . . . . . 110|
M.

Ricord's praise of this remedy has not been confirmed by my own, more mature experience, or that of others.

Great benefit is to be derived from the local application of *iodoform*, as recommended in the treatment of the chancroid. Under its influence the pain is allayed and the ulcer will frequently, without other measures, take on healthy action. The iodoform may be applied in powder or etherial solution once a day, and the sore be dressed with an ointment containing a drachm of iodoform to the ounce of lard or vaseline.

Probably no treatment affords better results in obstinate cases of phagedenic ulcerations than the prolonged immersion of the parts in hot water, a method employed by Hebra in various affections of the skin. If the ulceration be confined to the genitals, an ordinary sitz-bath will answer the purpose; if more extensive, a full bath will be required. In the former case, a large sponge is convenient for the patient to sit upon. Immersion for eight or ten hours a day, care being taken to keep the parts affected below the surface of the water, is desirable; as the case improves, immersion every other hour may suffice. The water should be kept at a temperature of about 98°, and the upper part of the body be protected by suitable covering. At night, a dressing of iodoform should be applied, and the same be allowed to soak in the bath the next morning before removal. By this treatment, the sufferings of the patient are not only greatly relieved, but the effect in arresting the progress of the ulceration and inducing reparative action is, in most cases, astonishing.[1]

Weisflog[2] uses a Faradic bath, one electrode being connected with the bottom of the tub. The patient, when immersed, touches the other electrode, covered with a moistened sponge, with one or more fingers, according to the sensations produced in the ulcer.

Our last resort for the cure of phagedenic chancroids is the complete destruction of the sore by a powerful caustic or the actual cautery. In cases of a comparatively mild character, we may rely upon the application of fuming nitric acid, taking care to apply it to every crevice, especially beneath the edges of the undermined integument. If the smallest loophole be left from which virulent pus can proceed, it will inoculate the wound remaining after the fall of the eschar, and the only effect of the treatment will be to increase the size of the ulcer. It is evident, therefore, that cauterization, in order to be a benefit and not an injury, must be thorough and complete. In severe cases Ricord repeats the application as often as twice a day, and in the mean while dresses the sore with lint soaked in

[1] See articles by—Dr. Simmons, of Yokohama, Med. Rec., N. Y., Sept. 11, 1875.
R. W. Taylor, Review in Arch. of Dermat., N. Y., vol. ii, 1876, p. 183.
Arthur Cooper, Lancet, Lond., May 24, 1879, p. 731.

[2] Arch. f. path. anat., etc. (Virchow), Berl., B. 66, s. 311, and Practitioner, Lond., March, 1879, p. 216.

aromatic wine or a solution of the potassio-tartrate of iron. Pain and swelling are not always contra-indications to the use of the caustic, which is frequently the most effective sedative that can be employed.

The carbo-sulphuric paste (see p. 367) is also an excellent caustic, and does its work better than any other, with the exception of the actual cautery.

Other caustics recommended by authors are—

Pure bromine.

The permanganate of potassa,[1] of which a saturated solution (gr. 85 to water ℥j) may be applied three or four times a day, and the sores dressed meanwhile with lint soaked in a mixture of a drachm of the saturated solution to the pint of water.

Carbolic acid has been more recently employed for the same purpose, and is, I believe, still more efficacious. The surface of the sore may be painted over with the impure liquid acid, and afterwards dressed with a solution of the same, of the strength of two drachms to the pint of water.

The actual cautery may still be required in the more severe cases of phagedæna, when other means have failed; and the extent of the surface involved by the ulceration should be no bar to its free application. Either the old cauterizing irons, or, better still, Paquelin's thermo-cautery or the galvano-cautery, is best adapted. A "white heat" is required, and the patient should be rendered insensible by an anæsthetic.

The ulcer should first be cleansed by washing it copiously with water, removing all adherent matter, and then drying it. Every portion of the secreting surface should now be deeply cauterized, carrying the hot iron into every nook and sinus, and paying special attention to the parts overlapped by the skin of the edges. These flaps of integument should be cauterized not only upon the under, but also upon the outer surface, so as to be for the most part destroyed. A cold water-dressing is afterwards applied, and the patient, on waking, does not suffer much more than he did before the operation. When suppuration commences, Goulard's extract or aromatic wine may be added to the lotion.

An attack of erysipelas has been known to arrest the progress of phagedæna and to induce cicatrization of serpiginous ulcers which have proved intractable under almost every form of medication. An instance of this kind is contributed by M. Buzenet to Ricord's *Leçons sur la chancre*, and several are reported by other surgeons.

Attempts to cure serpiginous chancroids by means of "syphilization" have signally failed.

[1] See "Remarks on the Use of Permanganate of Potassa," by Dr. F. Hinkle, Am. M. Times, N. Y., Nov. 28, 1863.

CHAPTER IV.

THE CHANCROID COMPLICATED WITH SYPHILIS.—"MIXED CHANCRE."

Syphilitic infection of the system presents no barrier to the existence of a chancroid, and *vice versâ*. Universal experience confirms the statement that a person presenting syphilitic symptoms, whether primary, secondary, or tertiary, may contract a chancroid, which will run the same course as in a person free from syphilis. Moreover two inoculations, one with the chancroidal and the other with the syphilitic virus, may occur side by side, and the resultant chancroid and chancre will each pursue its normal course uninfluenced by the neighborhood of the other; and, finally, two such inoculations may take place at one and the same point and produce a sore possessing all the properties of the chancroid and the primary syphilitic ulcer, viz., on the one hand, ready auto-inoculability and the power of producing a suppurating bubo secreting inoculable pus; and on the other, an indurated base, induration of the neighboring ganglia, and a secretion capable of communicating syphilis to a person free from previous syphilitic taint.

I have denominated such a sore a "chancroid complicated with syphilis." It would clearly be just as appropriate to call it "primary syphilis complicated with the chancroid." The French have named it the "mixed chancre," and it has been the subject of much discussion, as noticed in the Introduction to the present work, in connection with the doctrines of the Lyons school. It is hardly deserving of a distinct name, since

A "mixed chancre" is nothing more nor less than a sore resulting from the inoculation, at the same spot, of the syphilitic virus and of the chancroidal poison, the product of simple inflammation. The implantation of the two kinds of virus may take place synchronously, as, for instance, in the same act of coitus when a man has connection with a woman affected with a chancroid and also with syphilitic manifestations; or the inoculation of either virus may occur upon a previously existing ulcer of the opposite species. In either case, when fully developed, the mixed chancre may be perpetuated *in its kinds* by successive inoculation from one individual to another.

Prior to its full development—supposing the inoculations of the two kinds of virus to have taken place at the same time—the chancroid, having no period of incubation, will first appear, and can only by contagion give rise to a chancroid; while, again, towards the close of the ulceration, whichever virus persists in the sore the longer will ultimately transmit itself alone in its species.

The following instance in which a mixed chancre was developed by the inoculation of a primary syphilitic ulcer with the chancroidal poison, is reported by Fournier :—

Alphonse N., aged 17, contracted a chancre in the latter part of Sept. 1857. He became an out-patient of the Hôpital du Midi, Oct. 3, when a chancre, surrounded with cartilaginous induration, was found in the fossa behind the corona glandis, and the glands in both groins were enlarged, hard, and indolent. A dressing with aromatic wine was ordered for the sore, and mercury internally.

Oct. 14. The chancre has entered upon the period of repair; it is less excavated, and its edges less prominent.

Oct. 24. There has been a change for the worse. The original chancre has increased in surface and in depth; its base is still very much indurated. Moreover, upon the skin of the penis is found another large ulcer; its base œdematous, but without true induration. There are also several small ulcers with soft bases upon the external surface of the prepuce. The patient declares most positively that he has had had no sexual connection since he contracted his first chancre. Are the recent sores to be attributed to accidental inoculation from the first? N. is this day admitted as an in-patient.

In the early part of Nov. one of the lymphatic ganglia in the left groin became acutely inflamed, and presented all the characters of a bubo dependent upon a chancroid. It suppurated, and *its pus was inoculated with success.* In the right groin, the enlargement and induration of the ganglia characteristic of a chancre remained as before.

In Dec. secondary symptoms appeared; roseola and multiple mucous patches.

In spite of the patient's denial, Ricord attributed the more recent ulcers to a second exposure and fresh contagion; and a few days after his entrance into the hospital, the patient privately confessed to M. Fournier, the Interne, that on Oct. 15th he had connection with a woman whose name and address he gave. He also stated that on the following day his first ulcer began to enlarge, and the others appeared two days after.

Fournier immediately visited the woman indicated by N., and found that she had three large chancroids with perfectly soft bases, situated upon the internal surface of the left labium, on the fourchette and upon the folds at the entrance of the vagina, and of about three weeks' duration. The inguinal ganglia were in a normal condition.

This woman also confessed to M. Fournier that she had infected her lover, Charles V., who, by a singular coincidence, was at that moment a patient in the Hôpital du Midi, and who likewise had several chancroids with soft bases upon the prepuce and an acute bubo in the left groin.

To sum up this history: a man with a primary syphilitic ulcer in the period of repair and an indolent indurated bubo has connection with a woman affected with chancroid. He contracts fresh ulcers, which prove to be chancroids, and one of which is seated upon the surface of the original chancre. An inflammatory bubo appears, which suppurates and fur-

nishes inoculable pus. Finally, symptoms of general syphilis are developed.[1]

Rollet relates a similar case:—

G. Francois, aged 20, entered the Antiquaille Hospital, at Lyons, with a sore situated upon the meatus, which was slightly indurated and presented the usual aspect of a chancre. The fossa at the base of the glans was also studded with several ulcers which were as soft as possible. The ganglia in the groin were indurated. In six weeks after exposure, the patient was attacked with headache, syphilitic roseola, and rheumatic pains.

In order to confirm the diagnosis as to the nature of the sores, Rollet inoculated matter from the one which was indurated upon the left thigh, and the secretion of the others upon the right. The result was positive in both. It was then thought that pus from the simple sores might have been deposited upon the indurated one, and thence taken up upon the lancet. Rollet therefore waited until the chancroids in the fossa behind the corona had completely healed, and then, after repeatedly cauterizing the indurated sore with solid nitrate of silver, inoculated its secretion a second time. This inoculation produced the characteristic pustule of a chancroid as before; thereby showing that the success of the first inoculation was not owing to the presence of matter which had been simply deposited and again taken up, but to the inherent properties in the secretion of the sore itself.[2]

M. Rollet and his Interne, M. Laroyenne, were led by this case to try the effect of inoculating chancres with matter from a chancroid. Their experiments are briefly related as follows:—

Case 1. Pieri M.; indurated chancre of the meatus; duration three weeks; indurated ganglia; inoculation of the secretion of the chancre, negative. Sept. 14, the pus of a chancroid was deposited upon the sore. Sept. 15, application of the solid nitrate of silver; lotions; dressing with aromatic wine. Sept. 19, second inoculation; chancroidal pustule.

Case 2. John L.; indurated ulcer almost healed; indurated ganglia: general treatment and local application of aromatic wine; inoculation negative. Nov. 18, pus from a chancroid is applied to the ulcer; treatment continued. Nov. 23, second inoculation; this time positive.

Case 3. Robert M.; parchment variety of chancre upon the skin of the penis; duration five days. Dec. 11, inoculation without result; dress with opiated cerate and calomel. Dec. 16, application of the virus of a chancroid. Dec. 17, same dressing. Dec. 22, inoculation positive.

Case 4. Peter M.; chancre of six weeks' duration, occupying three-fourths of the circumference of the fossa glandis. Dec. 11, inoculation unsuccessful. Dec. 16, application of the virus of a chancroid. Dec. 17, dress with opiated cerate with addition of calomel. Dec. 22, inoculation successful.

[1] Leçons sur le chancre, p. 119.

[2] Laroyenne, Études experimentales sur le chancre, Annuaire de la syph. et d. mal. de la peau, Paris, Année 1858, p. 248.

According to Rollet, two or three days after the application of the virus of a chancroid to a chancre, the sore assumes a grayish aspect like an ordinary chancroid, but is less excavated; its edges become jagged, and its purulent secretion more copious and sanious; it may give rise to successive chancroids in the neighborhood or to a virulent bubo. It preserves, however, the essential characters of a chancre, and, among others, induration of its base, which is always pathognomonic; the ganglia of both groins are indurated as usual, unless a virulent bubo supervenes, when those of the opposite side may still indicate the nature of the disease. The general symptoms following the chancre are not modified by this inoculation, and secondary symptoms appear at the same time and in the same manner as under ordinary circumstances. The more copious secretion of the chancroid renders this species more liable to be ingrafted upon a chancre than the latter upon the former.

Thus far we have supposed the inoculation of one species of virus to succeed that of the other, but both sometimes, though rarely, occur during the same act of coitus. In this case the chancroid, which has no period of incubation, is first developed in its usual form, with abrupt edges, grayish floor, and soft base; subsequently the chancre appears, when the base of the sore and the neighboring lymphatic ganglia become indurated.

The union of the two species of virus in this variety is analogous to the mixture which takes place when gonorrhœa is complicated with urethral chancre, constituting the only true "gonorrhœa virulenta;" and also to the union of either the chancroidal or syphilitic virus with that of vaccinia, of which a number of examples are recorded.

The mixed chancre requires the local treatment of the chancroid and the general treatment of syphilis.

CHAPTER V.

THE SIMPLE AND THE VIRULENT BUBO.

Bubo, derived from the Greek βουβων, originally signified either the groin, the glands in the groins, or, again, inflammation of these glands. In more modern times, the term has been applied in general to *any* affection of the lymphatic ganglia. Thus we read of scrofulous buboes dependent upon a strumous diathesis; of cancerous buboes dependent upon a scirrhous tumor in the neighborhood; and of the Plague of the Levant (*the bubo-pest*), characterized, among other symptoms, by an affection of the lymphatic glands of the groins and axillæ. The meaning of the word, so far as having any connection with the groin, and so far as dependent upon any causes which can exclusively affect the groin, has, therefore, been departed from.

In common parlance, however, if we hear the expression "that man has a bubo," we infer that he has an affection of one of the lymphatic ganglia dependent upon *venereal* disease; and venereal diseases are, of course, those only which concern us in the present work. At the same time, let it be observed, so far as the situation of the tumor is concerned, that a venereal bubo is a bubo, no matter where situated; and that, even if dependent directly or indirectly upon venereal contagion, other causes than venereal often play an important part in its evolution.

We shall find hereafter that *syphilis* exerts a peculiar influence upon the lymphatic ganglia at two periods of its course: 1, In its initial stage, upon the glands in anatomical relation with the chancre; 2, In its period of full development, upon the glandular system at large. With these, so-called "indurated" and "constitutional" buboes, which are inevitable to syphilis, and which will be considered further on, we have at present nothing directly to do, although what we have to say of the anatomical connection between the glands and the lymphatics will be found to have a bearing upon them. In speaking of buboes in this chapter, we refer, therefore, only to those which are not specific in their origin. They are two in number:—

I. The Simple Bubo.

II. The Virulent Bubo.

Frequency of Buboes.—All persons are not disposed alike to the development of buboes. In those of a strumous constitution, the lymphatic system appears to be much more sensitive than in others, and buboes are of more frequent occurrence. In general, they are found oftener in men than in women, partly, doubtless, in consequence of the different habits of

life in the two sexes. It has been estimated that 40 out of every 100 men with chancroids are attacked with buboes; and of these 40, that from 30 to 35 have suppurating buboes; while of every 100 women affected with chancroids, only 20 have acute inflammation of the ganglia, of which 15 suppurate. Zeissl ascribes this difference not only to the more active habits of the male sex, but also to the fact that the majority of venereal affections in women are situated upon the mucous membrane and not upon the external integument, where their occurrence is found by experience to be followed most frequently by buboes in the male sex also.

As to the comparative frequency of the simple and virulent bubo, statistics vary greatly. Jullien[1] states, as the result of the collected observations of a number of authorities, that of 287 buboes, 149 were simple and 138 virulent. These statistics, however, must not be regarded at all as conclusive, since the diagnosis between a simple and a virulent bubo requires an amount of care and precision on the part of the observer which is rarely given.

Seat of Buboes.—The inguinal ganglia are most frequently affected in cases of buboes, and the anatomical seat of these ganglia is of no little interest as showing what course such tumors may take. This subject has been most thoroughly investigated in two admirable lectures by Prof. Auspitz,[2] of Vienna, one of whose plates (Fig. 114) we reproduce, and whose description we shall closely follow.

The inguinal ganglia are divided by anatomists into the *superficial* and the *deep*. The former are the more constant, indeed always present, and of the greater importance. They are seated in the subcutaneous cellular tissue, separated from the surface only by the skin and a thin layer of connective tissue—the "superficial fascia," and lying upon the "fascia lata." The richness of the tissue in which they are imbedded depends greatly upon the amount of corpulency of the individual. They vary to some extent in their number and situation; these, however, are so generally constant as not to differ materially from the accompanying representation, which includes the lymphatic vessels merging into them.

Of these groups of glands, *A* and *B* are strictly inguinal, while *D* is strictly femoral. The group *C* belongs rather to the inguinal glands, with which it stands in closer anatomical and pathological relations than to the femoral.

Deep-seated inguinal ganglia, underlying the fascia lata, described by most anatomists as four to six in number, are far from being constant. Auspitz has found only one usually present, and this, "Rosenmüller's gland," situated between the semilunar edge of Gimbernat's ligament and the vena cruralis.

In women, vessels from the lymphatic network of the labia majora and

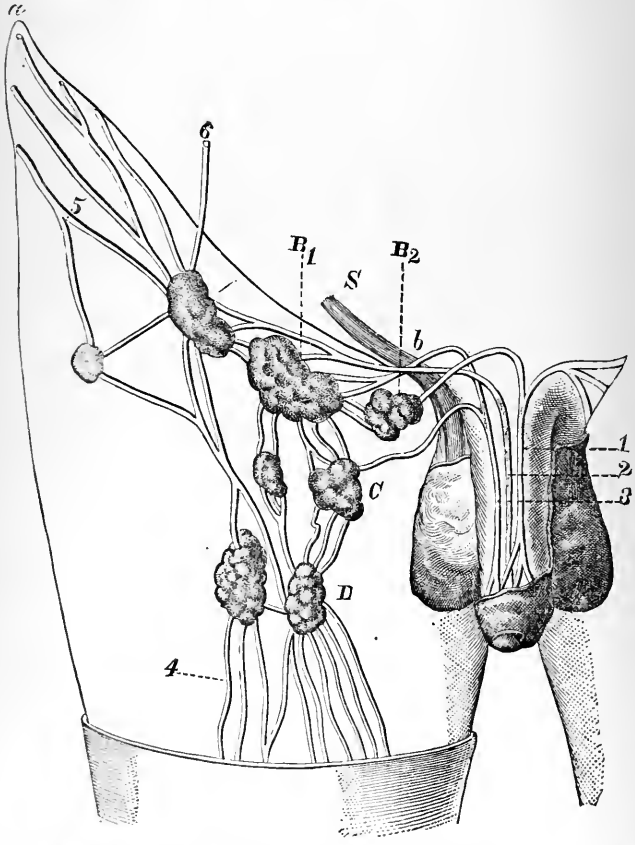
[1] Traité pratique d. mal. vén., Paris, 1879, p. 429.

[2] Arch. f. dermat. u. syph., Prag, 1873, iii u. iv Heft.

minora, connecting with that of the vagina, run beneath the skin of the labia and terminate in glands situated in the same manner as in the male.

The anatomical connection between the above mentioned ganglia and the exact seat of any lesion affecting them, will determine which of them will become exclusively or chiefly involved. "If the exciting cause be seated on the prepuce or glans penis, the group *B* is in the first place,

Fig. 114.



Schematic representation of the superficial inguinal ganglia (Auspitz). *a b*, Poupart's ligament. *S*, Vas deferens. *A*, B_1, and B_2, *C* and *D*, Inguinal ganglia. 1. Lymphatic vessel running along the dorsal groove of the penis; 2 and 3, vessels running along its right side; these three anastomose in the corona glandis. 1 becomes divided near the root of the penis into two lateral branches, which, as well as 2 and 3, terminate in the inguinal ganglia. 5, vessels coming from near the ant. sup. spine of the ilium to the ganglion *A*. 6, ditto from the hypogastrium to the same ganglion. 4, ditto from the lower extremity to the gland *D*.

in the next place *C* and *A*, and only very seldom *D*, is implicated. If the lesion be on the anterior portion of the scrotum, *B* and *C* are in most cases the glands mainly involved. If it be on the leg or on the lower part of the thigh, we find that it is first *D* and then *C* which is either exclu-

sively or especially swollen. In affections of the buttocks, it is *A*; in those of the hypogastrium, *A* and *B*; finally, in those of the perinæum, and of the posterior portion of the scrotum, whose lymphatics unite with each other or with the lymphatics of the penis, it is the group *B* (B_2) which is chiefly affected. The group *D* is *exclusively* swollen only in consequence of affections of the lower extremity, and never from those of the genitals."

Data similar to the above, with regard to the anatomical relations of lesions and buboes in other parts of the body, especially the upper extremities, head, and face, where of venereal ulcers the chancre is the rule and the chancroid the exception, will be given when describing the indurated bubo.

The Simple Bubo.—As already stated, this bubo is nothing more than a simple adenitis. Its causes are various. Commencing with those which are of the more trivial character and advancing to the graver, they may be enumerated as follows:—

1. In the first place, it may depend merely upon excessive sexual indulgence. Instances of this kind are by no means common, but are occasionally met with.

2. It may be due to any mechanical lesion of the genital organs, as a rent or abrasion contracted in coitus, especially if the latter be subjected to cauterization or the application of irritant dressings.

3. It may be due to eczema, herpes, follicular inflammation, balanitis, vulvitis, or any other simple affection of the genitals. Such simple causes as these and those above mentioned are now and then so slight and so transient, that they can be ferreted out only by the most careful investigation of the case, or otherwise the bubo passes for a *bubon d'emblée*.

4. Urethritis, whether due to contagion or not, and any mechanical lesion of the urethra, as by the use of instruments or the passage of a calculus, may occasion it.

5. It may depend upon the presence of a chancroid, or even a true chancre or a secondary lesion of syphilis, *acting merely as a common source of irritation and inflammation*, and not in virtue of any virulent or specific quality.

The manner in which either of the above causes produces its effect upon the gland has, possibly, not been fully explained, since the intervening lymphatic may show no sign of being involved. The old idea of "sympathy" between the rootlets of the lymphatics and the ganglion in which they terminate is no longer tenable. Doubtless, in many cases, simple irritant matter is conveyed by them and lodged in the ganglion; in other cases, the inflammatory process probably extends through them, but is so transient and rapid in its passage as to afford no evidence of its having existed. Analogous instances are found in the inflammation and suppuration of glands in other parts of the body, as the axilla, in consequence of wounds of the fingers, prurigo, eczema, etc., especially when the irritation is heightened by excessive manual labor, as we often see in washer-

women. We again observe the same in the evolution of gonorrhœal epididymitis without any affection of the cord.

The simple bubo usually appears during the early period of the existence of the lesion upon which it depends, within a few days or the first week or fortnight after the appearance of the latter.

The symptoms of simple adenitis are well known. Most frequently only one gland is affected; if others are involved, they are commonly so to a less degree. The patient first notices a swelling in the groin attended with tenderness on pressure, and pain which is aggravated by motion or the standing posture. The gland is felt to be somewhat enlarged, but is still movable beneath the integument which preserves its normal color; and the surrounding cellular tissue is evidently thickened by infiltration. This condition may last for an indefinite period, and yet finally disappear without suppuration. There exists only ganglionic tension or engorgement, which undergoes resolution, and this holds good of the great majority of buboes originating in such simple causes as gonorrhœa, balanitis, herpes, etc.; whereas a simple bubo dependent upon a chancroid is usually much more inflammatory in its character and prone to suppuration.

In the less fortunate cases, the inflammatory symptoms increase in severity; the tumor acquires large dimensions and becomes adherent to the skin and underlying fascia so that it is no longer movable; the pain and tenderness are increased; motion is difficult; the skin becomes reddened; suppuration is ushered in by a chill; the presence of matter is indicated by a soft spot in the midst of the general hardness, and soon after by distinct fluctuation; and although resolution is still possible, yet commonly the contents of the abscess are discharged through an opening in the integument formed by the process of ulceration. In the great majority of cases I believe that the seat of the suppuration is in the cellular tissue surrounding the gland and not in the gland itself. The original congestion or inflammation of the glandular tissue appears to undergo resolution after exciting a similar process in the loose cellular tissue of the neighborhood which more readily takes on suppurative action; and when the abscess is opened by nature or art, the gland may often be seen within the cavity already covered with granulations destined to commence the work of repair.

The pus of a simple inflammatory bubo is like that of any common abscess, destitute of contagious properties, and therefore not inoculable.

I have spoken of the simple inflammatory bubo as affecting one ganglion, but it sometimes happens that two or more are involved, when several collections of matter may form, and these by their early union may give rise to one large abscess; or they may remain distinct or only communicate after the opening of one of them. Not unfrequently these collections of matter are separated by Poupart's ligament, one being situated in the groin and the other upon the upper and inner part of the thigh.

The course of a bubo subsequent to the evacuation of the contained matter varies in different cases. In healthy subjects and under proper treatment, the cavity may rapidly contract and fill with granulations, its

walls unite and cicatrization take place, leaving a slight scar scarcely perceptible after the lapse of a few months. In less fortunate cases, secondary abscesses form in the neighborhood even after the first has been opened, and communicating with the cavity of the latter, give rise to fistulous passages which are often several inches in length. Or again, instead of having a distinct point of origin, a fistulous track may shoot out from the cavity itself. The opening may have been free, allowing ample exit to the matter, and the process of repair appear to be going on propitiously, when suddenly without apparent cause the surgeon in passing his finger over the surface notices a hardened cord beneath the skin, or in probing the cavity discovers a new fistulous track, which has formed insidiously without giving the slightest indication of its presence. In short, a line of infiltration of the cellular tissue has, as it appears, started from the original abscess, and by a process of suppuration opened a new fistulous track; and thus the cellular tissue beneath the skin may become riddled with false passages of different lengths, running in various directions, and reminding one of the burrowings of a mole in a hay-field. In whichever mode developed, these fistulous tracks most frequently run along Poupart's ligament either upwards and outwards towards the anterior superior spine of the ilium, or downwards and inwards to the inner fold of the thigh. In rare instances they penetrate nearly perpendicularly to the surface for some distance. Their walls become covered with a kind of false membrane which secretes a thin purulent matter, and the surrounding tissues are more or less brawny to the touch.

In strumous subjects, a bubo often assumes a still more sluggish and subacute character, resembling the well-known scrofulous inflammation of the glands of the neck in young persons.

The inguinal tumor is less firm and of a more doughy feel than in the form above described. A moderate amount of pain, tenderness on pressure, and difficulty of motion may be complained of by the patient, but these are rarely severe or of long continuance. The tumor very slowly enlarges, perhaps to the size of a hen's egg, and loses its mobility in consequence of contracting adhesions to the neighboring tissues. The skin covering it becomes thin and of a livid red color, and fluctuation can be detected without being ushered in by chills and fever, as in the inflammatory bubo. If an opening now be made with the lancet, the young surgeon is surprised to find that nothing resembling ordinary pus flows out, but merely a thin, flaky, watery-looking fluid. If, on the other hand, the tumor be left to itself, several openings usually form spontaneously at different points of the surface, and the skin included between them, being deprived of its vascular supply, loses its vitality and gives way. The glands thus exposed are found to be more or less disorganized; they are of a spongy and friable texture, and infiltrated with thin purulent matter which can be made to exude upon pressure from the numerous openings upon their surface. The external opening is still further enlarged by retraction of the skin, and the mass of swollen and disorganized glands often projects above the level of the surrounding integument, and, acting

like a foreign body, interferes with cicatrization of the wound. Fistulous tracks may form, running in various directions, but phagedæna never occurs as a complication, as it does with a virulent bubo.

Virulent Bubo.—The virulent bubo receives its name from the fact that the pus which it contains is contagious, and will, upon artificial inoculation, give rise to a chancroid. It is in fact a chancroid of the ganglion, and hence may be called a *chancroidal* bubo.

Unlike the simple inflammatory bubo, it is due to a single cause only, viz., the presence of a chancroid upon the region supplied by the lymphatics in anatomical connection with the affected ganglion; and, so far as we know, its occurrence cannot be avoided by any precautions except by the destruction of the chancroid, nor favored by any extraneous means, as mechanical violence, muscular fatigue, etc., which play so important a part in the etiology of the simple inflammatory bubo.

The virus secreted by the chancroid gains entrance within the lymphatics, probably by erosion of these vessels, and not, strictly speaking, by absorption. Being conveyed along their course, it is sometimes arrested at a certain point, and gives rise to virulent lymphitis, which will be described hereafter. More frequently it reaches one of the ganglia, beyond which it never extends; its further progress is stopped by the intricate meshes and minute ramifications of this body, and its presence gives rise to inflammation which assumes the contagious character of the exciting cause. The same power of reproduction is manifested which gives to virulent pus its contagious qualities, and the abscess which necessarily ensues is filled with inoculable matter. Resolution is as impossible and suppuration as inevitable as if the secretion of the chancroid had been deposited within the ganglion upon the point of a lancet. From the supposed mode of its origin, this bubo has sometimes been called the *bubo from absorption*.

A virulent bubo usually occurs during the early or progressive stage of a chancroid, but is by no means confined to this period. Ricord refers to a case in the service of M. Puche, in which a virulent bubo made its appearance as late as three years after the commencement of a serpiginous chancroid.

The chancroid may have entirely healed before the development of a virulent bubo, and the virus have entered the lymphatics but a short time before cicatrization took place.

Since the chancroid is, in the great majority of cases, situated upon the genital organs or in their neighborhood, a virulent bubo occurs with corresponding frequency in the groin. Even when the chancroid is seated within the male urethra, or in the deeper portions of the vagina, or upon the cervix uteri, or when in either sex it exists upon the perinæum or at the anus, it is equally in the groin that we are to look for a virulent bubo —a fact which has been established by Ricord, Robert, Grivot, Grandcourt, Bernutz, Legendre, Langlebert, and other observers. Artificial inoculation of the chancroidal virus upon the arm has produced virulent

buboes in the axilla, and in a case reported by Huebbenet, one was developed over the parotid gland following an inoculation upon the cheek.

Virulent adenitis is usually situated upon the same side of the median line as the chancroid, but sometimes upon the opposite, owing to the interlacement of the lymphatics. Commonly only one groin is affected; occasionally both are involved, especially when there are several chancroids seated upon each side of the penis, or when one ulcer is situated upon any part directly in the median line, as the frænum. It is very rare for more than a single gland on one or both sides to suppurate specifically; and hence the virulent bubo is said to be "monoganglial." Other ganglia in the neighborhood may, however, be secondarily affected through extension of the inflammatory process, but should they suppurate, the pus is not inoculable like that of the first ganglion.

Prior to its spontaneous or artificial opening, the course of a virulent is the same as that of a simple inflammatory bubo, and the student should understand that the early symptoms of the two are identical; though the presence of the former may be suspected from the rapid growth of the tumor and its tendency to suppurate; while the existence of the latter will be rendered probable by an irritated or inflamed condition of the chancroid upon the genitals, and by an amelioration in the bubo following rest and antiphlogistic treatment. Whenever a bubo undergoes complete resolution without coming to suppuration, it is evident that it could not have been virulent.

During the formation of this bubo, the virulent pus is confined to the interior of the affected ganglion; but at the same time simple inflammation and suppuration commonly take place in the surrounding cellular tissue as in the simple inflammatory bubo, and hence there exist two collections of matter separated by the walls of the ganglion; the one within containing chancroidal, and the one without simple pus. Now if the bubo be left to itself, the external abscess usually breaks before the internal, and consequently the pus which first flows out is simple and not inoculable, and the cavity of the abscess may be covered with healthy granulations like that of the simple inflammatory bubo. In the course of a few days, however, the glandular abscess discharges its virulent matter, inoculating the surface of the cavity, and the latter puts on all the characters of a chancroid; its interior becomes covered with a grayish diphtheritic deposit, its edges are everted and undermined, and its secretion is autoinoculable, or if it accidentally comes in contact with any solution of continuity, as a leech-bite, in the neighborhood, it will give rise to a chancroid. The same can be demonstrated when opening the bubo artificially; if a superficial incision first be made so as to penetrate the external abscess only, and a drop of the exuding matter be inoculated; and if subsequently the knife be made to penetrate the glandular abscess, and some of its contents be also inserted beneath the epidermis, it will be found that the former inoculation will fail while the latter will succeed.[1]

[1] "Equally instructive examples (that the glands collect hurtful ingredients, and thereby afford protection to the body) are afforded by the history of syphilis,

Secondary abscesses may form in the vicinity of the gland first affected in the virulent, as in the simple inflammatory bubo, but virulent pus does not appear except as the result of inoculation from the original abscess. Again, fistulous passages may be produced in the manner already described; these have been known to result in very extensive underminings of the skin, attended by acute inflammation of the cellular tissue, of the most formidable character.[1]

In some instances, a virulent bubo heals kindly in the course of a few weeks, like the milder chancroids upon the genitals previously described. It is thus probable that many virulent buboes are never recognized as such, since their appearance may not attract the attention of the attendant physician, and the only unfailing test of their existence—auto-inoculation—is rarely applied, or even necessary. But there is another termination which is far less fortunate, and which, although not frequent, is one of the most fearful consequences of venereal exposure:—

Virulent adenitis, alone of the different forms of bubo, is liable to phagedæna.

In a few cases this complication would appear to follow, and perhaps depend upon, that of the chancroid upon the genitals, phagedæna existing in both; but, in the majority, phagedæna attacks the inguinal chancroid or bubo, when the original sore has shown no such tendency, or has even been of the mildest type.

The remarks already made with regard to phagedæna in connection with the chancroid apply here. It may appear in three forms:—

1. Limited in extent and duration; merely enlarging the boundaries of the abscess, or at most increasing its depth and persistency, but soon yielding to appropriate treatment.

2. Sloughing phagedæna, resembling hospital gangrene, a rare form when accompanying a bubo; and

3. Serpiginous phagedæna, to the extent and duration of which there is no limit.

The last-named form is the source of those persistent and disgusting serpiginous ulcers which we occasionally see in our public hospitals, and which are depicted in all sets of illustrations of venereal diseases. (See *Cullerier's Atlas*, pl. xv.)

Judging from my own observation, these ulcers commence in a virulent bubo far more frequently than in a chancroid upon the genitals. Their symptoms have already been described in the preceding chapter,

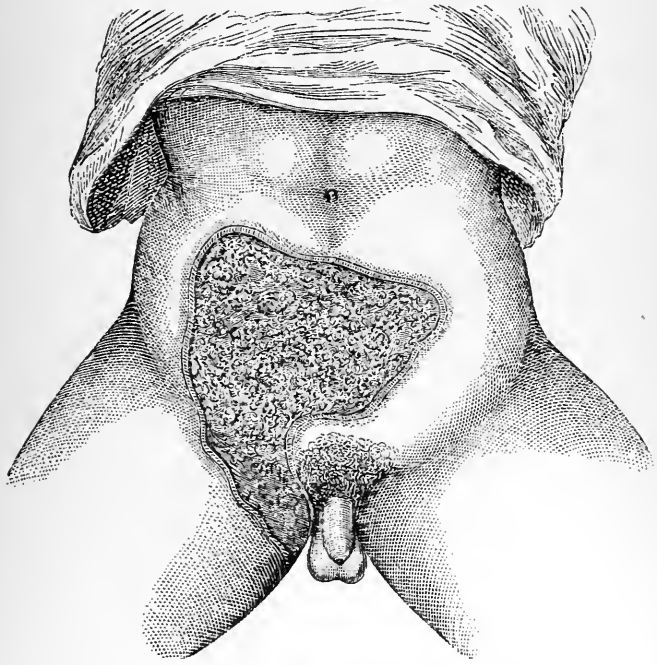
in which a bubo may for a time become the depository of the poison, so that the rest of the economy is affected in a comparatively trifling degree. As Ricord has shown, it is precisely in the interior of the real substance of the gland that the virulent matter is found, whilst the pus at the circumference of the bubo is free from it: only so far as the parts come into contact with the lymph conveyed from the diseased part, do they absorb the virulent matter." (Virchow, *Cellular Pathology*, p. 187.)

[1] See a remarkable case reported by Debauge, Chancres simples et bubons chancreux. Thèse de Paris, 1858, p. 75.

and their possible severity is shown in the following case reported by Fournier:[1]—

"A deplorable instance of ganglionic phagedæna was to be seen in the wards of M. Ricord, in 1856. The patient had contracted, in 1849, a simple chancre on the penis, which healed readily itself, but which was complicated with an acute bubo. This bubo suppurated, opened, and

Fig. 115.



Phagedenic bubo. (After Jullien, op. cit. p 433.)

continued for several weeks without showing any tendency to increase in size, but suddenly the inguinal ulceration began to extend, and took on the character of serpiginous phagedæna. From that time, in spite of every mode of treatment, and of the most energetic means known to science, this ulcer still extended; it invaded the whole inguinal region, turned the flank, mounted towards the loins, and entirely covered one buttock; then it descended again upon the thigh, the posterior and external surface of which it ploughed up for the whole extent of the limb, and at last reached below the knee, where it finally spread out over an enormous surface. Everything was done for this horrible sore, but all means failed. The patient left the hospital without benefit and wholly discouraged. Many years after, I met this unfortunate in one of the streets of Paris, pale, emaciated, and scarcely able to drag himself along.

[1] N. Dict. de méd. et de chir. prat., Paris, t. v, p. 771.

He told me that he had been subjected to various modes of treatment, without success, and that his ulcer was still present. Moreover, his leg was flexed at a right angle upon the thigh through retraction of the cicatrices on the posterior aspect of the knee. The disease had now lasted for fourteen years!"

Complications.—On account of the anatomical situation of the inguinal ganglia, lying in loose connective tissue and in the vicinity of important vascular connections, buboes in this region, especially after having been laid open and thus deprived of the support of the integument, are exposed to various forms of hemorrhage, which have been studied at length in an able article by Dr. De Paoli.[1] According to this author, the hemorrhage may assume three forms.

1. It may take place in the connective tissue surrounding the gland, in which case the serum of the extravasated blood may be seen to ooze from the edges of the wound or may be forced out in a jet on pressure, leaving the solid constituents behind to be absorbed; or, in case the effusion has been large, inflammatory action is set up, and an abscess is formed which finally communicates with the original one by means of a fistulous track, or opens through the overlying skin.

2. The hemorrhage may take place from the surface of the bubo, even when the latter has been progressing favorably with a prospect of speedy cicatrization.

3. Further, De Paoli speaks of what he calls a *hemorrhagic bubo*, a form which, it appears, is not uncommon among the impoverished residents of the large cities of Italy. In this form, a tumor is developed in the groin and gradually enlarges without producing much swelling externally. The skin covering it is of a rose-red color, somewhat darker at the centre. Fluctuation is detected on palpation, but it is evident that the amount of matter is not proportionate to the extent of the undermining of the integument. The patient suffers little inconvenience, and probably pursues his ordinary avocation.

Following the act of coughing, or on straining, or even without appreciable cause, this swelling undergoes a sudden increase of size. If incised, a moderate amount of blood escapes, and an extensive cavity is exposed, covered with fungosities of a bluish color, with one or more hyperplastic glands at the centre. These latter, if cut into, bleed freely. The surrounding integument is found to be extensively detached, thinned, and ecchymosed. The vascular bands or bridles connecting the opposite walls of the abscess, which are usually found in the purulent bubo, are here completely wanting.

Even after free incision, little tendency is shown towards reparative action. Fungous granulations spring up, which, on the slightest occasion, as a fit of coughing or the application of almost any dressing, break down

[1] Gior. ital. d. mal. ven., Milano, 1874.

again and bleed freely, and the case is often aggravated by the formation of ecchymoses in the neighborhood.

De Paoli has observed this bubo in persons of a decidedly scrofulous or phlegmatic temperament, but most frequently in those affected with scurvy, of which it is often one of the first manifestations,—"not indeed the terrible form of scurvy which affects mariners, but the milder form met with among the impoverished residents of the slums of large cities."

Dr. Hammond mentions a case of death from pyæmia following the opening of a bubo (op. cit. p. 57). Prof. B. W. McCready has met with a sloughing bubo, opening into the bladder and giving rise to a urinary fistula. (Oral com.)

A bubo sometimes occasions peritonitis, which is usually partial, but which may become general. Clerc[1] gives two such fatal cases, including the post-mortem appearances.

The possibility of a bubo being transformed into a cancerous ulcer is admitted by Jullien (op. cit. p. 438), who quotes Rollet as having met with such a case in an old man.

An instance is reported by De Paoli, in which the inflammatory process extended from a bubo in the groin to a testicle retained in the corresponding inguinal canal.

Bubon d'emblée(?).—The older writers on venereal diseases believed that the chancroidal and syphilitic poisons could be absorbed without any lesion of the skin and without any sore appearing at the point of absorption. In this manner, they stated there might occur a "*bubon d'emblée*," or "non-consecutive bubo," arising independently of any lesion of the genital organs, secreting pus which was auto-inoculable, and capable of being followed by general syphilitic infection of the system. Within the present century this view has been advocated by Baumès, Castelnau, Bertherand, Cazenave, and Vidal de Cassis, partly also by Diday; and has been ably opposed by Ricord, Fournier, Rollet, Langlebert, Virchow, and others. None of the cases adduced in its favor, not forgetting one published by Mollière,[2] which attracted at the time considerable attention, and which made a convert of Diday, can be regarded as convincing.

In short, there is as yet no proof whatever that the chancroidal or syphilitic poison can be absorbed through the sound integument and no local reaction occur at the point of inoculation. A bubo secreting inoculable pus can depend only upon a chancroid situated either externally or concealed within a mucous canal, as the urethra, vagina, or rectum. This chancroid may escape observation, either on account of its having healed at the time the patient comes under observation or because it is not sufficiently sought for, but it must exist or have existed. Until more satisfactory evidence is adduced in its favor, we must conclude that the existence of a "bubon d'emblée" is not proven.

[1] Ann. de derm. et syph., Paris, t. i, 1869, p. 439.

[2] D. Mollière, Observation de bubon d'emblée chancreilleux, Lyon méd., 1873, t. i, pp. 226, 241, 329.

Diagnosis of Buboes.—It is rarely the case that a bubo can be mistaken by an intelligent observer for any other affection, and little more than mere mention of the possible sources of error will be called for.

Hernia will be recognized by the softness of the swelling, by the impulse conveyed on coughing or sneezing, by its disappearance on pressure or on assuming the recumbent posture, by its increase when the patient is standing, by the absence of tenderness and other symptoms of inflammation. In case the hernia is irreducible, we still find resonance on percussion, and, should strangulation occur, the constipation of the bowels, the fecal vomiting, the tenderness of the abdomen, and the grave general symptoms which rapidly ensue, will *probably* put the attending surgeon on the right track; we say "probably," because a bubo alone may set up peritonitis, the cause of which, however, is not likely to be mistaken, unless by a careless observer.

An undescended testicle, inflamed in the course of a gonorrhœa, may be mistaken for a bubo.[1] The diagnosis may be based on the following points:—

1. Absence of the testicle from the scrotum on the affected side.

2. The presence in the inguinal canal of a movable tumor, ovoid in form, smaller than the descended testicle, but giving the characteristic pain on pressure.

3. The inflamed tumor is seated above Poupart's ligament, and its long axis corresponds with that of the inguinal canal.

4. The tumor is separable, on manipulation, into two portions, one inferior and internal, larger, harder, and more irregular, which is the epididymis; the other, superior and external, smaller, ovoid, smoother and softer, which is the testicle.

Inflammation of the cord due to gonorrhœa rarely occurs without the epididymis on the same side being also affected. Should it, however, occur alone, the coexistence of the urethral discharge, the position of the swelling, its diffuse character, and the very considerable amount of pain and uneasiness which it occasions—far greater than that caused by a gonorrhœal bubo—will serve to distinguish it.

Varix of the internal saphena vein, at the point where it passes through the saphenic opening in the fascia lata a short distance below Poupart's ligament, is said to have been mistaken for a bubo as well as for a femoral hernia. According to Zeissl,[2] the swelling in varix rises and falls isochronously with inspiration and expiration; or, if the walls of the vein are so thickened that this motion cannot be perceived, the diagnosis may be made out in the following manner: If the vein be compressed by the fingers below the varix, the supply of blood will be cut off, and the tumor collapse: if the same be done above the varix, the tumor will become more tense and prominent.

[1] See two cases reported by Rollet, Gaz. d. hôp., Paris, 3 déc., 1861, no. 141, p. 561.

[2] Op. cit., vol. i, p. 228.

An ulcerated epithelioma of the groin, which often accompanies epithelial cancer of the penis, may closely resemble a phagedenic bubo. The diagnostic signs have already been given, when speaking of the chancroid.

Is it possible that any one should fail to distinguish between a bubo and a simple abscess, an aneurism or a dislocation of the thigh?

Diagnosis between the Simple and Virulent Buboes.—There is no *certain* means of diagnosis between a simple and virulent bubo on their first appearance. If the patient has simply a gonorrhœa, balanitis, herpes, eczema, or a mere abrasion, a supervening bubo can of course be only a simple bubo. If he has a chancroid, the bubo may be either simple or virulent. We find, in general, that a simple bubo appears during the first fortnight of the existence of the cause upon which it depends, a virulent bubo after this period; that a virulent bubo is ushered in with more acute symptoms, as a chill, pain, and febrile disturbance; moreover, the glandular tumor is more circumscribed, and presents a hardness and elasticity which are not met with in the simple bubo. The virulent bubo also hastens with greater rapidity and with certainty to suppuration.

When a virulent bubo is left to open itself or is opened by the knife, the contained pus is found to be thick and creamy; the secretion of a simple bubo, on the contrary, is usually thin, watery, and flocculent. Auto-inoculation of the secretion of a virulent bubo, provided the matter be taken from the cavity of the gland itself, will produce a pustule followed by a chancroidal ulcer; inoculation of the matter of a simple bubo will fail. Finally, when the bubo is virulent, the whole surface of the incision becomes inoculated by the virus discharged from the gland, and the sore presents those characteristics which have already been described as belonging to the chancroid, and *a chancroid it really is*, liable to all the accidents of the latter, especially phagedæna, and subject to the same treatment.

When a patient has a bubo in each groin, it may be that the one on one side is simple while the one on the other is virulent, as observed by Ricord and others.

The diagnosis between the two forms of bubo here mentioned and the induration of the ganglia dependent upon syphilis, will be given in the chapter on the evolution of syphilis. It should here, however, be observed that we may have a bubo of a double character, just as we have sometimes a "mixed chancre." For instance, a true chancre upon the genitals occasions induration of the inguinal ganglia; this fact does not protect the same ganglia from taking on inflammation and suppuration in consequence of any of the simple causes already mentioned—and this is known to be of not very unfrequent occurrence,—nor is there any reason why a chancroid coexisting upon the genitals should not excite in the same ganglia virulent (chancroidal) inflammation.

Treatment of Buboes.—A patient with any affection of the genital organs will best avoid a bubo by remaining as quiet as possible—abstaining from much exercise of any kind; by using a suspensory bandage when on

his feet and keeping the parts elevated upon the abdomen when in bed; by a light diet and the avoidance of stimulants, and by securing freedom of the bowels. To the same end, the surgeon will take care neither to irritate the lesion, whatever it may be, upon the genitals, by inappropriate dressings or applications, nor to abrade its surface and thereby lay open channels for absorption. This remark does not conflict with the use of one of the stronger caustics *in the early stage of a chancroid*, when its employment may be expected to destroy the virulence of the ulcer and render the absorption of virulent pus impossible. Thus much as to the prophylaxis of buboes.

Supposing a bubo to have made its appearance, what then? In the first place, let the young surgeon remember that any attempt to abort it can be successful only in case the bubo is a simple inflammatory one; in case it is a virulent bubo, the attempt will surely fail. Some weight, therefore, should be attached to the affection or lesion on which the bubo depends. If this be a gonorrhœa or balanitis, an eruption of herpes, or other simple affection, we are encouraged to use every means to effect resolution of the tumor, and shall often succeed unless the patient be of a miserable, strumous constitution. But even if the patient have a chancroid, his bubo may still be simple, and hence attempts to abort it are not absolutely contraindicated, but need not be persisted in beyond a reasonable period.

Abortive Measures.—Of all available means to effect resolution of a bubo and to avert suppuration, rest is of the first importance, and the more absolute it is the better. Walking and even standing should be avoided, and the recumbent posture be maintained, with the hips elevated by means of a cushion or pillow. An active cathartic at the outset will rarely be amiss, and an evacuation from the bowels should be obtained daily. If the patient be of full habit, his diet should be low; but when the system is already depressed or cachectic, strict abstinence will favor suppuration, and should be avoided.

Similar rules should govern the use of local depletion, the benefit from which, however, is so uncertain as scarcely to compensate for its inconvenience; yet when the patient is plethoric, and the local symptoms acute, from six to a dozen leeches may be applied near (not upon) the tumor, and the bleeding be promoted by immersion in a hot bath; but leeches should never be used when an abscess has formed and is upon the point of opening, lest their bites be inoculated and transformed into chancroids, in case the bubo be of the virulent kind.

The application of ice or of ice-cold compresses to the swelling, especially when it is of an acute inflammatory type, will sometimes be successful in aborting a bubo. So long as it is agreeable to the patient's feelings, it may be regarded as beneficial.

Of local applications, used as counter-irritants, none is more convenient nor perhaps more efficacious than the tincture of iodine. It is desirable, however, to use a stronger preparation than the ordinary tincture of the Dispensatory, as Churchill's, the formula for which is the following:—

℞. Iodinii Puri ℥iiss 75
Potassii Iodidi ℥ss 15
Spt. Rectificat. f℥xij 360
Alcohol f℥iv 120
Solve.

The tinctura iodinii decolorata may also be used, when staining of the skin must necessarily be avoided. Again, the following ointment is a valuable counter-irritant:—

℞. Potassii Iodidi ℈j . . . . . 1 | 30
Iodinii gr. v . . . . . | 30
Unguenti Adipis ℥j 30
M.

Or a solution of iodine in glycerine:—

℞. Potassii Iodidi ʒss 2
Iodinii ʒj 4
Glycerinæ ℥j 38
M.

Either of these preparations may be applied twice a day until as much inflammation is induced as the patient can well bear, when the application must be less frequent.

For the purpose of lessening the irritation produced by the tincture of iodine, Prof. Sigmund adds the tincture of nut-gall, and Prof. Zeissl the tincture of belladonna (Zeissl, op. cit. p. 231):—

℞. Tinct. Iodinii ℥j 30
Tinct. Gallæ ℥ss 15
M.

℞. Tinct. Iodinii ʒvj 24
Tinct. Belladonnæ ʒij 8
M.

Zeissl, however, extols the basic lead acetate in the highest terms as a substitute for iodine in the local treatment of bubo. His method is to soak three or four compresses in a solution of the acetate of lead and bind them upon the tumor, wetting them again with the same as often as they become dry. Dr. Patzelt[1] confirms this high recommendation after a trial of the lead acetate in sixty-seven cases.

Goulard's extract is a solution of the *basic* acetate of lead, and may be used for this purpose. My opportunities for trying it have not been sufficient to enable me to express a decided opinion as to its effect, but I cannot forbear stating my belief that no special virtue is to be found in this or in any other of the topical applications here mentioned. Counter-irritation is doubtless of value, but, with a commencing bubo, rest is the main thing after all.

A strong solution of the solid crayon of nitrate of silver is highly recommended by Sir Henry Thompson.[2] The strength of the solution is three drachms of the nitrate of silver to the ounce of water, with the addition of

[1] Arch. f. dermat. u. syph., Prag, 5 Jahrg. 1873, 4 Heft.
[2] London Lancet, Am. ed., June, 1855, p. 536.

twenty minims of strong nitric acid. This is freely applied to the whole surface of the tumor, and repeated as soon as the eschar comes away; or the solid nitrate of silver may be employed by first moistening the part with water and then rubbing the crayon for a few minutes upon it.

The application of a blister—first shaving the part—is also resorted to. Diday recommends reviving the blistered surface as it commences to heal by pencilling it with the silver nitrate in stick.[1]

Ricord recommends that the blister should be dressed twice a day with half a drachm of strong mercurial ointment, and be covered with a rye-meal poultice which is to be changed three or four times in the twenty-four hours. Any ointment containing mercury should, however, be used with great caution; I have known three applications to a bubo to produce very severe salivation. A caustic solution of the bichloride of mercury, proposed by MM. Malapert and Reynaud for the treatment of buboes after suppuration has taken place, has also been employed by some surgeons for the purpose of inducing resolution.

A few years since a favorite mode of treatment of subacute buboes in the French hospitals was by means of "cautérisation ponctuée," or the rapid application of a pointed iron heated to a white heat to numerous points over the tumor. The dread rather than the pain of the application, which does not exceed that produced by many caustics, interferes with its adoption in private practice.

Compression is another means employed to induce resolution of buboes, and is said to have been suggested by the observation that these tumors do not occur wherever a truss is worn. The most ready method of applying pressure is by means of compressed sponge and a spica bandage, and the application of hot water to cause the sponge to swell. An Interne of the Hôpital du Midi invented a truss or pad for the same purpose, consisting of a rounded piece of wood covered with leather, and provided with straps to pass round the waist and thigh. This may be obtained at most instrument makers, and is very convenient and serviceable. It is generally called "Ricord's pad for buboes." Reynaud[2] combines heat and pressure by heating the half of a common brick, the edges of which have been chipped off, wrapping it in a napkin, laying it upon the bubo, and changing it at the end of three or four hours, or as soon as it becomes cool.

The application of collodion, which, by its power of contraction, exerts pressure upon the tumor, has been recommended by Dr. J. H. Clairborne and others.

Methods of Opening Buboes.—So soon as matter can be detected, and it is evident that resolution is impossible, the abscess should at once be opened. Delay will allow the pus to collect and undermine the skin, which, becoming thin and deprived of its vascular supply, will be destroyed to a greater or less extent, thereby increasing the difficulty of cicatrization and adding to the dimensions of the unsightly scar.

[1] Ann. de derm. et syph., Paris, 1 année, 1869, p. 64.
[2] Traité des maladies vénériennes, p. 76.

But even before the presence of matter is evinced by fluctuation, valuable time will often be saved by an early resort to the knife, and this is the case when abortive means show no prospect of success, and especially if we have reason to believe that we have in hand a virulent bubo, which must necessarily terminate in suppuration. Under these circumstances, no method of procedure can, I believe, equal that proposed by Auspitz, which is most simple in its performance, which can do no harm even if it should prove to have been uncalled for, and which will often be found of invaluable service in averting extensive suppuration and degeneration of the gland and neighboring tissues. It is based on the philosophical idea of removing "the thorn in the flesh" at the earliest possible moment, and it is described as follows by its able author:—

"As soon as I can feel and grasp the hardened and somewhat painful gland,—and this is often as early as the patient first complains of pain in the groin,—I press it between the thumb and forefinger of the left hand towards the skin, and make a puncture, with a sharp, narrow bistoury, perpendicularly over the most prominent point of the swelling, no deeper, however, than is necessary for me to feel certain that I have simply penetrated the skin. I then lay aside the bistoury, and enter the wound with a thin bulbous-pointed probe, *still keeping up the pressure exercised by the left hand.* The point of the probe sometimes strikes against the underlying fascia superficialis, which however will give way without the least use of force. In most cases this fascia has been cut through together with the skin, and the probe penetrates immediately into the deeper part of the gland, which offers little resistance. When sure that the probe is within the gland, I move its point about with a prying or lever-like motion in all directions, and thus bluntly *tear up* the connective tissue. This excites only moderate pain, and does not require much force. In most cases a small quantity of matter appears either on the first introduction of the sound or after the completion of the above movements.

"The gland being still firmly held in the left hand, the probe is now withdrawn and the pressure with the left hand somewhat increased and directed concentrically against the tumor. The effect of this, no matter whether matter has been let out or not, is almost always an immediate and very marked diminution in the size of the gland and a subsidence of the pain. I have never met with bleeding after this proceeding and, if it should occur, it could readily be controlled.

"To complete the operation, I apply to the point of puncture a pledget of carbolized lint, and exert pressure upon the tumor by means of compresses and a suitable bandage. This dressing is allowed to remain for twenty-four hours, when, after again lightly pressing the tumor to force out any matter, it is renewed. In many cases, in the course of forty-eight or even twenty-four hours, it will be found that the puncture has closed, the gland shrunk to a small hardish lump, and the pain has disappeared. After this there is no further danger of periadenitis.

"When several glands are involved, a puncture should be made in each. *For a single gland, one puncture and one stirring up with the sound is*

usually sufficient. Should, however, a repetition of the operation appear necessary, there can be no objection to it.

"In case the point of puncture has not closed, pus continues to be discharged through the opening. The edges of the glandular capsule gradually become adherent to the external skin without the occurrence of periadenitis, and finally the cavity of the abscess closes by the contraction of its walls and by granulation. Occasionally ulceration of the puncture takes place, but this is confined to the skin and does not extend in depth."

In case more or less matter has formed in a bubo before the surgeon has an opportunity to interfere, two methods for its evacuation are at his disposal, either by the knife or by caustic. The former is, with rare exceptions, to be preferred; and, in our opinion, a free opening is better than a number of small punctures.

The hair should first be shaved off from the surface to facilitate the after-dressing and promote cleanliness. The longest diameter of the abscess is in most cases parallel to the inguinal fold, yet if the incision be made solely in this direction, its edges are approximated whenever the thigh is in a flexed position and healing from the bottom of the cavity is interfered with. It is therefore desirable to secure one incision at least parallel with the median line of the body and to cut on either side as circumstances may require, making in the end a crucial opening. Any fistulous tracks which may exist at the time, or which may subsequently form, should be fully laid open, as soon as discovered. It is often desirable to pare off a portion of the skin from the flaps. This is absolutely called for when they are so thinned and purplish in color that their further vitality cannot be expected. But in the absence of such marked symptoms of degeneration, experience shows that the removal of a portion of the integument favors the healing of a bubo which has extensively suppurated, without adding to the subsequent cicatrix.

On opening a bubo, especially in strumous subjects, we often find that we have merely penetrated into an abscess of the cellular tissue, within whose cavity lie one or more disorganized glands, infiltrated with pus and almost isolated from their surrounding connection. Now, it is absurd to look for healing of the bubo until these glands are got rid of by the slow process of ulceration or are removed by a quicker process. The latter is best accomplished, the patient being anæsthetized, by tearing them out with the fingers or scraping them out with a Wolkmann's spoon; or, again, when they are large and sessile they may be tied off by means of a double ligature passed through their base.

The hemorrhage from this operation is seldom so severe that it may not be arrested by exposure to the air, by ice, or pressure; but should it be profuse, or continued even in a small quantity, the bleeding vessel must be secured. Carbolized lint or cotton is now introduced into every recess of the cavity, paying particular attention to any short sinuses which it was not thought necessary to lay open with the knife, and the whole may be covered with a water dressing. Care should subsequently be taken to keep the wound clean and avoid the collection and stagnation of matter by

daily syringing or a sitz-bath. If the bubo be a virulent one and its surface chancroidal, the same local applications are indicated as those mentioned when speaking of the chancroid.

In private practice it will rarely be desirable to open a bubo either by incision or puncture otherwise than in one of the methods above mentioned. Many other plans, however, have been advocated, but we regard most of them as unworthy of more than mere mention, and some of them not even of that.

Perhaps the one most deserving of notice consists of multiple punctures in buboes which have extensively suppurated, in which the skin over them has been undermined to a very considerable extent, and in which a single large incision, freely exposing the cavity of the abscess to the air, may be regarded as injudicious. In such cases, multiple incisions, recommended by Vidal, Langston Parker, and others, may be resorted to with the idea of evacuating the collection of matter, and securing by rest and pressure a contraction of the walls of the tumor, while still holding in reserve a free incision in case it should be required.

Langston Parker's favorite method was as follows: "When a bubo is ready to be opened, we should not suffer the skin to become too thin, but make several very small punctures over its thinnest part with a grooved needle, perhaps six, eight, or ten; through these the matter will ooze out till the cavity of the abscess is empty. Through one of the punctures the point of a very small glass syringe may be introduced, and a very weak solution of the sulphate of zinc injected, in the proportion of two or three grains to the half-pint of water. When the abscess is quite empty, place over it a large compress of lint, and use moderately tight pressure by means of a roller. In many instances, if we can keep the patient quiet for twenty-four hours, we get either partial or total adhesion of the sides of the bubo, and a speedy cure will be the result; in other instances this may not be the case, but by the daily use of the injection through one of the punctures, which should be kept open for that purpose, we succeed in a few days, in almost every case, in effecting a cure." Judging from my own experience, I am confident in stating that this result is overestimated, although the method of multiple punctures has recently received the highest praise from no less an authority than Zeissl,[1] who speaks of it as "a triumph of conservative surgery." Is it not probable that Lister's antiseptic method would avoid all dangers, real or supposed, of free incisions? Such has not yet been tried, so far as I know.

The following methods are not to be recommended:—

Aspiration of the contents of the abscess (Grünfeld).

A filiform seton recommended by Bonnafont, by Mr. Parker, also by Dr. Hammond (op. cit. p. 56), and reported against by a committee of the Soc. de Méd. de Paris, in 1859.

Caustics have been employed for the opening of buboes, particularly such as are of large size and with the skin over them much thinned, but

[1] Op. cit., vol. i, p. 235.

they are painful in their application and without any special advantage. Any powerful caustics, as Vienna paste, may be used for this purpose. A method proposed by MM. Malapert[1] and Reynaud[2] was at one time in vogue, but has fallen into disuse. It consisted in the application of a blister over the tumor, and of a pledget of lint soaked in a solution of corrosive sublimate (gr. xv. to ℥j of water) to the vesicated surface previously freed from all secretion of serum. The caustic was allowed to remain for two hours, or until a superficial eschar was formed, when a large poultice was applied. The authors of this method claimed that, as the eschar was detached, the contents of the abscess oozed out through minute openings in the integument, the whole substance of which was not destroyed, and that the walls of the cavity were so stimulated and modified by the caustic that they rapidly contracted and adhered. As stated upon a previous page, this method, although designed by its authors solely for the treatment of buboes after suppuration has taken place, has been applied by others for the purpose of effecting resolution. The excessive pain attending the application is not counterbalanced by any advantage over milder methods.

Gangrene attacking a bubo must be met by the same means as those already mentioned when speaking of the gangrenous chancroid. Continuous immersion in a bath, described upon page 388, is a most valuable mode of treatment which has been found successful in many cases where other means had failed, and it relieves the patient from the excessive pain which often attends the change of dressings. Attention to the general condition of the patient; the administration of tonics, cod-liver oil, and of opium, when indicated; the local application of iodoform and, in obstinate cases, of the more powerful caustics, as the carbo-sulphuric paste or the actual cautery, should not be forgotten.

Zeissl advises, on the first appearance of any symptoms of gangrene, filling the cavity of the bubo alternately with lint soaked in a solution of chloride of lime and with "gypstheer" (one part of coal tar and twenty parts of gypsum), and covering it with ice-cold compresses. He says that the extent of the gangrene can sometimes be limited by the use of "campherschleim" (one drachm of camphor to an ounce and a half of mucilage).

Any sinuses which form, as they may do either below or above Poupart's ligament, terminating in counter openings a long way off, must be treated according to the principles of general surgery, keeping in view the general condition of the patient and his consequent ability to withstand a cutting operation, and also the course of the sinus, its proximity to important vessels, etc. In some cases free incision may be resorted to; in others, we must content ourselves with a ligature passed through the fistula and gradually tightened, or with injections into the passage followed by carefully adjusted pressure over its track. I have little faith in drainage-tubes, which have also been employed.

[1] Arch. gén. de méd., Paris, Mars, 1832.
[2] Traité d. mal. vén., p. 70.

In the hemorrhagic bubo, the indications for the general treatment of the patient are evident. As to local applications, Prof. Gamberini is in the habit of using the liquor ferri perchloridi, or he sometimes sprinkles a thin layer of caustic potash in powder over the surface, so as to form an eschar. A light touch with a red-hot iron may be useful. The cavity should be thoroughly exposed by free incisions, the impaired integument be pared off, and the glands removed by enucleation, ligation, or cauterization in severe cases.

CHAPTER VI.

LYMPHITIS.

Having described the inflammation of the ganglia which constitutes a bubo, it will be necessary to devote but a few words to the consideration of lymphitis, since the phenomena are almost identical in the two cases; the latter being in fact a bubo seated in the course of a lymphatic vessel instead of in the terminal ganglion.

As with buboes, so with lymphitis, we find two forms:—

I. Simple Lymphitis.
II. Virulent Lymphitis.

Simple Lymphitis.—Simple lymphitis may be due to any of the causes already mentioned as producing a simple bubo. A hard, uneven cord is observed running along the dorsum of the penis towards the mons veneris, in which it is usually lost. This cord is made up in part of the thickened and distended walls of the lymphatic vessels, but in part also of the infiltrated cellular tissue in its neighborhood. The dorsal vein and artery are usually included in the inflammatory engorgement and cannot be isolated from the vessel. There is often more or less œdema of the cellular tissue, especially of the prepuce. Considerable heat and pain are experienced, and the course of the inflamed vessel is marked by a red line upon the surface. As we shall see hereafter, these symptoms of acute inflammation are sufficient to distinguish lymphitis from the induration of the lymphatics which often accompanies a chancre.

This form of lymphitis is capable of resolution, which, indeed, is its most frequent termination. If suppuration occurs, the pus is not inoculable.

Virulent Lymphitis.—As a general rule, morbid products which undergo absorption do not manifest their presence in the lymphatics themselves, probably in consequence of the rapidity of their passage; and the changes which take place in the ganglia where their progress is impeded are the only indication that this system of vessels is affected. In conformity with this law, the lymphatics which convey the pus from a chancroid in the direction of the ganglion generally escape, but in some instances inoculation takes place at one or more points in the course of the vessel, probably at the site of its valves, and virulent lymphitis is set up, the early symptoms of which are the same as those of the simple form. Suppuration, however, is inevitable, and when the abscess is opened

a chancroid is the result, as in the case of a virulent bubo. Several of these virulent ulcers sometimes occupy the sides or dorsum of the penis, following the course of the lymphatic vessels, and communicate with each other beneath the integument by means of minute fistulous tracks, which may be penetrated by a fine probe.

This affection of the lymphatics is seldom met with in women, in whom, however, it occurs in rare instances in the labia majora.

The complications and the treatment are the same as those of the virulent bubo, although destructive cauterization is less frequently applicable, partly on account of the situation of the sore, but chiefly from the extreme probability that reinoculation will take place on the fall of the eschar; we must, therefore be content in most cases with dressings of iodoform, a solution of carbolic acid, aromatic wine, etc.

PART III.

SYPHILIS.

CHAPTER I.

INTRODUCTORY REMARKS.

Syphilis is one of the class of diseases called "infectious," the characteristics of which are the following:—

1. The presence of a morbid poison or virus, which transmits the disease from one individual to another.

2. The immunity which one attack generally confers against a second.

3. A "period of incubation," during which the virus is latent and gives no external manifestation of its presence in the system.

4. A degree of order and regularity in the evolution of the symptoms.

There are two forms of syphilis, the acquired and the hereditary. Both are the result of the same morbid influence or virus, but their course, lesions, and symptoms vary in so many particulars that they require a separate description.

Acquired syphilis is the disease communicated by an infected person to one free from syphilis, and always manifests itself first at the point of inoculation, by an initial lesion or chancre. Acquired syphilis without a chancre, or, as some French writers have called it, "syphilis d'emblée," is a myth.

Hereditary syphilis is syphilis inherited from either parent, infection of the ovum having taken place at the time of conception. In this form of syphilis, the initial lesion or chancre is wanting.

Syphilitic Virus.

The existence of a syphilitic virus has sometimes been called in question,[1] but at the present day is established beyond a doubt. The daily experience of every surgeon demonstrates that in syphilis there exists a

[1] Chiefly by the following authors: Bru, Méthode nouvelle de traiter les maladies vénériennes par les gâteaux toniques mercuriels, t. i, chap. 3, p. 45, Paris, 1789; Caron, Nouvelle doctrine des maladies vénériennes, Paris, 1811, p. 33; Richond des Brus, De la non-existence du virus vénérien, Paris, 1826, t. i, p. 67; Jourdan, Traité complet des maladies vénériennes, t. i, p. 888.

contagious element, by means of which the disease is communicated; and though this morbid poison has never been detected by the senses, the microscope, or chemical analysis, its presence is fully proved by its effects. Various theories have been offered to explain its nature, but they have all been either fanciful or untenable, and their authors have almost invariably confounded the syphilitic with the chancroidal virus. Thus the essential element of this disease has always remained concealed, and probably will so remain, until our knowledge in general of the principle of life and the nature of disease is very much greater than now.

The severity of the symptoms produced by syphilis on its first appearance in the latter part of the fifteenth century, compared with its greater benignity at the present day, affords some ground for believing that its virus is slowly but gradually losing in intensity in the same manner as the vaccine virus becomes weaker after many successive removes from the cow. This fact was noticed by Astruc[1] in the middle of the last century, who says: "Whatever might formerly be the power and efficacy of the venereal disease when it was new and in vigor, while the undivided poison violently effervesced, there is nothing like it, I imagine, to be feared from it now, as it is weakened, become old, and its force almost quite spent." Another explanation advanced by some writers is, that the syphilitic virus retains its power, but that a preservative influence is transmitted to posterity by those who have the disease, which, like some vegetables, gradually exhausts the soil from which it springs of the materials necessary to its support. Admitting the fact, the first mentioned theory is probably the correct one.

Syphilis commonly Occurs but Once in the same Person.

It is true of all diseases which are both contagious and constitutional, that a person who has once had them is indisposed to contract them again. Smallpox, scarlet fever, measles, the hooping-cough, and the vaccine disease, all follow this law; and in the rare exceptions which sometimes occur, the symptoms are generally so modified as still to evince the protecting influence of the first attack. The applicability of this law to syphilis was first announced by Ricord in 1839, and in spite of frequent denials, may now be regarded as unquestionable. The immunity conferred by an attack of syphilis is as great as that resulting from an attack of any of the other infectious diseases just mentioned.

Without due care, however, it is an easy matter to be deceived on this point. After syphilitic infection, but few persons escape with only one outbreak of general lesions; however thorough their treatment may have been, one or more relapses usually occur, and if one of these has been preceded by a newly caught venereal ulcer, the secondary symptoms which follow are frequently ascribed to its influence, especially if the ulcer happened to be situated upon the remaining induration of the first, and thus

[1] English translation of Astruc, London, 1754, p. 102.

simulated a chancre. Fortunately, we are able in most instances to recognize a recent attack of syphilis by the following signs, and in their absence to ascribe the lesions to an old infection :—

1. By the induration of the preceding chancre and neighboring lymphatic ganglia.

2. By the time elapsing between the appearance of the suspicious ulcer and that of the general symptoms; the interval, in the absence of treatment, and when the latter are dependent upon the same infection as the former, being very uniformly about six weeks, and rarely exceeding three months.

3. By the character of the lesions, whether belonging to an early or late stage of syphilis.

4. In some cases, by the influence of treatment; the early lesions of general syphilis yielding most readily to mercury; the later to iodide of potassium.

But are there no exceptions to the law of the "unicity of syphilis," such as undoubtedly exist in respect to other infectious diseases? Numerous instances are recorded in which smallpox, scarlet fever, the measles, and hooping-cough have occurred twice in the same person. A single vaccination does not always protect one through life from variola. A second inoculation with the vaccine virus performed in adult life will often succeed nearly if not quite as well as the first vaccination performed in childhood. In the case of a second infection from any of the diseases mentioned, the severity of the attack will, as a general but not an invariable rule, be in inverse ratio to the length of time which has elapsed since the previous infection. In other words, the protecting influence of the virus appears to gradually diminish and finally disappear. One attack confers complete immunity for a time; then comes a period in which inoculation (as of the variolous or vaccine poisons) will produce a local effect without general reaction, and finally a third period in which constitutional manifestations of greater or less intensity are possible.

As early as 1845, Ricord himself expressed the belief that similar exceptions to the law of the unicity of syphilis would also be found to exist; he trusted it was so, since it would prove the effect of syphilis was not necessarily life-long; at the same time he confessed he had never as yet met with an unquestionable instance.

Since then attention has been directed anew to this subject. Quite a number of cases of repeated syphilitic infection in the same person have been reported by various observers, and Ricord himself has met with two which he regards as conclusive. A valuable contribution to our knowledge of syphilitic reinfection has appeared from the pen of Diday,[1] who believes that he has met with over twenty cases (?). The conclusions at which he has arrived are the following:—

1. As a general rule, the syphilitic, like other kinds of virus, does

[1] De la réinfection syphilitique, de ses degrés et de ses modes divers, Arch. gén. de méd., juillet et août, 1863.

not exercise the same action twice in succession upon the same individual.

2. When applied (under such conditions as to permit absorption) to a syphilitic subject, this virus produces no effect; applied to a subject who has had, but who no longer has syphilis, it produces a modified form of syphilis.

3. The more feeble the first attack, and the longer the time that has since elapsed, the more energetic will be the action of the virus and the more severe will be the second attack of syphilis; and *vice versâ*.

4. Experience shows that the only persons upon whom a second introduction of the syphilitic virus produces a pathological effect are those who are cured of their first attaek, or who at least have no other symptoms than those which cannot be transmitted either by generation or by contact (tertiary lesions).

5. The effects of the second introduction of the virus, under the conditions just mentioned, have presented in twenty-five cases which have been observed, the following varieties:—

A. In fourteen, there has been an ulcer presenting all the characteristics of an indurated chancre, *except concomitant induration of the ganglia*, and this ulcer has not been followed by general symptoms. Thus the absence of glandular induration may enable the surgeon to recognize in advance those indurated chancres which will not be followed by general lesions.

B. In nine cases, there was an indurated chancre followed by general symptoms, which were less intense than those of the first attack.

C. In two cases, there was an indurated chancre followed by general symptoms of greater intensity than in the first attack.

6. If we compare the intervals of time elapsing between the two attacks in these different series of cases, we find that the shorter the interval the more feeble was the effect of the second infection; the interval being at a minimum when the second attack produced only a chancre, and at a maximum when the general symptoms of the second attack were more intense than those of the first.

It is asserted by Diday that the twenty cases above referred to were observed by him in his private practice within a period of six years, and he therefore infers that instances of syphilitic reinoculation are more frequent than has generally been admitted, although they are rare when compared with the whole number of cases of syphilis that occur. This surgeon draws the following conclusions from a consideration of this subject:—

The reinfection of a man who has had syphilis proves that he was cured of it at the time of the second infection.

The possibility of reinfection proves that syphilis can be radically cured—a fact denied by many authors, who admit only a cure of syphilitic manifestations, and who maintain that the constitutional poisoning (or *diathesis*, as they erroneously call *syphilitic intoxication*) is perpetual.

The average time necessary for a radical cure may be deduced from

the cases above referred to, and which give a minimum of twenty-two months.

In any case of reinfection from syphilis, the surgeon should always wait for general lesions to appear before giving mercury, since in the majority of cases the effect is limited to the production of a chancre, and specific treatment is not required.

Since the publication of Diday's paper numerous authors have reported cases of syphilitic reinfection, to the number in all of above sixty; but fully one-half of these are not instances of a second attack of syphilis at all. The error several authors have fallen into is in regarding relapsing indurations as primary chancres. They thus mistake a manifestation of an old contagion as an evidence of a new one. Before we can admit a second attack of syphilis, we must have an undisputed history of the first infection: we must have proof beyond doubt of a second chancre, which is followed by *well-marked enlargement of the inguinal ganglia*, and later on *by secondary manifestations of an undoubtedly syphilitic nature*. Without this succession of lesions similiar to those of the first attack, we cannot admit the claims of any case of syphilitic reinfection.

Syphilis Possesses a Period of Incubation.

By a period of incubation we understand the lapse of time following the introduction of a morbid poison into the system, and preceding the earliest manifestation of its presence. Thus a person is exposed to small-pox, the measles, or scarlatina, and, when contagion takes place, breaks out with the symptoms of the disease only after an interval, which, with slight variation, is constant in each of the affections mentioned, and during which he enjoys his usual state of health. That, in the case of syphilis, such a period elapses between the act of contagion and the appearance of its initial lesion, will be shown in the next chapter. But syphilis also has a second period of incubation, between the appearance of the chancre and the development of its general manifestations, and of this we shall speak presently.

The Order of Evolution of Syphilitic Symptoms, and the Classification Founded Thereon.

The classification of syphilitic manifestations in common use is founded chiefly upon the order of their evolution, and embraces "primary," "secondary," and "tertiary symptoms." Primary symptoms should include the initial lesion which appears at the point where the virus enters the economy, and the induration of the neighboring lymphatic ganglia. Next follows, after a period of incubation, another set of symptoms, called "general," because they are developed at points distant from the seat of the initial lesion, to which they stand in no necessary anatomical relation.

Ricord's classification of general symptoms into *secondary* and *tertiary*, which is generally adopted at the present day, is founded upon Hunter's division of the tissues affected by syphilis into "parts first in order, and

parts second in order." Both systems are based upon the conformity of nature to laws which are more or less fixed as well in disease as in health, and upon the anatomical structure of the parts affected. An important distinction, also, which Ricord claims to exist between the two divisions in this classification, is a difference in the effect of remedies; secondary symptoms being more susceptible to mercury, and tertiary to iodine and its compounds.

Ricord's classification may best be given in his own words; "Secondary symptoms are the consequence of the absorption of the virus, and are transmissible by hereditary descent, without being inoculable. Tertiary symptoms are not only not inoculable, but cannot be transmitted by hereditary descent under their peculiar type, although in consequence of a kind of degeneration or modification of the syphilitic virus, they are probably one of the most fruitful sources of scrofula.

"Secondary symptoms rarely occur before the third week following the appearance of primary symptoms, and more rarely still after the sixth month; whilst tertiary symptoms scarcely ever appear before the sixth month, and may not until after several years.

"To secondary symptoms are referred certain affections of the skin (syphilitic eruptions) and of some parts of the mucous membranes (mucous patches, condylomata, and superficial ulcerations) and their dependencies (alopecia and onyxis); also some peculiar pathological affections of the eyes (iritis), lymphatic ganglia (engorgement of the glands in various parts of the body, especially the neck), etc. Tertiary symptoms consist of certain changes which take place in the subcutaneous or submucous cellular tissue (gummy tumors), in the testicles (orchitis), in the fibrous and osseous tissues (periostitis, ostitis, caries, etc.), and in the deeper organs.

"Proper treatment of the primary symptom may prevent the development of secondary symptoms. Very often this treatment cures the primary and arrests only the secondary symptoms; in this way may be explained, for example, the late appearance of diseases of the periosteum and bones, without the secondary link, in persons who have taken mercury. When once the primary ulcer is healed, it cannot be reproduced except by a new contagion; while secondary and tertiary symptoms may appear repeatedly, and at various intervals, within periods which cannot be limited. An apparent inversion in the succession of secondary and tertiary symptoms is observed only in persons who have undergone treatment. After the appearance of constitutional symptoms, the *syphilitic diathesis* may cease spontaneously or in consequence of appropriate treatment, and yet the symptoms persist under the influence of purely local causes, as is observed especially in many cases of diseased bones."[1]

In another place Ricord says of tertiary symptoms: "They not only differ from primary and secondary symptoms in affecting the deeper tissues, but also in the fact that in them syphilis loses, in part, its peculiar type. Though the skin is often affected at this period with the most severe

[1] Notes to Hunter, p. 396.

tubercular eruptions, yet the subcutaneous and submucous cellular tissues, and the fibrous and osseous systems are far more frequently involved. But, in addition to these parts, where the tardy effects of constitutional syphilis are so common and clearly admitted by all good observers, we may well inquire whether there be any privileged tissues of the body which are invariably exempt from its effects. We would inquire, also, if syphilitic infection, though it may not produce all the evils with which it is reproached, be not in a multitude of cases the cause of the evolution, or 'putting into action'—to use an expression of Hunter's—of diseases which have previously existed in a latent state, and of which it is thus only the exciting cause? Observation replies in the affirmative to these questions, and also teaches us that tertiary symptoms may continue under the influence of the virulent cause, or persist as local effects after this cause has been destroyed or neutralized by treatment; it shows, in a multitude of cases, that the syphilitic virus, after having been the cause of other diseases, may cease to exist or persist as a complication; and these are circumstances which, though real, are unfortunately not always easily appreciated.

"Tertiary symptoms rarely occur before the sixth month following the appearance of the primary ulcer, and the latter seldom remains at the time of their development; but they are frequently attended by some secondary symptom. They never furnish inoculable secretions, nor transmit characteristic constitutional syphilis from parent to child; their only hereditary influence being the frequent transmission of a taint as injurious and almost as fearful, viz., a scrofulous diathesis."

Ricord's classification may, I think, be resolved into two parts. The first is the chronological system, which, originating with Fernel and Hunter, has been freed from many errors by Ricord, and greatly perfected by this surgeon's keen powers of observation, and which is both natural and eminently practical. The second part consists of various additions relative to the inoculability of the different orders of symptoms, their transmission by hereditary descent, and the effect of treatment; some of which are open to criticism. I shall speak of each in turn.

The general symptoms of syphilis are not drawn at hap-hazard, but make their appearance with a great degree of order and regularity. This fact is most apparent in those lesions which follow immediately upon the period of incubation, and which vary but little in different subjects. Allow any patient with a chancre to go without treatment, and it may be predicted with almost absolute certainty, that within three months he or she will be attacked by the following category of symptoms with but little variation, viz., general lassitude, accompanied by headache and fleeting pains in various parts of the body; alopecia; an eruption of blotches or papules upon the skin; pustules upon the hairy scalp; engorgement of the post-cervical glands; and whitish patches, which may become ulcerated, upon the mucous membrane of the mouth, anus, or vulva.

Subsequent to the first outbreak of general syphilis, the same uniformity does not prevail; and certain symptoms are absent in one case and present

in another, or they appear to be modified by the constitution of the patient, the hygienic conditions in which he is placed, his habits, and especially by treatment. But if we take a number of cases, some of which supply what is wanting in others, we find that we can, as it were, make up a complete series, in which the symptoms progress by a regular gradation, and may be divided into two classes, distinguishable by the time of their appearance, their character, and their seat. Those of the first class follow immediately upon the earliest general symptoms before mentioned, with which they are evidently identical in character. Those of the second class never occur until after a certain interval which experience enables us to determine with great precision. Again, the order of the two classes is never reversed. For instance, a patient who has been suffering with symptoms belonging to the second, as deep tubercles of the cellular tissue or caries of the bones, is never known to exhibit the premonitory fever, exanthematous eruption, and other early symptoms of the first. The disease progresses with greater rapidity in some cases than in others, yet owing to the general uniformity referred to, simple inspection of a patient will enable any one familiar with its natural course to arrive at an approximate conclusion as to the length of time that has elapsed since contagion, and also as to the character of the preceding symptoms, unless these have been altogether suppressed by treatment.

Apparent exceptions to the regular succession of the general symptoms of syphilis are met with, and may readily deceive an inexperienced observer. One of the most frequent of these is due to treatment. It often happens that a patient had a chancre many years ago, and perhaps early secondary symptoms, for one or both of which he took mercurials; a long period has since passed without further general manifestations; but his system has continued under the influence of syphilis, which finally becomes active again and gives rise to tertiary lesions. Evidently the exemption from late secondary symptoms may be ascribed to mercury.

Again, the date of the first appearance of any lesion determines its position in the syphilitic scale; while its persistency may be due to many causes, too numerous to mention. It is a very common occurrence for a chancre to remain until secondary symptoms break out; but we do not therefore conclude that both belong to the same order. In the same way, secondary are often present long after tertiary manifestations have supervened. In Ricord's admirable remarks already quoted, allusion has been made to the fact that syphilis may give rise to symptoms, which are continued by various causes and especially by a strumous diathesis, long after the exciting cause has been subdued. Moreover, many syphilitic lesions, and particularly eruptions upon the skin and mucous membranes, may, either with or without treatment, disappear, and again return within a limited period with the same characters as at first. This tendency, however, ceases with time; and relapses after a considerable interval are in all cases rare. For instance, syphilitic erythema, which usually appears about the sixth week after the development of the chancre, may perhaps

return as late as the eighth or ninth month, but never several years after the chancre.

Finally, the same name is, in several instances, applied to symptoms which are in reality distinct, and which are widely separated upon the syphilitic scale. Thus there is a form of alopecia which is one of the earliest general symptoms, and in which the hair is freely shed from the scalp and eyebrows, but may grow again, since the hair-bulbs are not seriously affected; and there is another and rarer form, observed only in the later stages of syphilis, in which the whole integumental surface becomes permanently bald. Two forms of iritis, ecthyma, etc., are also observed at distinct periods; but these constitute no exception to the law of succession of syphilitic manifestations.

We thus see that a simple chronological division of constitutional symptoms may be maintained; but there are several objections to the additions made to this system by Ricord, as I shall proceed to show.

In the first place, Ricord's statement that "secondary symptoms are not capable of inoculation," is true in the guarded sense in which it was intended, viz., that they are not inoculable upon persons bearing them; but the inference which was also designed to be conveyed, that they differ in this respect from a chancre, is not true, as Ricord himself has since acknowledged. Both are contagious and inoculable upon persons free from syphilitic taint, but neither are auto-inoculable.

Again, Ricord's statements relative to tertiary symptoms cannot at the present day be implicitly received. This author maintains that tertiary lesions are not inoculable and cannot be transmitted by hereditary descent under their peculiar type, and hence that the virus in this stage must be entirely changed from its original character. The first of the above assertions is doubtful, the second incorrect. The inoculability of tertiary symptoms has never been tested upon persons free from syphilitic taint, and its possibility, therefore, may yet be demonstrated, as that of secondary symptoms has been. Their transmission by hereditary descent in a few instances, still preserving their peculiar type, is a known fact. The most frequent instance of this is the occurrence of syphilitic hepatitis and deep tubercles of the subcutaneous cellular tissue in infants affected with hereditary syphilis. Virchow[1] has also found small collections of the deposit peculiar to tertiary syphilis in the cerebral substance of children born of syphilitic mothers.

Hunter attributed the difference in the situation of early and late general symptoms to the influence of cold, which, as he supposed, rendered the more superficial parts of the body most susceptible to, and earliest affected by the virus. This anatomical distinction, without Hunter's explanation, has been retained in Ricord's classification, in which the skin and mucous membranes on the one hand, and the osseous, fibrous, and cellular tissues on the other, are regarded as the exclusive seat of secondary and tertiary

[1] La syphilis constitutionnelle, traduit de l'allemand par le Dr. Picard, Paris, 1860, p. 4.

manifestations respectively. But this rule cannot always be maintained, since one of the earliest symptoms of general syphilis—preceding in many cases the eruption upon the skin—consists of pains resembling rheumatism, some of which are evidently seated in the periosteum (chiefly that of the cranium and in the neighborhood of the joints), and this fibrous tissue has been known to take on acute inflammatory action at this time. In order to avoid this difficulty, Bassereau asserts that general syphilis attacks indifferently the integumental, fibrous, and osseous structures in all periods of the disease, but that the more superficial portions of each are affected in the earlier and the deeper in the later stages.

Virchow[1] would exclude all consideration of situation from the classification of general symptoms, and has proposed a system based upon the nature of the pathological changes in the different lesions, but which is too widely at variance with the ideas at present received to meet with general adoption. Von Baerensprung[2] offers a similar classification in which secondary symptoms are made to include those lesions which are characterized by hyperæmia and simple exudation; and tertiary symptoms those in which there is tubercular deposit.

But it is easier to pull down than it is to build up, and attempts in the latter direction may well be deferred until many preliminary points are settled. Meanwhile, we have every reason to be satisfied with the simple and natural chronological division which forms the basis of Ricord's classification, and which owes its excellence in a great measure to the keen powers of observation of this truly eminent surgeon. The few errors which he introduced are not essential to the system, and may well be forgotten, when we recollect his important contributions to our knowledge of the natural history of syphilis.

The time of the appearance of any given syphilitic lesion will be influenced in a measure by the constitution of the patient, his mode of life, and the treatment to which he is or has been subjected, and can therefore be determined only approximately. The following table compiled by M. Martin[3] from the statistics of McCarthy, Bassereau, Sigmund, and Fournier, is however, of value in exhibiting the usual period of development, following the appearance of the chancre, of the more important syphilitic lesions:—

[1] Op. cit. [2] Annales de la Charité, vi, p. 56, et vii, p. 173.

[3] De l'accident primitif de la syphilis constitutionelle, Paris, 1863, p. 87.

Symptoms.	Date of usual development.	Date of earl'st development.	Date of lates development.
Roseola	45th day	25th day	12th month
Papular eruption	65th "	28th "	12th "
Mucous patches	70th "	30th "	18th "
Secondary affections of the fauces	70th "	50th "	18th "
Vesicular eruption	90th "	55th "	6th "
Pustular eruption	80th "	45th "	4 years
Rupia	2 years	7th month	4 "
Iritis	6th month	60th day	13th month
Syphilitic sarcocele	12th "	6th month	34th "
Periostosis	6th "	4th "	2 years
Tubercular eruption	3 to 5 years	3 years	20 "
Serpiginous eruption	3 to 5 "	3 "	20 "
Gummy tumors	4 to 6 "	4 "	15 "
Onychia	4 to 6 "	3 "	22 "
True exostosis	4 to 6 "	2 "	20 "
Ostitis, changes in the bones and cartilages	3 to 4 "	2 "	41 "
Perforation or destruction of the velum palati	3 to 4 "	2 "	20 "

According to Bassereau's statistics, the administration of mercury for the primary lesion has a decided influence in delaying the appearance of secondary manifestations; and I am convinced from my own observations that this is the case. Admitting this to be true, it may seem strange that I should deny the power of the same agent to altogether prevent general manifestations. I am, however, irresistibly led to this conclusion, by the fact that I have never seen an unquestionable case of true chancre, which was not followed, sooner or later, by some general lesion, no matter what treatment had been employed.

In most cases, when syphilis is abandoned to its natural course uninfluenced by treatment, the earliest general manifestations nearly or quite disappear spontaneously, and, after a time, are succeded by another set, which, in its turn, may give place to a third, and so on; the number of successive outbreaks varying in different cases, and commonly being in proportion to the intensity of the action of the virus. Thus syphilis usually shows itself not in a continuous, but in an interrupted succession of lesions,—a fact of some importance, because too often the reappearance of syphilitic manifestations is regarded as a relapse, while it is really but the natural course of the disease.

In many cases, even in the absence of treatment, syphilis tends to self-limitation, and its lesions ultimately cease to appear, leaving the patient in a fair state of health.

The Sources of Syphilitic Contagion.

The older writers on syphilis fully believed in the contagiousness not only of secondary lesions, but also of the sweat, saliva, semen, milk, blood, and even the breath of persons affected with general syphilis. Hunter, founding his opinion upon a few unsuccessful inoculations of the secretion

of secondary lesions upon the persons bearing them, declared that the power of contagion was confined to the primary sore. Auto-inoculations, similar to those of Hunter, were repeated in thousands of instances by Ricord, and, in imitation of his example, by numerous surgeons in various parts of the world, the results of which were uniformly unsuccessful with scarcely an exception worthy of notice. On the other hand, the chancroid was regarded by Ricord and by the profession generally as the chancre-type, and its secretion was found to be inoculable with the greatest facility. The inference which was drawn was a natural one, viz., that a radical distinction existed between primary and secondary lesions in the contagiousness of the former and the incommunicable character of the latter; and the zeal, energy, and ability with which this idea was for many years defended are known to the whole medical world.

The plausibility of this evidence, the immense number and uniform results of the experiments resorted to, the keen powers of observation, ingenious reasoning, attractive manners, and evident sincerity of the Surgeon of the Hôpital du Midi, united in adding weight to a doctrine which had already been sanctioned by the great name of Hunter, and which was consequently for a time received as beyond dispute. Yet cases in apparent contradiction to Ricord's "law" were met with by many careful observers, especially in infants affected with hereditary syphilis, whose early age, incapacitating them from sexual intercourse, greatly diminished the chances of error of observation; and although instances of the transmission of secondary lesions from the nursling to the nurse, and vice versâ, were explained away with great ingenuity by Ricord and his adherents, yet they gradually came to be admitted by the majority of the profession. At the same time it was felt to be highly desirable to demonstrate this power of contagion by experimental inoculation, and thus place it beyond a doubt; and afterwards to study the phenomena of the process and compare them with those attending the evolution of general syphilis when originating in a chancre. Until this was done, the subject was likely to remain an open question.

This test, however, could not readily be applied. Ricord and his school had confined their inoculations to persons already infected, and it was generally admitted that further experiments, in order to be decisive, must be made upon those who were free from syphilitic taint—a course which could not be justified in a moral point of view even for the purpose of advancing science. Wallace had already, in 1835, succeeded in inoculating the secretion of condylomata upon healthy individuals, but the want of precision in his observations rendered them of little value. Subsequent inoculations, however, by Waller of Prague, Rinecker of Würzburg, a surgeon of the Palatinate who concealed his name, Gibert and Vidal of Paris, and others, settled this question in favor of the contagiousness of secondary lesions and even of the blood of syphilities, for all time. The novelty of this subject at the time of the publication of the earlier editions of this work, led me to give the experiments referred to in detail. These

will now be omitted, and I shall content myself with a bare statement of what must be regarded as proved both by clinical observation and artificial experiment, and what, moreover, is universally admitted at the present day.

We must admit as sources of syphilitic contagion—

1. The secretion and the organic débris of the primary lesion or chancre.

2. The same of any of the secondary lesions of syphilis, among which the various forms of mucous patches are eminently contagious.

3. The blood of persons in the secondary stage of syphilis. For the absolute demonstration of this fact by actual experiment in 1862, we are indebted to Dr. Pellizari, Clinical Prof. of Venereal Diseases at the Ecole Pratique of Florence.

It is generally believed that tertiary lesions are not inoculable, and perhaps no cases have as yet been reported with sufficient accuracy of detail to prove the contrary; but, as the boundary line between secondary and tertiary syphilis is not definitely defined, so are the limits of contagion to some degree uncertain.

Admitting the contagiousness of the blood of syphilitic persons, we might from *à priori* reasoning suppose that the various fluids which are secreted from the blood, as the saliva, milk, sweat, and semen, are also contagious, and this was the belief of the earlier writers on syphilis. This supposition, however, is not in accordance with clinical observation, and has been disproved by actual experiment with a number of the secretions mentioned. Diday inoculated two healthy persons with the lachrymal secretion taken from the eye of a patient in the height of secondary manifestations; the result was negative.[1]

The non-inoculability of the semen of syphilitics was fully proven in a number of experiments made by Mireur.[2] A number of cases, which have appeared in medical journals within a few years, and which have been supposed by their authors to establish the contrary, have been so loosely observed as to deprive them of any claim to serious consideration.

The innocuity of the milk is proved by the fact, that a mother who contracts syphilis after the birth of her child, may nurse that child with impunity, provided she has no lesion upon her breasts. Moreover, Pardova,[3] in 1866, attempted to inoculate the milk of eight syphilitic women, by pricking it into the skin, by applying it to a vesicated surface, and even by hypodermic injection, and in all without effect.

In short, we have no reason to believe that any of the normal secretions of syphilitic persons, when free from admixture with the secretions of secondary lesions or with the blood,—as, for instance, saliva, not mixed with the secretion of buccal mucous patches,—are contagious.

[1] Gaz. méd. de Lyon, No. 3, 1865.

[2] Ann. de derm. et syph., Paris, No. 6, tome viii, 1877.

[3] Gior. ital. d. mal. ven., Milano, t. ii, p. 153, 1867.

The Modes of Syphilitic Contagion.

Syphilitic contagion may be direct or mediate, like that of the chancroid; and much that has already been said in reference to the latter (see Part II, Chap. I.), is here applicable.

Direct contagion takes place most frequently from the genital organs of one person to those of another in sexual congress, and it is often the result of unnatural and beastly modes of indulgence between persons of the opposite or the same sex. Hence arise many chancres of the anus, of the tongue, of the fold between the breast and side of the chest, etc. etc. I have seen a chancre of the tonsil in a man, due to inoculation from a mucous patch upon the tongue of another man.

More innocently, contagion takes place in the contact of mouth to mouth, as in the act of kissing. The most innocent girls are thus often contaminated by the freedom, which is unfortunately common in some families of saluting their male visitors in this manner. The frequency with which mucous patches in the mouths of sucklings will infect the nipples of a wet-nurse, is well known, and the same is sometimes met with in adults. I recently prohibited a man who had contracted syphilis from having connection with his wife. He obeyed my instructions, but, thinking it safe to suck her nipple, gave her a chancre in that situation. It is commonly by direct contagion, that so many surgeons, and especially accoucheurs, contract chancres upon the fingers from contact with the lesions of syphilis upon their patients. The number of such cases is greater than is commonly supposed, for the unfortunate victims, although innocent, are usually most careful to conceal their misfortune. I have known dentists to suffer the same fate.

Syphilis is also said to have been conveyed in the rite of circumcision, from mucous patches in the mouth of the operator to the wound upon the infant's penis, which it is customary to suck, and Sigmund has reported a case of this kind. In a number of cases referred to Dr. R. W. Taylor, he was unable to find sufficient evidence of such transmission, although its possibility cannot be doubted. Dr. Taylor's paper[1] contains an able résumé of the subject.

Mediate contagion may occur from the passage of a cigar or a pipe from mouth to mouth; from the use of common utensils, as a tooth-brush,[2] wine-glass, a cup, a spoon, etc. etc., by different persons; from sleeping in the same bed; from matter conveyed on certain tools used in manufacture, as the pipes of glass-blowers (many instances of which have been recorded as having occurred in France and have led to the passage of a law that each workman should have his own mouth-piéce). Washing utensils used in common, surgical appliances, as sponges, bandages, etc., and surgical

[1] N. York M. J., Dec. 1873.

[2] A case of syphilitic inoculation by a tooth-brush, by Dr. E. B. Baxter, Lancet, Lond., May 31, 1879.

We have also met with a case in which this was probably the mode of contagion.

instruments, especially the Eustachian catheter, are also recorded as having been the medium of contagion.

In 1877, Albert Josias[1] reported a case of the transmission of syphilis by tattooing, the instrument used for the purpose having first been moistened in the mouth of the operator, who had mucous patches in the buccal cavity. Since then Drs. Maury and Dulles[2] have reported fifteen similar cases occurring in this country.

At a late meeting of the Society of Public Medicine, in Paris, Dr. Galippe related a number of cases of the transmission of syphilis through children's toys, as whistles and trumpets, which had been blown upon by the vendor before being passed to the child. But the different ways in which mediate contagion may take place are so self-evident, that it is not necessary to enter into them more fully. I shall, therefore, only briefly refer to one which has attracted much attention and which should ever be borne in mind; I refer to syphilitic contagion conveyed on the point of the lancet in performing vaccination.

There is every reason to believe, as stated in an admirable paper by Viennois,[3] that the agent of contagion in these cases is not the lymph taken from the arm of the syphilitic infant, but the blood which is often drawn in collecting the lymph, especially toward the close of the operation if a number of punctures have been made. Moreover, because an infant develops general syphilis after vaccination, it is not always true that the syphilis is due to the vaccination, since this disease may have been inherited from its parents and its appearance have been merely hastened by the irritation of the integument induced by the vaccination. These conclusions are thus formulated by M. Viennois:—

1. Vaccination with pure vaccine matter is sometimes the exciting cause of the appearance of a syphilitic eruption *in infants already under the syphilitic diathesis;* in the same manner that it gives rise to non-specific eruptions in strumous subjects. The history of the case and the order of evolution of the symptoms are generally sufficient to establish the diagnosis. For instance, the appearance of the eruption within a few days or weeks after the vaccination, without the ordinary period of incubation of syphilis, will render it probable that the disease was already latent in the system.

2. Syphilis cannot be transmitted to a healthy person by the inoculation of vaccine matter taken from a syphilitic subject, unless the lancet at the same time be charged with blood; in which case a chancre is produced, followed by general symptoms in their usual order of evolution.

It is still believed by some that, in these cases, the blood is not the only vehicle of contagion, and that epidermic scales, or leucocytes, or the secretion of an ulcer underlying the vaccine vesicle (Rinecker[4]), may also be responsible.

[1] Progrès méd., Par., 1877, p. 205.
[2] Am. J. M. Sc., Phila., Jan., 1878.
[3] Arch. gén. de méd., Paris, juin, 1860.
[4] Vrtljschr. f. Dermat., Wien, 1878, p. 25.

Two remarkable instances of the transmission of syphilis by vaccination are reported by M. Lecoq.[1] By far the most important and interesting series of cases, however, occurred at Rivalta, Italy, in which forty-six out of sixty-three children who were vaccinated became syphilitic and transmitted the disease to nurses, mothers, fathers, brothers, and sisters, making a total of eighty persons. In these cases, also, blood is said to have been drawn with the lymph from the arm of the first vaccinifer, and the initial lesions in those who received the poison were indurated ulcers (chancres) which were preceded by a period of incubation averaging twenty days.[2]

Numerous instances of a similar character, in some of which the disease spread to a large number of persons, have been collected by M. Viennois, and are sufficient to show that although vaccination is commonly a harmless operation, yet that it may, if proper precaution be omitted, be the means of transmitting a fearful constitutional disease.

In the above remarks on "vaccino-syphilis," it will be seen that reference has only been made to the conveyance of syphilis from the person from whom the lymph was taken to the person upon whom the lymph was implanted. But there is still another danger in vaccination which had nearly or entirely escaped notice, until attention was called to it by Dr. R. W. Taylor: I refer to the transmission of syphilis by using the same instrument uncleansed upon a number of individuals in succession, one of whom is syphilitic. In performing vaccination in this manner, as is often done in charity institutions, the vaccine matter may be never so pure, but the scarificator may be contaminated by contact with one person under the influence of syphilis and convey the disease to the next. In the case reported with great detail by Dr. Taylor,[3] a number of the inmates of the Penitentiary, Blackwell's Island, were ordered to be vaccinated. The vaccine was in quill form, and furnished by the Board of Health. The physician vaccinated about twenty persons in succession, using the same scarificator without cleansing it. The operation had been done upon six persons, when a young prostitute affected with syphilis was vaccinated; next to her an infant, aged nine months. All did well with the exception of this infant, in whom a chancre was developed at the point of inoculation, followed by the usual train of general lesions.

General Syphilis always follows a Chancre.

In the great majority of cases of acquired syphilis (excluding those of hereditary origin), general symptoms can clearly be traced to a preceding chancre. Thus of 826 patients with general syphilis who were treated at

[1] Guyenot, Thèse de Paris, 1859. See also Gaz. hebd. de méd., Paris, 27 janv., 1860.

[2] For an able resumé of these cases, see Mr. Henry Lee's Lectures on Syphilitic Inoculation and its Relations to Vaccination, London Lancet, 1862.

[3] Arch. of Dermatol., N. Y., vol. ii, 1876, p. 203.

the Hôpital du Midi in 1856, the previous existence of a chancre in 815 was established beyond a doubt either by examination or by voluntary confession; in 9, there was strong reason to suspect it; and in the remaining 2, the disease was evidently due to hereditary taint. Of 267 cases of secondary syphilis observed by Fournier,[1] the same fact was proved in 265. Of 198 cases of syphilitic erythema under the care of Bassereau,[2] either a chancre or unquestionable traces of one were seen in 170; in 19, the patients confessed to the fact, although no evidence of it was found upon their persons; 4 acknowledged having had a gonorrhœa; 5 declared that they had had no preceding lesion. Thus we find that in a total of 1291 cases, general syphilis was undoubtedly preceded by a chancre in all except 22.

These statistics agree with the experience of all physicians, that, as an almost invariable rule, syphilis *evidently* originates in a chancre; and the small number of cases in which the existence of the ulcer cannot be established renders it extremely probable that there are no exceptions to this law, especially when we take into account the following considerations:—

Chancres are capable of spontaneous cicatrization, and all traces of them may disappear in time, even without treatment.

They may occupy unusual situations, where their presence may readily escape notice, or be almost impossible to detect; among which the interior of the urethra, vagina, cervix uteri, and the buccal and rectal cavities deserve special mention.

Exceptional cases almost invariably rest upon the testimony of patients alone; and are the more frequent, the later the lesion presented in the order of succession of syphilitic symptoms, in other words, the longer the time which must have elapsed since contagion took place. For instance, cases are rare in which a patient with syphilitic erythema does not confess that he has had a chancre; on the contrary, they are not infrequent when the general lesion is syphilitic rupia, tubercles, orchitis, or periostitis. This fact leads us to suspect that the defective memory of patients will explain some apparent exceptions to the rule.

From various motives, patients often conceal facts within their knowledge.

With perfect memory and unquestionable honesty, patients are incompetent witnesses upon subjects which involve medical knowledge, which they do not possess. The superficial chancre—the form which most frequently precedes general syphilis—is so indolent and so insignificant a sore, that it may readily pass unnoticed, or, if seen, be mistaken for a mere abrasion. I have met with several instances in which patients bearing this form of chancre in plain sight upon their persons, were entirely ignorant of its presence, or thought it of no consequence.

A chancre may be overlooked by the patient because seated elsewhere than upon the genitals—the exclusive seat of venereal ulcers in the esti-

[1] De la contagion syphilitique, Paris, 1860, p. 15. [2] Op. cit. p. 103.

mation of the public—or may not be discovered, because concealed within the vagina, or beneath the prepuce when phimosis is present, or when the glans is never uncovered. In many instances married men have applied to me with chancres, and within a few months their wives have exhibited the early symptoms of general syphilis, without having noticed or suspected the presence of a chancre which undoubtedly existed, but which fear of exposing the husbands prevented my searching for. In other cases where an examination has been made, I have found chancres of which the patients were entirely ignorant.

Again, chancres sometimes occur within the urethra beyond the reach of vision, where an unprofessional person cannot be expected to be aware of their presence from the slight discharge, pain in micturition, and induration, which constitute their only symptoms, and which may be obscured by a coexisting gonorrhœa.

I repeat, therefore, that when we consider in how great a proportion of cases general lesions are known to have been preceded by a chancre, and when we reflect upon the numerous sources of error attending the testimony of patients in apparently exceptional cases, it is infinitely probable that a law which is known to be commonly true, is in fact invariable, and that general syphilis always follows a chancre.

Syphilis pursues essentially the same course, whether derived from a Primary or Secondary Symptom; in the latter case, as in the former, the initial lesion is a Chancre.

This proposition may almost be said to be self-evident, for who would ever dream that a case of scarlet fever, measles, or smallpox would vary in its symptoms according as it was contracted from a person in the early or the late stage of the same disease? We are surprised, therefore, when we look back only a few years to the time when some of the most eminent authorities maintained that contagion from a chancre would indeed produce a chancre, but that contagion from a mucous patch would produce a mucous patch, etc.; equally surprised must we be at the incredulity with which this proposition was met on its first announcement, in 1856, by Dr. Edward Langlebert, at a meeting of the Société Médicale du Panthéon, of Paris.[1] Langlebert's paper, however, contained no adequate proof and was nearly forgotten, when the subject was again taken up by Rollet,[2] who adduced such an amount of evidence in favor of this proposition as to leave no doubt of its truth. It is unnecessary at the present day to dwell upon this subject; suffice it to say that, as shown by many cases of artificial inoculation, the results of syphilitic contagion are the same whether the matter be taken from a primary or a secondary lesion.

[1] Proceedings of the above Society for 1856, p. 8. See also a letter from M. Langlebert to M. Diday, Gaz. méd. de Lyon, july 1, 1859.

[2] Arch. gén. de méd., Paris, fev., mars, et avril, 1859.

SYPHILIS HAS A SECOND PERIOD OF INCUBATION (between the appearance of the chancre and the development of general lesions) WHICH, ALTHOUGH SUBJECT TO SOME VARIATION, IS NOT INDEFINITE IN ITS DURATION.

It was at one time erroneously supposed that the first general manifestations of syphilis might make their appearance at any period subsequent to contagion and to the development of the initial lesion; hence, that a man who had once contracted a chancre was never safe, no matter how long a time had been passed without any further evidence of the disease. It is now known that if general manifestations are ever to appear they will show themselves within a comparatively limited period.

In studying any case or series of cases with reference to this point, the following conditions should be observed:—

1. That the date of the infecting coitus or of the appearance of the chancre should be known.

2. That the patients have not been subjected to treatment which may delay and, in the opinion of some, entirely prevent the appearance of general lesions.

3. That they have been under the observation of some one competent to discover the earliest manifestation of general syphilis.

These conditions were carfully fulfilled in fifty-two cases observed by Diday,[1] who arrived at the following results:—

No. of Cases.	Interval in Days.	No. of Cases.	Interval in Days.
1	25	4	47
1	28	4	48
1	33	3	50
2	35	1	52
3	36	1	54
1	37	2	56
4	38	1	57
1	39	2	58
1	40	1	60
1	41	1	63
1	42	1	70
1	44	1	105
10	45	—	
2	46	Total, 52	

It appears from this table that the shortest period of incubation was 25 days, and the longest 105 days, but that the latter was 35 days more than the one immediately preceding it. The extreme limits of variation are not widely separated (certainly not if compared with the variation from a few weeks to thirty years, which is given by some authors), and we find on examination that in by far the larger proportion of cases, the periods of incubation terminated within two weeks of each other; thus in 38 of the 52 cases, or in about four-fifths, this period was from 35 to 50 days. Taking the average of the whole number, it was 46 days.

[1] Nouvelles doctrines sur la syphilis, p. 265.

Similar testimony is given by Bassereau,[1] Victor de Méric,[2] Fournier,[3] MacCarthy,[4] Sigmund,[5] Ricord,[6] and others.

The testimony derived from artificial inoculation (which has the advantage that all the steps of the process are under the direct observation of the surgeon) is essentially the same. Thus in 12 cases of inoculation of the secretion of a chancre, the mean length of the second period of incubation was 48 days; in 14 cases, in which the secretion of various lesions of the skin and mucous membranes was employed, it was 45 days; in 4 cases, however, in which the matter was taken from pustules, it was 82 days.

In my own practice, I have learned to regard the appearance of secondary symptoms between the fortieth and fiftieth day after the development of the chancre as almost certain, and I have never seen a case which was carefully watched, in which they failed to show themselves within three months. Ricord's limit of "six months" will certainly include the most extreme cases.

The conclusions at which we have arrived furnish the strongest inducement in all ulcers of a doubtful character to defer general treatment, and keep the patient under careful observation until the time for secondary symptoms to appear is passed.

To sum up this whole matter:—

A venereal ulcer which is not subjected to specific treatment (so called) *will usually, if at all, be followed by secondary symptoms within fifty days, and always within six months.*

It follows as a corollary from this proposition that

The earliest symptoms of general syphilis (except in cases of hereditary origin) *have been preceded by a chancre, probably within fifty days, and certainly within six months.*

I will merely add that the development of general syphilis is hastened by an elevated temperature, and by those causes which tend to depress the vital powers, as excessive or prolonged exertion, or a dissipated course of life; and that it is, on the other hand, retarded by the contrary influences, and also by the supervention of an acute disease, as continued fever, inflammation of the lungs, etc. It also appears to be earlier in women, in whom mucous patches are developed with great rapidity, sometimes even three weeks after the chancre.

[1] Op. cit., p. 176.
[2] Lettsomian Lectures, 1858, p. 31.
[3] Notes to Ricord's Leçons sur le chancre, 2d ed. p. 466.
[4] Thèse de Paris, 1844.
[5] Wien Wochenschrift, 1856.
[6] Lettres sur la syphilis, 2d ed. p. 300.

CHAPTER II.

THE NATURE OF SYPHILIS.

In its nosological relations syphilis has been called a contagious and a virulent disease, a specific fever allied to the exanthemata, a disease of the lymphatics, a disease originating in a fungus, a purulent diathesis (Després), and a blood disorder.

Although these appellations, with the exception of the purulent diathesis, are applicable in a restricted sense, they are all of them more or less incorrect and unsatisfactory. It is true that acquired syphilis is communicable through the blood and certain secretions which are contagious, but this is only a comparatively minor feature of the disease.

The same remarks apply with even more force to the term virulent, since the only reason for using it is that virulent diseases, like glanders, farcy, and hydrophobia, are transmitted by means of a morbid secretion termed *virus*, and have periods of incubation. There is, however, no pathological resemblance, much less a relation, between syphilis and these diseases.

Though the adoption of the term "specific fever" in classifying syphilis is urged even by celebrated syphilographers, a careful examination and comparison of the course of syphilis and of the exanthemata shows only certain resemblances in prominent, but from a pathological view, merely accessory features. Syphilis originates in a fixed contagion; the exanthemata likewise in a volatile or fixed contagion; they have periods of incubation; syphilis two, the exanthemata one, which are followed by constitutional disturbance and fever; syphilis in this feature being comparatively mild. Further they all have extensive integumentary and mucous membrane lesions, which in the exanthemata are always inflammatory during their whole course, while in syphilis they are moderately hyperæmic and essentially proliferative. Here is a radical point of difference; the exanthematous eruptions are simply inflammatory, and if cell-proliferation occurs it is of a simple nature, a mere increase of the normal cells. The opposite occurs in syphilis; the inflammatory processs is less active and always results in infiltration of new cells entirely foreign in their nature.

In order to complete the comparison which places syphilis in the group of specific fevers, it is urged by the chief advocate of this view, Mr. Hutchinson, of London, that the late or tertiary lesions of syphilis have their analogue in the sequelæ which sometimes follow the exanthemata, and, instead of calling them tertiary lesions, he would call them sequelæ. Ac-

cording to this view, syphilis ends with the secondary period, and all subsequent lesions are not, as we believe them to be, new, pathological processes originating in the one virus, but they are simply non-specific tissue-changes induced by the previous ones in the secondary stage. Not only is this comparison false, but it is founded on false assumptions. The sequelæ of the exanthemata are simple tissue changes, resulting without doubt from inflammatory processes; they are in fact true sequelæ, and are etiologically related to the acute stage of the disease. Now tertiary lesions are simply a late series of specific pathological processes following, at varying intervals, somewhat similar processes, called secondary lesions, which are etiologically related to the same morbid cause, the syphilitic diathesis. We can scarcely imagine a greater difference. The one is a simple, chronic, inflammatory process depending on acute antecedent inflammation; the other is the definite and late expression of a diathesis, which manifests itself by a series of proliferative lesions separated by varying periods of time.

Although the lymphatic vessels and ganglia are largely affected by syphilis, and although they are the means of its diffusion and probably its occasional depots of deposit, this relationship, though intimate, is but transitory, since the full development of syphilis takes place not in the tissues of either vessels or ganglia but in the connective tissue to which these are freely distributed. Syphilis cannot therefore be classed among diseases of the lymphatics.

It would be a waste of time to entertain the probability of syphilis being caused by a fungus. It was claimed by Salisbury, some years ago, that the disease had its origin in a certain fungus, the "*crypta syphilitica*," which he said he found in the blood during the activity of the diathesis, and which he did not see when the disease was cured. Since no one else has been able to find this source of the disease, we conclude that it does not exist, and that the specimens, upon the study of which the theory was based, were those of syphilitic blood, into which, owing perhaps to carelessness of preparation and exposure, fungus growths had permeated and fructified.

Perhaps the most remarkable theory of the nature of syphilis is that of Després, who, in a work of over 500 pages, elaborates the assertion that syphilis is a purulent diathesis; that the blood is contaminated by an animal poison containing the syphilitic elements; that it is altered little by little by contact of the débris of syphilitic pus with its globules, thus infecting them, and multiplying the poison, which seeks to escape by the skin in the form of eruptions. Among humoralists, this author goes to an absurd extreme. His work need only be mentioned to condemn it as a piece of theorizing, utterly at variance with facts, and not supported by any tenable simile. The truth is, that of all diseases, syphilis is essentially the least purulent. It is not so in its origin, since the unirritated secretion of the initial lesion never contains pus; its most extensive lesions are peculiar in the fact that pus is rarely present, and then only accidentally. Further, the course of purulent infection is widely different from that of syphilis.

Lastly, syphilis, according to the views of humoral pathology, is a blood disease. The main fact in support of this opinion is that its contagion is in some stages transmissible through this fluid, yet we must admit the qualification that this is true *only at certain times*. In order to prove that it is not in its essence a blood disease, we must show what form of disease it is. We have found that it originates in the secretions of active lesions and in the blood during an active stage of syphilis. These fluids inserted beneath the integument do not at once pass into the circulation but cause a local cell-increase, which forms a peculiar circumscribed tissue entirely foreign to the parts. We then have a local new growth which is limited but exuberant. Remaining local until mature, this tissue or initial lesion passes away, having been accompanied by marked indurated enlargement of neighboring lymphatics. Such being the facts, the presumption is that these new cells have, like those of cancer and sarcoma, passed into and infected the lymphatic ganglia. That here, owing to the profusion of lymphatic globules, which we know to be protoplasm, or living matter of the most active kind, this new tissue, or rather these new cells, undergo great change, increasing in numbers according to the susceptibility of the patient. Having been thus proliferated, these cells are now taken into the blood, either gradually or suddenly, and by it are carried over the body, chiefly, however, at first to the periphery, where they are deposited.

Being deposited in the connective tissue, they take root in this soil, which is peculiarly susceptible to the influence of the syphilitic diathesis. Here they luxuriate, and are still further developed, not attacking primarily other tissues. Inducing, in scattered circumscribed spots, cell-proliferation in the middle layer of the blastoderm, they cause increase of the cells of this connective tissue itself, as well as the development of a new tissue, the granulation tissue, also called gummatous tissue, gumma, and syphiloma. This is a young transitory tissue composed of cells, sometimes called *cyto-blastômes* and *cyto-blastions*, which resemble white corpuscles. In describing their development, Virchow says: "The process begins by a proliferation of cells which augment in volume (hypertrophy), and of which the nuclei are multiplied, often in an astonishing manner. Then follows segmentation of these cells, and finally the veritable development, ordinarily, the production of numerous cells which in general are very small and usually contain nuclei, these latter being large and for the most part round. They have a certain resemblance to the lymphatic globules, and have been heretofore called lymph-corpuscles or exudation-corpuscles, as they were thought to be due directly to this *process*. On cutting such a tissue, we find a great number of free nuclei, which are round or oblong, pale, slightly granular, and containing one or more nucleoli. In short, it is essentially a young production, but slightly advanced in development, and especially indifferent in its cellular nature." This description applies to a gummy tumor of recent date. Such a tissue is not always sharply limited and compact, but is infiltrated; its shape being moulded by the surrounding parts. In old cases, however, there *is*

often a collection of fully developed cells, with but few free nuclei. Among them may be stellate and fusiform cells, and, frequently, Baumgarten has clearly shown that giant cells, formerly considered distinctive of tuberculous infiltration, are found also in these tumors.

These stellate and fusiform cells are distributed through the tumor, which is frequently traversed by an intercellular substance which is sometimes fibrous. In some instances these tumors merge gradually into the surrounding parts, while in others they are encapsulated. Their structure varies in compactness; they may be firm and fibrous or they may have a gelatinous consistence, resembling mucous tissue. Such is the general formation of syphilitic tumors; it must be remembered, however, that their structure depends largely upon the configuration of the region in which they are developed and the arrangement of its anatomical elements. In the development of these tumors, as well as of syphilitic papules and tubercles, the first morbid change is in the adventitia of the vessels.

The description here given applies to the fully developed gummy tumor. The cells of the earlier stages are mainly similar. Those of the initial lesion are mingled with molecules of fibrine, showing a more inflammatory process, while those of tubercles form infiltrations rather than distinct tumors. All of these cell-changes are similar and etiologically related. The cells, being immature, are liable to fatty degeneration, and for this reason syphilitic lesions often disappear spontaneously. These cells belong to the group called by Virchow *granuloma*, which also includes the tumors of lupus and leprosy. The cells of each of these diseases are similar and resemble those of granulation tissue. Those of syphilis are peculiar in their arrangement, mode of development and course, and in being absorbed under the influence of mercury. An important and almost unanswerable question is, whether these cells of syphilis are specific. They are so regarded by Wagner, who gives the name "*syphiloma*" to the tissue which they form. Virchow, on the contrary, denies their specific nature, and prefers the terms "*gumma*" and "*granuloma*." Although the appearance of these tumors is almost identical, it must be acknowledged that the property of contagiousness is peculiar to the cells of the syphilitic tumors.

We now come to the consideration of hyperæmia. Chronic congestion is an important feature in the pathology of syphilis. It is especially noticeable in the early stage, and is best exemplified in the exanthematous syphilide and in the hyperæmia of the fauces. Many other secondary symptoms have a similar nature, and hyperæmia of the viscera probably occurs in this stage, yet generally it altogether escapes observation. Early in syphilis, this hyperæmia precedes and accompanies the extensive lesions, though it may exist merely as capillary stasis without cell change. In the late stages, the hyperæmia is milder and more localized. It is probably always a forerunner of gummy tumors.

An additional phenomenon of syphilis is the production of connective tissue, either without gummatous cells or accompanying gummy tumors. This tissue increase is the result of mild hyperæmia, and occurs in firm, fibrous tissues, such as the periosteum and the capsules of the viscera. It

is best seen in syphilitic periostitis and in the fibrous bands observed in the liver, spleen, lungs, and testicles.

It is noticeable that suppuration rarely accompanies syphilitic lesions; when it does, as in the early pustular eruptions, it is a secondary result or an accidental occurrence, and is not an essential part of the syphilitic process.

Although it was long since claimed that the lymphatics were the active agents in syphilitic infection, and although Virchow has for years insisted upon a similar theory, the question has never been properly studied, and modern authors are vague and uncertain in their opinions. The majority, however, regard the blood rather than the lymphatics as the vehicle of contagion.[1]

Our own conclusion is that syphilis is a disease of the connective tissue, and not primarily of the lymphatics or of the bloodvessels, although the blood may be temporarily modified and may be the vehicle of contagion.

The secretions of syphilitic lesions are found to consist of a serous fluid containing numerous shining granules or molecules, which are masses of protoplasm or germinal matter, holding the contagious properties of syphilis. These microscopic bodies are probably taken into the circulation by the lymphatics and conveyed over the body. Possibly they are absorbed by the blood corpuscles, or the latter are infected in some mysterious manner by these actively increasing morbid cells. The fact that serum alone does not convey the syphilitic poison goes to prove that the corpuscles hold the contagious material.

In the secondary period of syphilis these cells are very numerous, and the body may be covered with papules and tubercles composed of them. As the disease wanes, these lesions become more localized and fewer in number, and the blood is less contagious. Finally these cells may be limited to a few gummous tumors; the blood no longer carries the molecules, and it loses its contagious properties. The cells no longer have a tendency to reproduction, which characterizes them in the early stages, but rather degenerate. Hence we consider the blood and the secretions in tertiary syphilis innocuous. Even if cells are present, they are old and inactive, and are incapable of reproducing themselves. Lancereaux states

[1] In the year 1871, Dr. F. N. Otis published two articles, endeavoring to explain the periods of incubation and the course of syphilis upon the theory that infection occurs only through the lymphatics. Assuming the syphilitic virus to consist of disease-germs, the author thinks that the first period of incubation is occupied in their passage through the tissues, the process varying in duration in proportion to the depth of the lymphatics and the resistance of the tissues. He believes that the syphilitic virus coagulates the superficial tissue-fluids, causing obstruction to the circulation and attraction to the spot of wandering white corpuscles, which by their amœboid movement entrap the specific disease germs. The latter are developed and increase within the white corpuscles, which themselves multiply. According to this view, the initial nodule is simply an aggregation of diseased white corpuscles. These latter pass into the ganglia and there again multiply, passing finally from the lymphatics into the circulation.

that he has often punctured himself in making autopsies on subjects with gummy tumors, and has never seen any bad result.

The periods of latency observed in the course of syphilis are of interest, and may perhaps be explained in the following way. Each outburst is attended by the development and multiplication of the peculiar cells, which run their course and are finally absorbed. Some remain and after a time are excited by unknown causes to activity. Thus repeated exacerbations may occur, each one depending upon the multiplication of cells remaining from a previous outburst. But each relapse is less active and less prolonged than its predecessor, until perhaps only one nodule, and that composed of effete cells, may remain. The disease is then cured. This explanation may seem to apply imperfectly to those cases of prolonged latency in which no lesion whatever has been perceptible. Virchow thinks that in these cases the lymphatic ganglia have been the places of deposit of the syphilitic cells, which, at the expiration of the period of latency, undergo the changes mentioned. In any case, the specific cells must be hidden away somewhere in the system, since the continuance of the disease depends upon their existence.

With this view of the nature of syphilis, its effect upon the health and upon the organs and tissues may be readily comprehended. In the early active stage of proliferation the red globules are diminished and the white increased in number. The depressing influence of syphilis is thus fully accounted for. Digestion is impaired and the tissues are poorly nourished. Finally, the functions of vital organs may be perverted or destroyed by the cell-changes produced.

CHAPTER III.

THE INITIAL LESION OF SYPHILIS, OR CHANCRE.

Logical accuracy as well as simplicity and perspicuity of language require the abandonment of the terms "hard," "indurated," and "infecting chancre," as applied to the initial lesion of syphilis, which should be called simply by the name of *chancre*, *syphilitic chancre*, *initial lesion of syphilis*, or *primary syphilitic ulcer*. If the name "Hunterian chancre" be retained, it should be applied exclusively to the less frequent form of chancre which Hunter designated, and which is characterized, in addition to the induration common to all forms of chancre, by a degree of ulceration that involves the whole thickness of the skin or mucous membrane. The term "infecting chancre" is especially objectionable, as it implies that it is the chancre which infects, whereas the very development of this sore is the *result* of constitutional infection. As Diday remarks, when a man contracts syphilis, the only chancre that can properly be called infecting is the one upon the woman who gave him the disease.

For a comparison of the frequency of the initial lesion of syphilis with that of the chancroid, the reader is referred to the first chapter of the second part of this work, where the remarks upon the seat of the chancroid are also applicable in the main to the sore under consideration. The following table exhibits the seat of 471 chancres in men, comprising all that were observed at the Hôpital du Midi in the year 1856:—

Chancres on the glans and prepuce	314
" on the skin of the penis	60
" on various parts of the penis	11
" involving the meatus	32
" within the urethra (not visible on forced separation of the lips of the meatus, but recognized by palpation, inflammation of the lymphatics, etc.)	17
" on the scrotum and peno-scrotal angle	11
" of the anus	6
" " lips	12
" " tongue	8
" " nose	1
" " pituitary membrane	1
" " eyelid	1
" " fingers	1
" " leg	1
Total	471

In 130 women affected with true chancres at the Antiquaille Hospital, Lyons, where wet-nurses are admitted, M. Carrier found the seat to be:—

	Times.
The labia majora	43
" entrance of the vagina	12
" meatus	14
" nymphæ	10
" fourchette	7
" sheath of the clitoris	3
" anus	12
" buttocks	1
" thighs	1
" under lip	6
" upper lip	4
" labial commissures	1
" nostrils	2
Both breasts	3
The right breast	1
" left breast	5
Regions not determined	5
Total	130

By comparing these tables with those upon pages 348, 349, it is seen that the seat of chancres is still more extensive than that of the chancroid, since it embraces the face and buccal cavity, where the last-mentioned ulcer is rarely met with in practice, but where the syphilitic virus is often inoculated from a secondary lesion in the contact of mouth with mouth, etc.

Among the rarer situations of a chancre, should be mentioned the walls of the pharynx, where a certain aural specialist of Paris is said to have inoculated several of his patients by means of a Eustachian catheter which he neglected to cleanse. A remarkable instance came under our observation of a chancre concealed beneath the upper eyelid, showing no signs of its presence externally, even upon the free margin of the lid. The patient applied to me for disease of the eye, and on everting the upper lid I found a superficial excoriation which bore a striking resemblance to a chancrous erosion, and just in front of the ear on the same side was an indurated ganglion. The genital organs were sound. I exhibited the case and stated my diagnosis to my class at the College of Physicians and Surgeons, and under expectant treatment secondary symptoms made their appearance after the usual period of incubation. The man was a stupid Irishman, made his living by slaughtering sheep, was married, and I never could obtain any clue to the manner in which he contracted the disease.

Has the chancre a period of incubation? This is an important question, since it involves two others of great practical interest: 1. Whether the chancre is a local or constitutional lesion; 2. Whether its abortive treatment can prevent systemic infection. As I have shown in another chapter, the chancre produced by inoculation of the secretion of secondary symptoms undoubtedly has a period of incubation, amounting on the average to more than three weeks. Again, in three cases of artificial inoculation of the secretion of a chancre, performed by Rollet,[1] Rinecker, and Gibert,

[1] Arch. gén. de méd., avril, 1859, p. 409.

the period of incubation was 18, 25, and 24 days respectively. In clinical observation, the same difficulties obtain as have already been mentioned with regard to the chancroid, but many careful observers have noticed the fact that, as a general rule, advice is sought at a later period for a chancre than for the chancroid, and the interval between contagion and the appearance of the ulcer is represented by patients as longer in the former than in the latter. Diday made minute inquiry of twenty-nine persons whose chancres were of recent origin, who appeared to be trustworthy, and certain of the facts which they stated, who had been exposed but once, and who had had no previous connection for at least a month, and found that the average interval between the sexual act and the appearance of the sore was fourteen days.[1] M. Chabalier, in an examination of ninety cases of chancre, found an average period of incubation of from fifteen to eighteen days; and states that the chancroid, on the contrary, is visible within thirty-six to forty-eight hours after contagion.[2] M. Clerc has especially insisted upon the presence of incubation as diagnostic of the chancre, and has reported several cases which were preceded by a period of incubation of thirty days.

A gentleman of this city, of high social position, whom I know so intimately that I can vouch for the truth of his statements, visited Paris, unaccompanied by his wife, and, while under the influence of wine, for the first time during fifteen years of married life had connection with a woman of the town. This was on the eve of his return to America, and his subsequent remorse and anxiety were so great that on his voyage home he examined himself daily with the greatest care to see if he had contracted any disease. His prepuce was very short, so that the glans was habitually uncovered, and no lesion was likely to escape observation, yet he found nothing until the day of his arrival home, the thirty-fifth after exposure, when he noticed a slight excoriation upon the internal surface of the prepuce. He showed it to his family physician, a "Homœopath," who told him that it was a mere abrasion which would heal in a few days, and that he might with safety have connection with his wife. As the promised cicatrization did not take place, on the fourth day after his arrival he applied to me, and I found a superficial chancre with well-marked parchment induration and attendant indurated ganglia. Since then he and his wife have had several attacks of general syphilis.

Castelnau reports a case communicated to him by the physician of a venereal hospital, who was himself the subject of the observation, in which a chancre appeared thirty-three days after an impure intercourse.[3]

Fournier[4] relates a number of cases of comparatively long incubation, amounting to 28, 21, 39, 28, 21, 21, 40, 29, 23, 25, 21, 34, 28, 30, 30, 30, 27, 35, 42, 45, 21, 42, 42, 30, 42, 35, 48, 21, 33, 10, 25, 28, 34, 28, 30,

[1] Gaz. méd. de Lyon, mars 1, 1858.
[2] Thèse de Paris, No. 52, 1860, p. 111.
[3] Annales des maladies de la peau et de la syphilis, t. i, p. 212.
[4] Recherches sur la incubation de la syphilis, 1865.

35, 17, 36, 37, 21, 30, 70, 25, 28, and 30 days. The longest incubation that we have ourselves observed was 50 days.

But further evidence on this point is unnecessary. There can be no question that the initial lesion of syphilis, as of other infectious diseases, possesses a period of incubation, upon an average of from two to three weeks, and sometimes extending to five, six, or even, in rare instances, to eleven weeks; and this fact leads to the important conclusion that

An interval of two weeks or more between the last exposure and the appearance of a suspicious sore upon the genitals, renders it extremely probable that the latter is a true chancre.

To ascertain its shortest limit is attended with more difficulty, since the virus is sometimes deposited in a wound or abrasion occurring at the time of coitus, and, in consequence of inattention to cleanliness or other accidental causes, remaining open until the development of the chancre, so that it is impossible to say precisely when the simple is transferred into the specific ulcer. The inoculation of the same point with the chancroidal and syphilitic poisons will also explain why in some instances the initial lesion of syphilis appears to be developed in some cases earlier than in others, since the action of the former virus commences at once and gives rise to an ulcer which may be perceived by the patient in the course of two or three days, and which masks the later development of the chancre.

When inquiring into the incubation of a venereal ulcer, the surgeon must be on his guard. A patient applies to him with a sore and says he was exposed three days before. The careless surgeon chimes in with the idea of the patient that the sore was thus recently contracted, and, on the ground that there has been no period of incubation, pronounces it a chancroid, forgetting to ask the patient when he was exposed before this last time! Such inquiry will often elicit the fact that the previous exposures have been frequent and closely approximated, and that at which of them the inoculation took place is a "conundrum." If the sore prove to be a true chancre, it was certainly not at the last one—three days before—that the mischief was done.

Symptoms.—The following table, prepared by M. Bassereau,[1] of the chancres which preceded 170 cases of syphilitic erythema, will indicate the various forms which a chancre may assume, and afford some idea of the comparative frequency of these forms in the milder cases of the disease, of which the more severe instances exhibit a larger proportion of excavated ulcers:—

Superficial erosions	146
Circumscribed ulcers, with abrupt edges, involving the whole thickness of the skin or mucous membrane	14
Circumscribed phagedenic ulcers, with a pultaceous floor, involving the tissues a short distance beyond the skin or mucous membrane . . .	10
Total,	170

[1] Op. cit. p. 140.

It appears from this table that the chancre has no exclusive form, but that it most frequently assumes one which differs widely from the chancre type as formerly described by many authors. The frequency of the superficial form of chancre excited my attention several years before I had met with any description of it in books, and the first cases which came under my notice were mistaken for mere abrasions until the appearance of secondary symptoms corrected the diagnosis.

The superficial form of chancre is most marked on the internal surface of the prepuce, by which it is protected from the air and friction, and kept free from scabs; and it is in this situation that it is most frequently met with. It has generally a circular or ovoid, but sometimes irregular, outline. Its floor is but slightly, if at all excavated, and occasionally is even elevated above the surrounding integument by the subjacent induration. Its surface is smooth, often looking as if polished, destitute of the consistent and adherent exudation of the chancroid, and of a red or grayish color; or, at times, it is dark or even black, owing to molecular gangrene.

Moreover, there is a frequent feature of the chancrous erosion which I have often observed, and which was first described by my friend, M. Clerc, of Paris, who gave several admirable representations of it in his *Traité pratique des maladies vénériennes.* I refer to a "kind of false membrane, presenting some resemblance to the diphtheritic patches which characterize certain forms of syphilitic symptoms occupying the mucous membranes." It is entirely distinct in its appearance from the membrane covering a chancroid, but the difference is better seen than described. I can only say, that it usually occupies only the centre of the chancre, that its edges shade off into the reddish circumference, that it is of a translucent, slightly greenish, and pultaceous appearance, unlike the dull or yellowish-gray membrane which covers the whole surface of a chancroid. M. Clerc believes that this diphtheritic layer is a *constant* feature of a chancre during the early stage (first two weeks) of its existence. I cannot regard its presence as thus invariable, but it is certainly very frequent, and is well worthy of careful observation.

The secretion of this form is a clear serum—free from pus-globules, unless the sore has been irritated—which may often be seen issuing from minute pores, after the previous moisture has been wiped away. It has no surrounding areola, and leaves no cicatrix to mark its site. Barely one-third of the chancres in Bassereau's 170 cases, left any visible traces aside from induration. When situated upon the external integument, as the sheath of the penis—where most venereal ulcers are chancres—and exposed to the air, it becomes covered with scabs, which give it the appearance of a pustule of ecthyma, or a patch of scaly eruption, and which may readily lead to an error in diagnosis. The characters of the chancrous erosion are also modified by the application of irritants, or by a want of cleanliness; its secretion may become purulent, and its surface resemble that of the chancroid; but its normal appearance may be restored by applying a water-dressing for a few days.

Frequent as is the chancrous erosion, it must not be regarded as the exclusive form of chancre. Diday believes that it is due to inoculation from a secondary, and that the excavated chancre is produced by inoculation from a primary lesion, but this distinction will not hold. Between this form and the indurated excavated ulcer, known as the Hunterian chancre—which was so long and so erroneously supposed to be the especial harbinger of general syphilis—there may exist many gradations which it is unnecessary to describe in detail. Ulcerative action may go beyond this point, and terminate in phagedæna; but, generally, it is limited by the plastic inflammation of the surrounding tissues, as is evident from an examination of the edges of nearly all the forms of chancre, which are sloping, somewhat prominent and adherent, unlike the abrupt and detached margins of the chancroid. If phagedæna occur, the destructive process is usually limited to the induration (neoplasm), and, on the final healing of the ulcer, it is surprising to see how little mischief has been done to the normal tissues.

Multiple Herpetiform Chancres.—Under this title Dubuc first called attention to a variety of syphilitic chancre, liable to be mistaken for herpes. These chancres have a diameter of a line or less; they look like small round excoriations, of a deep-red, sometimes coppery hue, which bleed readily and have very slight induration of their bases. The induration often increases at a later period. From five to fourteen chancres may be observed upon the prepuce or glans. In their first stage the diagnosis is difficult; but the absence of itching and burning, their dark color and their chronicity are points which aid in distinguishing them from herpes. Another important feature is that their surface is very smooth and shining. Moreover, induration of the inguinal ganglia is soon developed. The duration of these herpetic chancres, is, according to Dubuc, a month or six weeks. In exceptional cases, in which the chancres are not close together, they remain separate during their whole course. In the majority of cases they are closely grouped, and after remaining for several weeks in the herpetic form, they unite and form a single chancre.

Anomalous Appearance of the Initial Lesion of Syphilis.—The chancre is subject to various modifications. One of the rarest is that described by Dr. P. A. Morrow[1] as "*diphtheroid of the glans.*" In the case which he had under his care and which we had the opportunity of observing, "the anterior four-fifths of the glans penis was covered with a glistening grayish-white coating of a leathery consistence, simulating in all its physical characteristics a diphtheritic exudation. This coating was of uniform thickness, raised about two lines above the healthy mucous membrane, and covered the entire surface of the glans, except a narrow zone embracing the corona.

"The edges of the coating were abruptly raised, and the line of demar-

[1] On a rare form of initial lesion, Diphtheroid of the glans penis: Report of a case with remarks. P. A. Morrow, M.D. Arch. Dermat., N. Y., 1876, vol. ii, p. 383.

cation between its border and the healthy tissue was distinct and unmasked by any inflammatory areola. This appearance was suggestive of a white membranous hood drawn over the head of the penis, with a slit-like opening for the meatus in front. So evenly and smoothly was it moulded over the glans that the contour was perfectly preserved. A sensation of a smooth greasy feel was communicated to the finger passed over the surface. There was absolutely no erosion—its epithelial coat seemed to be continuous with that of the healthy mucous membrane, which limited its circumferential border above. Its base was supple, with no trace of induration. Its surface was moist and glistening, with no appreciable secretion. It was intimately adherent, and could not be detached from the tissues which supported it without leaving a bleeding base." It was painless and indolent; it appeared several weeks after coitus, and was followed by secondary symptoms.

In three cases which we have seen at the New York Dispensary, the lesion was developed in round or oval patches, less than an inch in diameter. In one case the patch was continuous with an indurated nodule. The lesion disappeared slowly, leaving the parts normal or slightly pigmented. For reasons given in our published reply[1] to Dr. Morrow, we do not consider this a diphtheroid condition of the initial lesion. We regard it rather as a form of scaling or dry chancre, the "*papule sèche*" of Lancereaux. In this lesion the syphilitic cells are developed in the superficial tissues of the glans, which are thereby thickened and assume a leathery appearance. The whitish color is probably due to the close packing of the cells.

Infecting Balano-posthitis.—Under this title Mauriac has described a form of initial lesion which is liable to be mistaken for simple balanoposthitis. In this lesion the mucous membrane of the prepuce is thickened, has a deep red color, and is slightly excoriated either partially or completely. The glans may be superficially thickened, and is generally hyperæmic and eroded. Retraction of the prepuce, which may be somewhat difficult or quite impossible, best displays its infiltrated condition. The induration may be evenly distributed or irregular; its localization may be marked in the fossa near the frænum, in which case there exists merely an indurated nodule. The course of the lesion is chronic, but it yields readily to internal treatment. The lesion consists of an infiltration of the submucous tissue with hyperæmia; in other words, it is a combination of cell-infiltration and hard œdema.

Induration was recognized at a very early period in the history of syphilis, first by Torella, in 1497, by John de Vigo,[2] Gabriel Fallopius,[3] Leonard

[1] Notes on a rare appearance presented by the initial lesion of syphilis. R. W. Taylor, M.D. Arch. Dermat., N. Y., 1877, vol. iii, p. 5.

[2] "Nam ejus origo in partibus genitalibus, videlicet in vulva in mulieribus et in virga in hominibus, semper, fuit cum pustulis parvis, interdum lividi coloris, aliquando nigri, non nunquam subalbidi, cum *callositate* eas circumdante." (John de Vigo, *Practica copiosa in Arte Chirurgica, etc.* Rome, 1514, lib. v.)

[3] Tractatus de Morbo Gallico, Patavium, 1564.

Botal,[1] and Ambrose Paré,[2] as a prominent symptom of the sore which precedes general syphilis; nearly forgotten by subsequent writers, though occasionally mentioned, as by Nicholas Blegny,[3] it again assumed importance in modern times from the teachings of Hunter,[4] Bell,[5] and especially Ricord, and is now justly regarded as the most characteristic feature of a chancre, when seated upon a person exempt from previous syphilitic taint.

The induration of a chancre is a peculiar hardness of the tissues around and beneath the sore. Simple inflammation may occasion an effusion of plastic material and consequent engorgement about any sore; but specific induration is of an entirely distinct character. The latter is formed, as the French say, "*à froid*," that is, without inflammatory action; the deposit takes place in the absence of all the symptoms of inflammation, "pain, heat, redness, and swelling;" and so silently, so insidiously, that the patient is often ignorant of its presence, or discovers it only by accident. No event is more common than for a surgeon to be consulted by a man who states that he had a sore a few weeks ago, "which did not amount to much;" he "burnt it with caustic and it healed up;" but he has recently found that it left a "lump" behind it. This "lump" is specific induration and denotes that the constitution is infected. A gentleman applied to me for phimosis—neither congenital nor inflammatory—which occasioned no inconvenience except an inability to retract the prepuce. He was not aware that he had had any venereal trouble, but, on examination of the parts, a mass of induration as large as an almond was perceptible to the touch and even to the sight—so great were its dimensions—situated about the furrow at the base of the glans. The phimosis was simply due to the mechanical obstruction presented by the induration to the retraction of the prepuce, and this difficulty alone induced him to seek advice. Frequently, also, patients apply to a surgeon for treatment for general syphilis, and honestly declare that they have never had a chancre, though the previous existence of such, and even its very site, are unmistakably indicated by the remaining induration.

Again, specific induration and inflammatory engorgement differ in their objective symptoms. The boundaries of the former are clearly defined, while the extent of the latter cannot be limited with nicety; the one terminates abruptly, the other shades gradually into the normal suppleness of the part; the first is freely movable upon, the second adherent to, the tissues beneath. The difference in the sensations they impart to the fingers is still greater; specific induration is so firm, hard, and resistant, that it

[1] Luis Venereæ Curandæ Ratio, Paris, 1563.

[2] "S'il y a ulcère à la verge et s'il demeure dureté au lieu, telle chose infailliblement montre le malade avoir la varole." (Paré's works, first published at Paris, 1575. Book 19th.)

[3] L'art de guérir les maladies vénériennes, etc., Paris, 1673.

[4] Ricord and Hunter on Venereal, 2d Am. edition, Phil., 1859, p. 286.

[5] Treatise on Gonorrhœa Virulenta and Lues Venerea, London, 1793, vol. ii, p. 19.

is often compared to a "split-pea"[1] or mass of cartilage: the softer and doughy feel of common inflammatory engorgement requires no description. It is hardly necessary to say that there is no incompatibility between these two pathological conditions which can prevent their coexistence, and hence arises, in some few cases, a difficulty of diagnosis. The effect of simple inflammation, however, subsides in a few days, or in a week or two at farthest, and lays bare the specific induration, which may, for a time, have been buried beneath it; and under all circumstances reference may be made to the neighboring ganglia, the induration of which is equally constant and significative with that of the chancre.

In the masses of induration of considerable size to which the above description chiefly refers, the adventitious deposit occupies the skin or mucous membrane bordering upon the edges of the sore, and also the cellular tissue beneath it. There is another but less common form of induration in which the deposit is confined to the mucous membrane alone, and does not involve the cellular tissue beneath. It most frequently occurs in connection with the superficial chancre, and is called the "parchment-induration" because it imparts to the fingers a sensation as if the erosion rested upon a thin layer of that material. Readily perceived in most cases, in others it may escape notice, especially to one not familiar with it.

The situation of the chancre influences to a certain extent the degree of development of the induration; which, for instance, is generally but slightly marked and of the parchment variety in certain regions, as at the margin of the anus; while, on the contrary, it is fully developed in the furrow at the base of the glans and upon the upper lips. Some authorities have gone so far as to maintain that induration is entirely dependent upon the seat of the sore, and have instanced the uniformity with which all venereal ulcers upon the lips are indurated, in proof; but, as before stated, this objection to a duality of venereal poisons has been effectually exploded by recent experimental inoculations, in which chancroids with a perfectly soft base have been developed upon the region in question.

Ricord believes that the development of induration corresponds with the supply of lymphatic vessels; that the former is most marked where the latter are most abundant; and that the induration consists in an inflammation of the capillary absorbents with effusion into the intervening tissue.[2] The investigations, however, of Auspitz and Unna, to be mentioned presently, show a remarkable immunity of the lymphatics in the indurated mass. Thus it is seen in Figs. 117 and 118 (pp. 464 and 465)

[1] Benjamin Bell usually has the credit of the comparison of induration to a split-pea, but reference to his work shows that he uses the term as indicative of the size of a chancre, and not of the consistency of its base. He says: "A real venereal chancre is seldom so large as the base of a split-pea, and the edges of the sore are elevated, somewhat hard, and painful." Op. cit., vol. i, p. 19.

[2] Leçons sur le chancre, p. 86.

that, notwithstanding the arteries and veins are partially or wholly obliterated, the walls of the lymphatics are unaffected and their lumen unobstructed. Fibrillary hypertrophy of the connective tissue of the adventitia of the bloodvessels, round-cell infiltration, disappearance of the lymph spaces, and similar changes in the perivascular tissues, are the essential changes to be found in chancrous induration.

Ricord has endeavored to determine the limits of time within which induration may take place. He states that it occurs most frequently during the first or second week after contagion; never before the third day, nor after the third week; that, consequently, if a sore is to be indurated at all, it will be so by the twenty-first day after the sexual act in which it originated. It is with great reluctance and hesitation that I dissent from so accurate an observer, but believing as I do in the incubation of the chancre, I cannot but think that this subject requires renewed investigation with the additional light we now possess. I believe it would be nearer the truth to substitute the words "after the appearance of the chancre" in place of "after contagion." Taking the former as the starting point, there can be no question but that induration occurs within a very few days; I have almost invariably met with it on the earliest appearance of the chancre, or during the first week, and should not hesitate to regard its absence, at the termination of three weeks, both in the sore itself and in the neighboring ganglia, as indicative that the patient was safe from constitutional infection.

Sigmund,[1] of Vienna, gives the following table of the dates *after contagion* at which induration was first detected in 261 cases of chancres:—

On the 9th	day in	71	cases.
" 10th	"	84	"
" 14th	"	76	"
" 17th	"	15	"
" 19th	"	12	"
" 21st	"	3	"

Mr. Babington, the English editor of Hunter on Venereal, advanced the opinion that induration may take place before the appearance of the chancre, and this fact, which was for a time denied, has of late years been proved to be true, both by the results of artificial inoculation, and by some instances met with in clinical observation; indeed, in a few rare cases the initial lesion of syphilis has been found to consist only of an induration, without any ulceration whatever. After all, if it be admitted that all possible mischief is accomplished long before the chancre first appears, the exact date of the evolution of the induration possesses less practical importance than it assumed under the supposition that it marked the boundary line between "local" and constitutional syphilis.

Specific induration usually remains for a long time after the cicatrization

[1] British and For. Med.-Chir. Rev., Jan., 1857, p. 206; from the Wien Wochenschrift, No. 18.

of the chancre, and, unless dissipated by treatment, may, in most cases, be felt for at least two or three months, and often longer. Some statistics collected by M. Puche show that its persistency becomes rarer after the third month, and is quite exceptional after the eighth, though this surgeon reports thirteen cases in which it was perceptible from 390 to 2062 days after contagion; in nine of the thirteen, the induration occupied the furrow at the base of the glans, a favorite seat for its full development and long persistency. M. Puche met with still another instance in which induration persisted for nine years. I have met with several cases of two and three years' duration, and Ricord with one of thirty years. It follows from the above data that induration is an early symptom of syphilis, and that the time within which its presence or absence is of diagnostic value is limited, though variable in different cases.

Induration is sometimes much shorter lived; the parchment form especially, *may* entirely disappear before the chancre heals, and the cicatrix present as soft a base as the chancroid. This form of induration is, however, in many instances, as durable as any other.

As the process of absorption goes on, the indurated mass becomes less firm and resistent, and gradually softens until it can finally no longer be detected. In other instances, after partial absorption has taken place, the induration suddenly resumes its earlier dimensions, and this is most likely to occur upon the first appearance of secondary symptoms, or at a subsequent relapse of the same.

Under the name of "*indurations de voisinage*," Fournier[1] describes masses of induration, contemporaneous with the chancre, but occurring secondarily at a short distance from it. I have seen several cases of the kind. The induration is probably seated in the tunics of the bloodvessels emanating from the seat of the chancre, and in the surrounding cellular tissue. Although the surface of such indurations usually remains intact, it may take on ulceration in the manner hereafter described.

Relapsing Induration.—The genital organs may at any time in the course of syphilis be the seat of indurated nodules which are liable to be mistaken for primary lesions.

They are of two kinds—the superficial and deep. The superficial induration is in every respect like a true chancre, consisting of a localized infiltration, somewhat elevated, having a smooth exulcerated surface, which secretes a scanty mucous fluid. It generally appears upon the mucous layer of the prepuce or upon the glans in the form of a small papule. It runs an indolent course, but may reach quite a large size. It is usually accompanied by enlargement of the inguinal ganglia. It sometimes appears exactly on the former seat of a primary lesion, and is generally solitary.

The deep relapsing induration occurs in the submucous connective tissue of the prepuce and of the labia majora. It consists of a sharply-defined

[1] Étude clinique sur l'induration syphilitique primitive, Arch. gén. de méd., nov., 1867.

nodule of cartilaginous hardness, freely movable and generally not adherent to the mucous membrane. Its growth is rapid, and it sometimes reaches the size of a nutmeg. There may be several of these tumors, and we have seen five in one case. The lesion may remain inactive for a long time, causing no pain but giving some inconvenience in coitus. In some cases it contracts adhesions with the surrounding soft parts; exceptionally, it undergoes necrosis and forms a deep ulcer, which is difficult of cure. In women the infiltration is often very large, involving perhaps the whole labium. The induration is very marked and often persists for years. In rare cases the labia minora are involved. There is usually no enlargement of the inguinal ganglia with the deep induration, either in men or in women.

These indurations may occur as early as the first and as late as the tenth year of syphilis. They are amenable to early treatment, but are more obstinate with age. They have been known to undergo spontaneous involution, and to relapse after complete cure. It is important to distinguish them from primary lesions of syphilis. Many of the reported cases of reinfection have no doubt been in reality examples of relapsing induration.

Secretion.—The secretion from a chancre is much less copious than that from the chancroid and is chiefly serous. This difference is especially evident in the superficial erosion, but is also perceptible in the excavated forms, the discharge from which is less free and purulent than in the chancroid.

Numerous experiments show that the immunity conferred by one attack of syphilis extends in most cases even to the initiatory sore. This fact was first announced by M. Clerc in 1855. Fournier inoculated the discharge of ninety-nine chancres upon the patients themselves, and succeeded in but one, in whom the experiment was performed within a very short period after contagion. M. Puche states as the result of his own experiments that auto-inoculation of the chancre is successful in only two per cent. Poisson obtained like results in fifty-two cases,[1] and Laroyenne was unsuccessful in every one of nineteen.[2] Do not these facts tend to show that the chancre is from the very first a constitutional lesion? Their bearing upon the use of artificial inoculation as a means of diagnosis is evident; failure favoring the supposition that the sore is a chancre.

Whenever auto-inoculation has proved successful, it has been with virus taken from the sore at a very early period of its existence, or from one which has been irritated and its secretion rendered purulent, and in the latter case, the resulting sore is not a chancre but a chancroid. (See Introduction.) In the same manner vaccine lymph may be successfully reinoculated within a day or two after the first appearance of the future pustule, while if the attempt be deferred until its full development, it will fail. Hence we infer, that although absorption is instantaneous and general infection is inevitable from the first, yet that time is requisite to bring the system fully under the influence of the virus.

[1] Leçons sur le chancre, p. 274.

[2] Annuaire de la syph. et d. mal. de la peau, Paris, année 1858, p. 241.

Mr. Henry Lee, of London, as early as 1856, also called attention to the difficulty of inoculating chancres, or "syphilitic sores affected with specific adhesive inflammation," upon the persons bearing them.[1] This surgeon afterwards maintained that if a chancre—the discharge from which, under ordinary circumstances, is destitute of pus-globules—be irritated, as by the application of a blister or ung. sabinæ, until its secretion becomes purulent, it is susceptible of inoculation.[2] This statement was confirmed by Prof. Boeck and other advocates of "syphilization."

The difficulty of inoculating the secretion of a chancre is equally as great upon a person who has arrived at the stage of secondary syphilis as upon one who has but recently been infected.

Duration.—The chancre, as a general rule, is of somewhat shorter duration than the chancroid, but often remains until after the appearance of secondary symptoms—a remark which I should not think it necessary to make had I not met with persons who supposed that primary syphilis must terminate before secondary commenced! Of 97 cases observed by Bassereau, in which no treatment had been employed, syphilitic erythema, one of the earliest general symptoms, occurred in 58 before, in 18 during, and in 21 after the cicatrization of the chancre.

Termination.—As previously stated, most chancres are not attended by any loss of substance, and consequently leave no cicatrix.

A chancre situated upon the external integument, as the sheath of the penis, often leaves a peculiar discoloration of the skin of a sombre brown or brownish-red color, which is never seen after the chancroid; in time its dark hue fades into a white. An instance of this kind is figured by Ricord in his *Iconographie des maladies vénériennes*, pl. xviii.

A chancre may have entirely healed, leaving an induration in its site, and the latter again take on ulceration, commencing either upon its surface or in the centre of the mass, and form a sore precisely similar in every respect to the original chancre. In this case, the secretion is just as infectious as that of the first ulceration.

Moreover—and this is an important point—I have known this second ulceration to take on phagedenic action, which, under these circumstances, requires the active use of mercury to arrest it, although the destructive nature of the process and possibly the recent administration of this mineral would seem to demand a contrary course. I have met with several instances of this kind, in which the phagedæna threatened to destroy the glans or penis, and only yielded to the timely administration of mercury.

Ricord first called attention to the fact, which has since been verified by many observers, that a chancre during the reparative period may be transformed into a mucous patch, and thus a primary be changed into a secondary lesion. This transformation may take place upon any part of the body, whether of skin or mucous membrane, but more frequently upon the latter, especially when habitually in contact with an opposed surface,

[1] Brit. and For. M. Chir. Rev., London, Oct. 1856. [2] Ibid. for April, 1859.

whereby heat and moisture are maintained; as, for instance, upon the internal surface of the prepuce and labia majora, and upon the lips and tongue. Davasse and Deville have carefully studied the progressive changes by which this process is accomplished.[1] The surface of the chancre loses its grayish aspect and fills up with florid granulations, commencing at the circumference as in the ordinary period of repair; but just as these changes are reaching the centre of the sore, a narrow white border of plastic material appears around its margin, and extending towards the centre, finally covers it with the membranous pellicle which is characteristic of a mucous patch. If the patient does not come under observation until these changes have been effected, the initial lesion of his disease may be supposed to be a mucous patch instead of a chancre.

Number of Chancres.—Unlike the chancroid, the chancre is rarely met with in groups of two or more upon the same subject. Of 556 patients under the observation of Fournier, 402 had but one, and 154 several chancres. Debauge collected 60 cases at the Antiquaille Hospital, at Lyons, in 41 of which there was a single chancre, and in 19 several. These statistics would show that the chancre is solitary in three cases to one in which it is multiple. The ratio is still greater in M. Clerc's observations, in which the chancres were single in 224 out of 267 cases. If multiple at all, it is almost always true that they are so as the immediate effect of contagion, and because several rents or abrasions were inoculated together in the sexual act. If solitary at first, they continue to be so; since successive chancres rarely spring up in the neighborhood, as in the case of the chancroid, owing to the fact that the virus ceases to act upon the system as soon as it is once infected.

Phagedæna.—Phagedæna generally spares the chancre or limits its ravages to the destruction of the surrounding induration. In some instances, however, as I have seen in my own practice, an extensive phagedenic ulcer is the initial lesion of syphilis, and, in this case, the subsequent general symptoms are usually of an aggravated character. Babington says: "The secondary symptoms which follow the phagedenic sore are peculiarly severe and intractable. They commonly consist of rupia, sloughing of the throat, ulceration of the nose, severe and obstinate muscular pains, and afterwards inflammation of the periosteum and bones. Similar complaints will follow the ordinary chancre; but when they follow a phagedenic sore they are very difficult to be cured; and it is not uncommon that the constitution of the patient should at length give way under them, and that the case should terminate fatally."[2]

Bassereau also found a correspondence between the severity of the chancre and that of the syphilitic eruption. Thus, of 68 chancres which preceded a pustular syphilide, 20 were phagedenic and 4 others serpiginous;[3] and 18 of 50 chancres followed by a tubercular eruption produced

[1] Etudes cliniques des maladies vénériennes; des plaques muqueuses. Arch. gen. de méd., 4e série, vol ix, p. 182.

[2] Ricord and Hunter on Venereal, 2d ed. p. 371.

[3] Op. cit. p. 442.

destruction of the tissues to a greater or less extent. It will be recollected, on the contrary, that 143 of 170 chancres followed by syphilitic erythema were mere erosions, and that 10 only exhibited a very slight tendency to phagedæna. Bassereau states that a similar relation exists between the primary sore and other syphilitic lesions, and lays down the rule, that "mild syphilitic eruptions and, in general, those constitutional symptoms which exhibit but little tendency to suppurate follow the mild forms of chancre; while pustular eruptions, and, at a later period, ulcerative affections of the skin, exostoses terminating in suppuration, necroses, and caries, follow phagedenic chancres." The degree of ulceration of the chancre is also regarded by Diday[1] as one of the most valuable indications to enable us to determine whether the attack of syphilis is to be mild or severe, and whether mercury can or cannot be dispensed with in the treatment. Admitting the truth of this rule, it does not follow that the condition of the chancre in any manner determines the severity of subsequent symptoms, but merely that it is an indication of the activity of the virus and of the state of the patient's system—the two causes upon which the severity of the attack chiefly depends.

Condition of the neighboring Ganglia.—We have already seen that most chancroids are free from ganglionic reaction, and that when this occurs it is always inflammatory and chiefly involves one ganglion, which tends to suppuration and often furnishes inoculable pus. The chancre, on the contrary, gives rise to changes in the neighboring lymphatic ganglia, which, by their constancy, and the peculiarity of their symptoms, are of the highest value in diagnosis. A number of these bodies become enlarged and indurated in a similar manner to the base of the chancre, without inflammatory action; they do not suppurate except in rare instances, and the pus is never inoculable. The induration of the neighboring ganglia, attendant upon a chancre, will be more fully described hereafter.

Diagnosis of the Chancre.—The most valuable diagnostic signs of a chancre are its period of incubation, the induration of its base, and the induration of the neighboring ganglia. Both of the latter are rarely, if ever, wanting. Of the two, I believe induration of the ganglia to be the more constant. Absence of induration of the base cannot always be depended upon, even according to Ricord's showing, who says that this symptom sometimes disappears after a few days' duration, and it may, therefore, have passed away before the patient comes under the care of the surgeon. Cases are reported by competent observers of chancres with a perfectly soft base, which have yet been followed by general syphilis; such instances, however, are extremely rare. If a caustic or astringent has recently been applied to a sore, induration of its base should be admitted with caution: examine the condition of the neighboring ganglia; direct simple applications only for a week or two, and see if the hardness persists. Inflammation of the surrounding tissues may counterfeit or mask specific

[1] Histoire naturelle de la syphilis, p. 84.

induration: here again, refer to the ganglia, or defer the diagnosis until the inflammatory products shall have time to undergo absorption.

Even admitting that cases may possibly occur in which induration of the base and of the ganglia are both absent, yet these two prominent symptoms of a chancre are as constant and as valuable as any others in the whole range of pathology; more than this we can neither ask nor expect. Since absorption of the syphilitic virus takes place instantaneously so soon as it has penetrated beneath the epidermis, and since there is, therefore, no opportunity of preventing constitutional infection by abortive treatment, there is less necessity for an early diagnosis than was formerly supposed; and, in obscure cases, we may wait, if necessary, until after the time within which, if ever, secondary symptoms invariably appear.

The superficial form of chancre does not differ materially in appearance from a common excoriation, or from the superficial ulcerations of balanitis; it may be distinguished by its late appearance after exposure, its induration, and greater persistency. No suspicion of a chancre, however, may be awakened if the erosion be surrounded by simple inflammation of the mucous membrane, unless the induration of the inguinal ganglia be discovered, and hence the condition of these bodies should always be examined in apparent cases of balanitis.

Inoculation of the secretion of a sore upon the person bearing it is presumptive of a chancroid, but is of less value in the diagnosis of a chancre.

Diagnostic Characters of the Chancre and Chancroid.

The Chancre.	The Chancroid.
Origin. (Confrontation.)	*Origin.* (Confrontation.)
Always due to contagion from the secretion of a chancre, syphilitic lesion, or from the blood of a person affected with syphilis.	In practice generally due to contagion from a chancroid, or chancroidal bubo, or lymphitis.
Incubation.	*Incubation.*
Constant; usually of from two to three weeks' duration.	None. The sore appears within a week after exposure.
Commencement.	*Commencement.*
Commences as a papule or tubercle, which afterwards, in most cases, becomes ulcerated.	Commences as a pustule, or as an open ulcer.
Number.	*Number.*
Generally single; multiple, if at all, from the first; rarely, if ever, by successive inoculation.	Often multiple, either from the first or by successive inoculation.
Depth.	*Depth.*
Most frequently a superficial erosion, "scooped out," flat, or elevated above the surface; rarely deep, and then cup-shaped, sloping towards the centre.	Perforates the whole thickness of the skin or mucous membrane; "punched out," and excavated.

Edges.

Sloping, flat, or rounded, adherent.

Floor.

Red, livid, or copper-colored, often iridescent. Sometimes covered by a false membrane, scaly exfoliation, or scabs.

Secretion.

Scanty and serous, in the absence of complications.

Auto-inoculable with great difficulty.

Induration.

Firm, cartilaginous, circumscribed, movable upon neighboring tissues; sometimes thin, resembling a layer of parchment, or, again, annular; generally persistent for weeks or months.

Sensibility.

So little painful as often to pass unnoticed.

Destructive tendency.

Phagedæna rare and generally limited.

Frequency in the same subject.

One chancre usually affords complete, and always partial protection against another.

Lymphitis.

Induration of the lymphatics common.

Characteristic gland affection.

The superficial ganglia on one or both sides enlarged and indurated, painless, freely movable; suppuration rare and pus never auto-inoculable.

Transmission to animals.

Peculiar to the human race.

Prognosis.

A constitutional disease. General symptoms usually occur in about six weeks after the appearance of the sore, and very rarely delay longer than three months.

Effects of treatment.

Improves under the influence of mercury.

Edges.

Abrupt, sharply cut, eroded, undermined.

Floor.

Whitish, grayish, pultaceous, "worm-eaten."

Secretion.

Abundant and purulent.

Readily auto-inoculable.

Induration.

No induration of base, although engorgement may be caused by caustic or other irritant, or by simple inflammation; in which case the engorgement is not circumscribed, shades off into surrounding tissue, and is of short duration.

Sensibility.

Painful.

Destructive tendency.

Often spreads and takes on phagedenic action.

Frequency in the same subject.

May affect the same person an indefinite number of times.

Lymphitis.

Inflammation of the lymphatics rare.

Characteristic gland affection.

Ganglionic reaction absent in the majority of cases. When present, inflammatory; suppuration frequent, pus often auto-inoculable.

Transmission to animals.

May be transmitted to the lower animals.

Prognosis.

Always a local affection; the general system never infected.

Effects of treatment.

Treatment by mercury always useless, and, in most cases, injurious.

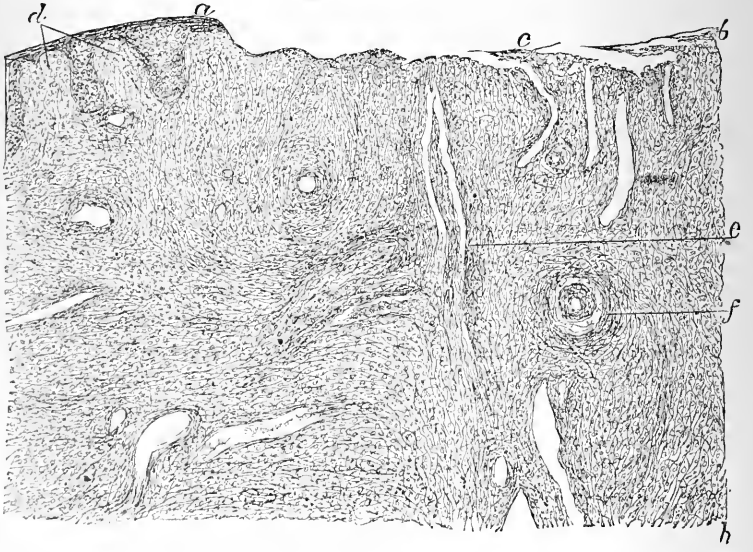
Pathological Anatomy.—Kaposi gives the following account of the microscopical appearances of sections of a chancre :—

"In the histological investigation of the hard chancre, the point of greatest interest is the minute anatomy of the induration. In a perpendicular section, the microscope shows a uniformly and thickly distributed deposit of cells in the papillæ and in the corium throughout its whole thickness down to the subjacent cellular tissue. This cell infiltration is limited somewhat abruptly at the sides and below, and is surrounded by a coarse (œdematous) tissue of fibres, in which are found irregularly distributed cells containing a large nucleus that strongly refracts the light.

"Under a higher power the infiltrated cells of the induration are roundish, corresponding in size to granulation cells, but generally somewhat smaller, with one or two nuclei and a finely dotted protoplasm evidently overlying the enclosed nucleus.

"The cells are deposited in a network of narrow meshes, whose walls are thin and somewhat sharply outlined. Corresponding to the surface of

Fig. 116.



Section of a Chancre, Hartnack, *oc.* 3 ; *obj.* 4. (After Kaposi.) *a b*, surface of the ulcer. The indurated mass beneath, to the base of the section *g*, is uniformly infiltrated with small cells. *d*, papillæ hypertrophied and infiltrated with cells. The epidermic layer covering them, becomes thinner and thinner up to *a*, where it disappears. At *c* and *b* are seen remains of the epidermis, and, beneath, an infiltrated papilla, which can only be recognized by its ascending vessels. In the indurated mass are several vessels with thickened walls and contracted calibre. *e*, a vessel cut longitudinally. *f*, a vessel cut transversely.

the ulcer, the network and its cell-deposit is irregularly exposed. Here, as well as in the parts lying nearest the surface, the cells are mixed with numerous isolated nuclei, small shrivelled cells, larger cells filled with granular elements, and free nucleoli.

"The papillæ, Fig. 116, *d*, at the sides of the ulcer are preserved, but are thickened, club-shaped, and infiltrated with cells extending from the corium. The rete between them and especially over them is much thinned. At several points on the surface of the ulcer are remnants of the epidermis and the rete, lying on the infiltrated corium. At still other points traces of the papillæ are seen with indications of the slings of the vessels, Fig. 116, *c b*.

"Within the cell-infiltrated portion there are but few bloodvessels, the walls of which are notably thickened, and their calibre diminished in size."

These microscopical appearances should be compared with those of the chancroid given on page 364, and their resemblance is so great as to lead Kaposi to say: "It appears to me allowable, from a histological standpoint, to regard the hard chancre as different from the soft only in the intensity and suddenness of the cell-infiltration and cell-degeneration, but not in their essence."

Since Kaposi's observations, however, further light has been thrown on this subject by Caspary[1] and others, but especially by the admirable investigations of Auspitz[2] and Unna.[3]

Caspary arrived at the following conclusions: "The essential difference in the structure of the soft and hard chancres consists in this, that in the latter a new growth of connective tissue occurs, which in the former is not developed at all, in consequence of the loss of tissue (destructive metamorphosis) which is constantly going on. This new formation is characterized, even in recent indurations, by a firm, closely-woven network everywhere inclosing the cells; in old indurations, by entire bundles of fibres which interpenetrate the new growth of cells. The narrowing of the vessels, which I could not demonstrate in fresh cases, appears to me to be the effect, not the cause, of the sclerosis. It appears to me probable that the formation of fibres proceeds from the infiltration cells, and not from the growth of young connective tissue occurring at the periphery, and extends into the interior of the neoplasm, because such a growth has not been found in the interior of the sclerosis. I would look upon the embryonic connective tissue found at the periphery as a kind of capsule caused by reactionary inflammation."

Auspitz and Unna have further studied the changes in the vessels of the mass of induration, resulting in a diminution of their calibre or in their complete obliteration, which they compare to those observed by Heubner in the arteries of the brain; and they express the opinion that in future investigations of syphilitic neoplasms, the condition of the vessels is the chief point for study. As to the manner in which these changes take place, Unna concludes:—

[1] Vierteljschft f. Derm. u. Syph., Wien, 1876, s. 45.

[2] Anatomie d. syphil. Initial Sklerose, von Prof. Heinr. Auspitz u. Dr. Paul Unna, Vierteljschft f. Derm. u. Syph., 1876, s. 161.

[3] Zur Anatomie der syphil. Initial-sklerose, Vierteljschft f. Derm. u. Syph., 1878, s. 531.

1. The fibrous constituent of the cutis, which, through its hypertrophy, occasions the hardness of the initial-sclerosis, is composed of pure collagen.[1]

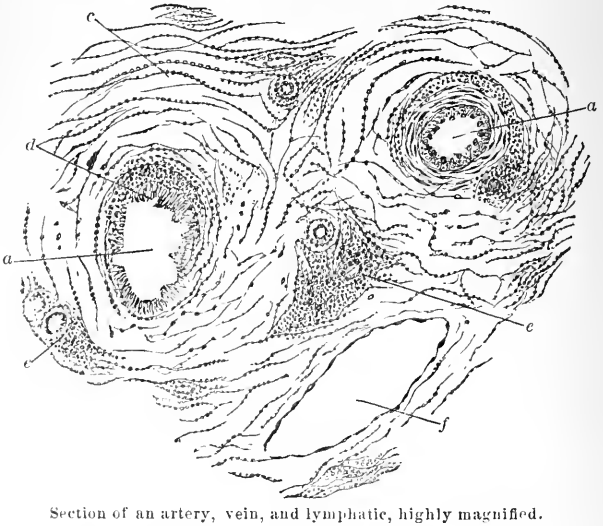
2. A sclerosed vessel arises in consequence of the fibrous hypertrophy of the connective tissue of the outer coat (adventitia) attended by the disappearance of the lymph-meshes (complicated with more or less infiltration of round cells), and of the same change in the connective tissue immediately surrounding the vessel.

3. In *endarteritis obliterans syphilitica acuta*, as takes place in the initial-sclerosis, the thickening of the endothelium is certainly not the first change. The constant and early implication of the *vasa vasorum* renders it probable that the starting point is here. Where there are no *vasa vasorum* the pathological process always begins in the outer coat.

4. Still more extended than the typical *endarteritis obliterans* is the closure of the vessels through obliteration of the walls by means of round-cells (granulating arteritis). Both processes, independent of each other, combine, and one may, by its excessive development, crowd out the other. The larger vessels are most frequently the victims of endarteritis obliterans, the smaller, especially the capillaries, of closure through infiltration.

Figs. 117 and 118, taken from Unna's latest paper on this subject, admirably represent the changes which take place in the arteries. The sections are represented as they appeared after having been prepared and colored.

Fig. 117.



Section of an artery, vein, and lymphatic, highly magnified.

In Fig. 117 are seen sections of an artery (*a*), a vein (*b*), and a lymphatic (*f*). In the tunica intima of the artery the nuclei of the endothelium are very marked and appear to project more than usual into the lumen.

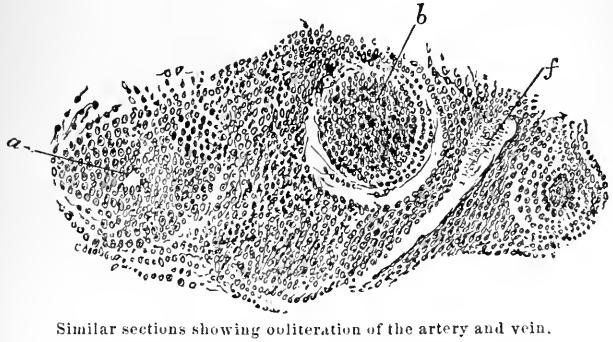
[1] For the properties of "collagen," see Dalton's Treatise on Human Physiology, 6th ed., 1875, p. 91.

The whole intima is in a swollen condition. The media is also swollen and, like the intima, more yellow than normal; the nuclei of the muscular fibres are sharply shown. Round cells, in rows and in groups, are first seen at the border line between the media and the adventitia, and especially at a spot where a clear lumen is seen to be thickly and concentrically surrounded by round cells, and where also a small nutrient vessel enters as far as the media. The adjoining portion of the adventitia is more thickly infiltrated with round cells than elsewhere.

The same appearance is presented in the adventitia of the vein: thick bundles of connective tissue, separated by isolated round cells and regions of the same,—but the round cells are here generally more abundant, and in the upper quadrant especially they completely mask the structure of the media. The most striking appearance, however, in the vein, is the exuberance of the endothelial cells, which changes the shape of the lumen to that of an irregular pentagon. In marked contrast to this is the condition of the lymphatic endothelium, which is not at all changed. Several small vasa vasorum (*e*, *e*) are seen thickly surrounded and partially closed by round cells. The surrounding cellular tissue (*b*) presents hypertrophied fibrillæ and round cells.

A later stage of the above process is shown in Fig. 118, in which *a* is probably an artery, *b* a vein, and *f* a lymphatic. The first two are obliterated or nearly so, while the last is unaffected.

Fig. 118.



Similar sections showing obliteration of the artery and vein.

Virchow,[1] in his celebrated work on the Pathology of Syphilis, advocated the complete correspondence of an indurated chancre with a gumma of the skin. The identity of these two lesions is not now, however, to be maintained, as is shown by the following comparison of the two.

"A gumma is a collection of small cells with large nuclei, lying in a network of fine connective tissue. It forms a roundish mass, whose separation from the neighboring tissues is more apparent on gross than on microscopical examination. Its regular course is to undergo dry atrophy (cheesy degeneration), or fatty degeneration and ulceration. Fre-

[1] Ueber die Natur der constitutionell-syphilitischen Affectionen, 1859.

quently, especially in the cutis, it is surrounded by sclerosed, brittle bundles of connective tissue, but we can apply the name of gumma only to the central, gum-like, richly cellular mass, which, especially in the corium, almost always forms an abscess.

"The initial sclerosis, on the other hand, presents a syphilomatous, new cell-growth, permeated by a new formation of fibrous connective tissue, which of itself renders the formation of cavities of considerable size impossible. No tendency to the formation of even miliary abscesses is shown." (Unna.)

Treatment of the Chancre.—It was formerly supposed that a chancre was at first a mere local affection, and that the general circulation did not become contaminated until some days after the appearance of the ulcer; and hence that its early and complete removal was capable of averting infection of the constitution. The advice was therefore given to cauterize or excise a chancre as soon as it appeared; and we were told, that, if the caustic was sufficiently powerful to kill the tissues to an extent exceeding the sphere of specific influence of the virus, or if the excison was carried to a sufficient extent, a simple wound would be left after the fall of the eschar, and our patient would be preserved from syphilitic infection. This treatment, known as the "abortive treatment of chancre," was supported by the distinguished names of Ricord and Sigmund, who assigned *the fourth day after contagion* as the limit within which destructive cauterization could be employed with a certainty of success; but it should be known that these surgeons have since abandoned their early views on this subject.

Belief in the efficacy of "the abortive treatment" never could have been entertained, had it not been for confounding the chancroid and syphilis, whereby surgeons were led to believe that when a patient whose chancroid had been cauterized escaped general syphilis, *post hoc ergo propter hoc* his immunity was due to the cauterization.

A chancre is never a mere local lesion, as is proved by its period of incubation, by the analogy of other morbid poisons, and by the fact, as shown by repeated experiments, that its destruction within a few days and even a few hours *after its appearance* fails to avert constitutional infection.

The average duration of the incubation of a chancre is, moreover, from two to three weeks. During this period the inoculated point remains in a state of quiescence and exhibits no traces of inflammation; hence the subsequent appearance of the chancre can only be ascribed to the reaction of the absorbed virus. It may be remarked, in passing, that this period of incubation renders the conditions of the so-called abortive treatment (cauterization within four days *after contagion*) impracticable, since the sore very rarely appears until the time specified has elapsed; and the same consideration increases the probability that Ricord and Sigmund, in their "thousands" of supposed successful cases, really applied the method only to the chancroid. Experiments with other morbid poisons prove that absorption is almost instantaneous. Bousquet inoculated the vaccine virus,

and immediately applied cups and washed the parts with chlorinated water without preventing the evolution of a pustule.[1] Renault, Surgeon of the Veterinary School at Alfort, inoculated horses with acute glanders, excised the part and applied the actual cautery one hour afterwards, yet the animals died of the disease.[2] Similar experiments with the sheep-pox virus proved that its absorption does not require more than five minutes. Hence analogy would show that the syphilitic virus also reaches the general circulation almost instantaneously after its implantation beneath the epidermis.

We have still farther the evidence of direct experiment. Numerous cases are recorded in which destructive cauterization within a few days, and *even a few hours after the development of the chancre*, has failed to avert constitutional infection. Diday has thoroughly cauterized chancres within four days and a half, and others within five days, and secondary symptoms have still appeared. In another case, occurring in a patient who had watched himself with the greatest care from day to day and almost from hour to hour, the chancre was not developed until a month after the sexual act, but the abortive treatment was applied within *six hours* of its first appearance; the sore healed in the course of three days, but secondary symptoms appeared three weeks afterwards.[3] More recently,[4] Diday has reported several additional cases.

It was desirable that thus much should be said in deference to any of our readers who may have imbibed their only notions of venereal from the teachings of authorities a few years ago; but the "abortive treatment of syphilis" is now so generally recognized to have been founded in error, that we need not dilate farther on the subject.

But if destructive cauterization is inefficacious as a means of preventing constitutional infection, it is equally unnecessary in most cases for the purpose of hastening the cicatrization of the chancre, which rarely tends to spread, and which is commonly sufficiently under the control of mercury. I would, therefore, limit its application to those few chancres which are complicated with phagedæna, and to those cases in which conjugal relations and the necessity of secrecy render it desirable to effect cicatrization of the sore as speedily as possible in order that coitus may be indulged in with comparative safety. Even then, it is a question whether much time will be gained by its use. When employed, induration usually reappears in the wound, and general lesions are developed within the normal period. The mode of its application has already been described.

Excision of Chancres.—Excision of chancres with the view of aborting syphilis was practised in earlier years, but was afterwards abandoned on account of its failure to accomplish the object. The method has of late years been again revived and advocated, especially by Auspitz, Kölliker, and Otis. During the past ten years we have ourselves carefully tested

[1] Traité de la vaccine.

[2] Académie des sciences, 1849.

[3] Gaz. méd de Lyon, 1 mars, 1858.

[4] Annuaire de la syph. et d. mal. de le peau, Paris, année 1858, p. 134.

this form of treatment in fifteen cases. Those who rely upon it as a means of aborting syphilis regard the disease in its primary stage as merely local, a position which we are not yet willing to assume. We shall, however, give the details of the treatment and its most important results.

The observations of Auspitz were made upon thirty-three cases, from which his conclusions are drawn with such care that we shall give them here in brief. It is his custom to seize the tissues with an anatomical pincette, with toothed forceps, or with a serre-fine, and elevating the parts, to cut with scissors well beneath the indurated mass. The surface of the wound generally bleeds but little, and should be carefully examined to avoid leaving any indurated tissue. In some cases the wound is closed with a few sutures, or a carbolized compress is applied.

In several of our own operations, in case of extensive and deep induration, we passed several threads, for the purpose of traction, under the mass and transfixed the parts beneath the threads, cutting outwards in one direction and then in the other. In some cases of long prepuce, where the chancre was seated at its free margin, the excision was performed by a single cut of the knife or scissors. Previous to the operation, the parts should be thoroughly cleansed, and the nodule should be cauterized with equal parts of water and carbolic acid. In two of our cases induration recurred in the cicatrix.

Auspitz says that phagedæna and a diphtheritic condition were observed by him in a few instances, and in most cases the inguinal ganglia were indurated. The latter feature was present in all of our cases. The induration is regarded by Auspitz not as an indication of infection, but as an ordinary result of the local inflammatory process on the penis. In fourteen of his thirty-three cases no syphilis followed. This experience is decidedly at variance with our own; we have never succeeded in aborting syphilis by this procedure. Auspitz recommends excision in cases of recent induration, even though accompanied by indolent enlargement of the inguinal ganglia. Chancres on the external surface of the limbs and on the prepuce are selected as most favorable for operation, while those in the sulcus coronarius are considered unfavorable.

The results of Kölliker with this operation are of interest. In seven out of eight cases he excised a chancre on the seventh, the ninth, the tenth, the fourteenth, the twenty-first, and the forty-ninth day after its appearance, while in one case the date is not given. In six the wound healed by first intention, and in two by granulation. In three cases induration appeared in the cicatrix, and in two of these syphilis followed, while in two other cases induration appeared later and was the forerunner of syphilis. Kölliker says that in but three of his cases was syphilis *probably aborted or prevented by excision*. He concludes that in certain cases, excision may prevent, retard, or modify constitutional infection. He does not regard lymphatic induration as a contra-indication, and like Auspitz, thinks "that the chancre is not to be considered an expression of constitutional infection."

In the local treatment of chancres, cleanliness and the interposition of

some absorbing medium, as dry lint, are of the same importance as in the treatment of the chancroid. The same rules should also govern us in the selection of any medicated applications, except that on theoretical grounds at least, mercurials may be used with some show of reason, and "black wash" may not be entirely lost to memory. Fatty preparations of mercury are not to be recommended when the chancre is seated within the balano-preputial fold, but, when seated on the external integument, the unguentum hydrargyri, the mercurial plaster, or the emplastrum de vigo cum mercurio will usually be found to be good applications. In the superficial variety of chancre which is the most frequent, the degree of ulceration and the amount of the secretion are so slight, that the simple interposition between the glans and prepuce of a piece of dry lint, or lint soaked in some mild astringent, is all that is necessary, and the dressing need not be changed oftener than once or twice in the twenty-four hours.

General Treatment.—The chancre is decidedly under the influence of mercury, and presents in this respect a marked contrast to the chancroid. Under the use of this mineral reparative action is speedily induced, and unless the ulcer be deep and extensive or the system much depressed, complete cicatrization may be promised the patient in the course of from one to three weeks.

I do not propose at present to enter fully into the subject of the treatment of syphilis, which of course includes the treatment of its initial lesion. A few remarks, however, may be better made here than elsewhere. And, in the first place, let me say that no course of mercury administered for a chancre, however thorough or prolonged, is *likely* to prevent the subsequent evolution of general manifestations. Some eminent authorities maintain the contrary, but their opinion has not been confirmed by our own experience. In the very many attempts that we have made to subdue the disease during the existence of the initial lesion and prior to the appearance of general manifestations, we have always failed. Moreover, although the use of mercury retards the appearance and probably ameliorates the severity of secondary symptoms, *yet it is a fact attested by many observers*, ourselves included, *that those cases ultimately do best, in which specific treatment is deferred until the secondary stage.*

The exceptional cases of chancre in which it is advisable to administer mercury before secondary symptoms appear may be summed up as follows:—

1. Chancres which, from their size, depth, and progress, occasion pain and inconvenience, or which threaten to destroy important parts.

2. Chancres occurring in married persons who cannot long avoid sexual intercourse without exciting suspicion.

3. Chancres in persons who are either too anxious or too unreasonable to be willing to submit to delay.

In other cases, especially when the sore is superficial and attended with little or no inconvenience, we prefer to delay the use of mercury until secondary symptoms appear, meanwhile resorting to tonics, as one of the preparations of iron, iodide of potassium, or cod-liver oil.

In using mercurials during this period of syphilis, we commonly employ either the blue mass or gray powder; giving one or two grains of the former, or from three to five grains of the latter, twice a day for a week; increasing the dose at the end of that time if, as is rarely the case, there is no perceptible effect upon the ulcer; always avoiding action upon the gums and bowels, and suspending treatment as soon as reparative action is established. After cicatrization of the sore it is desirable to resort to iodide of potassium and iron, in order to combat the chloro-anæmia which exists in the early stage of syphilis, and thus diminish the severity of the premonitory symptoms which usually usher in secondary manifestations, when mercurials should at once be resumed.

CHAPTER IV.

SPECIAL INDICATIONS FROM THE SEAT OF CHANCRES.

Under this head there is much less to be said than has already been presented with regard to the indications arising from the seat of chancroids, for the reason that a chancre is merely the initial lesion of a constitutional disease, while the chancroid is a local affection, and is to be treated as such.

Chancres of the urethra are more frequent than is commonly supposed, and are much more common than the chancroid in this locality. Our experience leads us to believe that they occur with rather more frequency in Jews and in patients who have a short prepuce. They are found most frequently at the meatus and in the fossa navicularis, but we have seen several one, two, and even three inches from the orifice.

Chancres at the meatus are sometimes seated on one lip only, but they usually involve the entire circumference of the canal. They first attract attention by causing a slight impediment in urination, and the mucous membrane is found to be thickened, and the lips glued together by a scanty viscid discharge. The whole canal at the site of the ulcer finally becomes thickened and rigid, and it is often impossible, owing to the congestion of the parts, to clearly circumscribe the induration. The normal opening of the urethra often becomes greatly reduced, even to the size of the head of a pin, so that the pain and difficulty of micturition are excessive. The parts have a reddish-blue appearance, and give forth a muco-pus. The urethral walls are excoriated rather than ulcerated, and very often a few drops of urine escape several minutes after urination. The case is frequently mistaken by the inexperienced for an anomalous case of gonorrhœa.

Chancres of the fossa navicularis and of the deeper parts begin painlessly, with mere gluing of the lips of the meatus as their first symptom. Soon there is slight pain as the urine first passes, and the patient discovers a thickening of the tissues at the site of the chancre. The discharge is sometimes muco-purulent, but again may be decidedly purulent and as considerable in quantity as in ordinary gonorrhœa. This is due to the fact that the lesion sets up a urethritis of the contiguous membrane. Externally is found in the corpus spongiosum a hard, tender, circumscribed nodule, which gives pain on urination and on erection of the penis. With the endoscope we observe rigidity and erosion of the urethral walls, which have a grayish-red color. This lesion is sometimes very chronic, and gives remarkably little inconvenience. It then occasions hard, non-

inflammatory thickening of the prepuce on either side of the frænum, a phenomenon so constant in our observation as to be of considerable diagnostic value.

Chancres several inches from the meatus, acting like true fibrous strictures, often cause much inconvenience. They may be as large as a pea, or, exceptionally, of the size of a nutmeg. They are always accompanied by induration of the inguinal ganglia, and sometimes by engorgement and induration of the lymphatics, which arise at the side of the frænum.

After the disappearance of a chancre of the urethra the parts may be restored to their normal condition, or thickening and contraction may result, requiring to be relieved by internal urethrotomy or slitting of the meatus.

The importance of distinguishing these chancres from gonorrhœa is evident. The chief aids to diagnosis are the slight gluey, perhaps bloody, discharge, the localized impediment to urination, and the subacute course of the lesion. When the lesion is fully developed, the patient himself usually calls attention to the induration.

The symptoms induced by these chancres are sometimes so urgent that an active mercurial treatment is demanded even before the evolution of secondary manifestations. In ordinary cases we have found benefit from the use of bougies made of mercurial ointment two parts and white wax six parts. These are sufficiently rigid, and when made conical at the end, and of a diameter of a line or two, can be readily introduced and retained. They produce a beneficial effect by the gentle pressure which they exert as well as by their medicinal action. They are particularly efficacious when the pressure of an ordinary bougie cannot be borne. In some cases we have used similar bougies with one drachm of iodoform thoroughly incorporated in each ounce of the other ingredients.

Chancres of the Anus.—Statistics prove that chancres of the anus are much less common in the United States than upon the Continent and in South America. In the latter country, especially, the practice of Sodomy is sadly prevalent, and the occurrence of anal chancres correspondingly frequent.

Jullien, in his elaborate work on venereal, records 11 chancres of the anus out of 2170 chancres of the male sex, and 39 out of 473 in females, making a proportion of 1 to 119 in men and 1 to 12 in women.

Such chancres may be situated entirely without the anus or at its margin; or, again, wholly within the anal ring, so that they can only be seen by gently opening the canal with the fingers, or by the use of a small speculum or, preferably, Nelaton's preputial forceps (see Fig. 24, p. 108). They rarely form open and closely circumscribed ulcers, but usually present a thickened, fissured, and ulcerated surface of a subacute character, devoid of the deep redness and free suppuration of simple fissures. They are of a pale rose tint, their base decidedly indurated. True chancres, seated at the anus in the form of fissures, which they often assume, have hard, pale margins and smooth, light red surfaces. Their bases are resistent to

the touch, and they are usually much less tender than simple fissures—a point of considerable importance in the diagnosis, which may also be aided by their slow and painless evolution, and, sometimes, by the early development of mucous patches in their neighborhood.

Extra-genital Chancres.—Chancres of the skin, occurrin in other parts than the genital organs, are called "extra-genital chancres." They may appear on any region of the body, but they are most commonly found on the face, the neck, the arms, forearms, and hypogastrium. These chancres begin as small, coppery-red, non-inflammatory papules which may be scaly. They extend until they attain a diameter of half an inch to an inch, and an elevation of about a line. Their margins are sharply limited, although there is not much induration. The scaly, papular condition of the lesions is seldom found in regions where two surfaces are in coaptation. We have several times seen it upon the hypogastrium, the cheeks, and the neck. The degree of induration is sometimes not greater than that of an ordinary papule; in other cases it is more marked.

Frequently the primary lesion begins as a papule, extends slowly and without inflammation, becomes indurated, elevated, and sharply circumscribed, and finally ulcerates. In some cases a thin greenish-brown scab covers the lesion, which then looks like an ecthymatous patch. The scab is formed of pus mingled with the new cells thrown off from the surface of the ulcer. In case of its absence the lesion presents a raw vascular surface, of about a line in elevation, free from granulations, and sometimes covered with a film of false membrane like chamois skin. It has a dense hardness and shows no reparative tendency. In addition to the history and appearance of the lesion, we find chronic, indolent enlargement of the lymphatic ganglia in anatomical connection with the part affected.

Chancres of the Fingers.—Chancres of the fingers are by no means infrequent, and are especially common among obstetricians, surgeons, and midwives. They may be seated on any part of the phalanges, but are, perhaps, most common at the side or base of the nail or at its free margin. They begin either as a pimple, as a pustule, as a slight excoriation, or as a fissure. They first attract attention as a "hang-nail" which will not heal, or as a small persistent sore. On examination, we find a hard, somewhat elevated mass of moderate size, which has a deep red, perhaps coppery, color. Its exulcerated surface, which is free from granulations, gives forth a scanty serous secretion. The lateral borders of the nail may be somewhat thickened, and its free margin may be superficially ulcerated. This tendency of the chancre to be confined chiefly to the soft parts is in marked contrast with the morbid condition in syphilitic onychia. The form of the ulcer is very irregular. The finger itself often has a bulbous shape, the entire distal phalanx being involved in the induration, which is always extremely chronic. The diagnosis is usually confirmed by enlargement of the epitrochlear and axillary ganglia; it is in some cases attended by moderate lymphangitis. The fact that there is very slight tendency to the formation of abscesses in the lymphatics and in the

glands is important in the diagnosis of syphilitic chancres of the fingers. On account of their exposed situation these chancres are very slow to heal.

Numerous instances of the communication of syphilis by chancres of the fingers have occurred, but the most remarkable is the case reported by Bardinet. This physician was appointed to investigate an epidemic of syphilis which occurred in the town of Brive, France. He ascertained that those affected were parturient women (and their husbands, children, and relatives) who had been attended in confinement by a certain midwife, examination of whom revealed a syphilitic ulcer near the margin of the nail of the right middle finger. She afterwards had general syphilitic manifestations. This chancre of the finger had been in an ulcerated condition for about six months, during which period she had attended fully fifty women in confinement. As a result, nearly one hundred persons became infected with syphilis, among them several children who died. The case illustrates the great importance of careful attention to chronic rebellious ulcers of the fingers on the part of physicians and obstetricians.

Chancres of the Lip.—Chancres of the lips are quite common, and may exist in the form of a diffuse infiltration or of a fissure. Those seated near the vermilion border are usually much larger than those on the inner surface of the lips. Chancres in this region are seldom seen by a physician until they have reached quite a large size, since they are at first regarded as cold-sores or cracks of the lip. They begin either as slight, often painful, excoriations, or as fissures, which gradually enlarge and become indurated. Their course is not rapid, a month or six weeks generally elapsing before they become fully developed. When seated upon the lower lip, as they more commonly are, they often involve its whole thickness, and the lip becomes converted into a wedge-shaped mass of induration with its base at the free margin, which is more or less ulcerated. Such a chancre usually presents a ligneous hardness. The lip becomes everted so that the patient is unable to close the mouth. The surface of the ulcer is smooth, and emits a scanty secretion. In other cases there exists a callous fissure with reddish-gray margins and a deep red base. The induration is usually very marked.

Within ten days after the appearance of the chancre the submaxillary glands become swollen and indurated, and may give rise to much discomfort and pain.

In children chancres of the lip are sometimes derived from lesions on the nipple of the nurse. These chancres are small, round, or oval in shape, and are slightly indurated. They may readily be mistaken for mucous patches.

When chancres are seated at the labial commissure, they are divided into two portions, separated by a deep ulcerated fissure at the angle of the mouth.

Chancres of the Buccal Cavity.—Chancres of the tongue are not frequent. They are usually seated on its lateral margins near the tip.

They consist of hard, quite sharply circumscribed nodules of the size of a pea, which involve the deep as well as the superficial structures. Their surface is flat and slightly elevated; it has a dull red color, is smooth, raw, and highly vascular. In some cases the lesion is covered with a milky-white film and resembles a mucous patch.

Chancres of the tonsil are never sharply circumscribed. They are dark red, superficially ulcerated nodules which secrete a scanty fluid. On account of the difficulty in examining them, it is not easy to determine their density. Their character is indicated by the history of the case, by their subacute course, by the absence of inflammatory symptoms, and the enlargement of the cervical and submaxillary ganglia.

Chancres have also been observed upon the gums, internal surface of the cheeks, the palate, and the walls of the pharynx.

Phagedæna is a rare complication of the buccal chancre. A single instance was observed at Cullerier's clinique, in which irritant applications had caused the ulcer to extend until it involved one-half of the lower lip and the inferior half of the cheek.[1]

Chancres in the Female.—These are in general similar to those occurring in the male, but have certain features which should be clearly understood. We find in females, as in males, the two varieties, the indurated nodule and the superficial erosion, although their appearances are less distinctive than in the male.

Upon the labia majora either variety may occur, the indurated nodule perhaps being more frequent. The nodule is generally quite large, the induration sometimes involving the whole lip. In almost all cases it is deeply seated and does not project greatly above the surrounding level. In some cases the induration is cartilaginous and clearly defined, in others it is less marked at its periphery. The induration is painless, and the superjacent mucous membrane is but slightly inflamed. The course of the indurated nodule is very chronic, and may be attended by hard œdema of adjacent parts.

The chancrous erosion is much less frequent in this region. It begins as a small red spot, which increases in area so as to form a dark coppery-red, slightly elevated patch. Its surface is smooth and velvety, being free from granulations; its elevation above the surrounding level seldom exceeds half a line; its margins may be sharply cut, but owing to the tendency to hyperæmia of the parts, the contour of the initial lesion in women is often obscured. In many cases we find the true parchment induration, while in others the induration may be so slight as to escape recognition. It was formerly claimed that syphilitic chancres in women were free from induration. On the contrary these lesions are in reality quite constantly indurated. Even with chancres upon the prepuce the induration is not more marked than in chancres of the labia majora. The œdema of the surrounding parts is certainly greater in females than in males, and vulvitis is not uncommon

[1] Buzenet, Du chancre de la bouche, etc., Thèse de Paris, 1858.

in persons of uncleanly habits. Not unfrequently the chancrous erosion of the labia, especially when seated on the cutaneous surface or when the lip is much everted, is covered by a purulent crust. This occurrence is merely accidental and due to exposure of the ulcer, allowing its secretions to harden.

Chancres of the labia minora have a similar history. The indurated chancres are usually large, often involving the whole of one lip and a portion of the other. The clitoris may be involved, in which case it becomes hard and prominent, and according to the simile of Fournier, resembles a ramrod. The clitoris itself and its sheath become much condensed and have a ligneous hardness. When the lower part of the labium minus is involved, the induration, as we have often observed, may extend around to the opposite lip, forming a V-shaped mass. The initial lesion of the labia minora is usually less clearly defined than in other regions. The indurated nodule is commonly surrounded by more or less hard œdema.

The chancrous erosion of the labia minora is usually complicated by vulvitis and is often multiple.

Chancres of the fourchette and vestibule are very interesting and often difficult of diagnosis, both because they are not readily accessible and because they are less indurated. The lesions are rarely circumscribed, and rarely present the typical appearance of chancres. We find rather a diffuse hardening of the mucous membrane, which has a dark coppery-red color, and gives forth a scanty sero-pus, which may be augmented by secretions from the surrounding parts. The parts are much less supple than normal, and the difficulty in thorough examination met with in health is greatly increased. The vulvitis, which so frequently complicates the case, renders the diagnosis still more difficult. Induration, although by no means invariable, is often very marked. We have in several cases found the fourchette of ligneous hardness and the orifice of the vagina rigid and resistent.

We know nothing of chancres of the vagina. The mucous membrane of that canal seems always to escape the virus or perhaps to possess an immunity to its action.

Cernatesco has studied the course and duration of chancres and vulvar syphilides in pregnant women. Of the former he collected eleven cases, in which the chancres were on the vulva. In one case, the duration of the sore was less than a month, and in the other ten it was longer than eight weeks. Three lasted from four and a half to eight months. He concludes that, under the influence of pregnancy, the duration of the chancre is notably lengthened.

Of the vulvar syphilides he examined thirty-three cases, which he divides into two groups: 1st, those which he was able to follow up after delivery; 2d, those lost to view prior to that time. These lesions were also more than ordinarily persistent during pregnancy, and in some instances disappeared soon after delivery, while in others, they were equally obstinate afterwards, owing to the bad general health of the women.

The cause of the persistency of the above-named lesions is due to a passive congestion of the genital organs rather than general debility. In

twenty-one cases of pregnant women with chancres on the vulva, there were nine of abortion. Cernatesco, without committing himself, advances the hypothesis, that the abortion was caused by the lesions. Admitting that the latter may act as irritants, the author thinks that local treatment should not be too active, as it may hasten the expulsion of the fœtus.

We would simply add that syphilitic lesions, and especially condylomata, of the vulva in pregnant women, often present a most remarkable color resembling that of Port wine, undoubtedly due to the venous congestion above referred to.

Chancres of the Breast.—Chancres of the breast, or, more properly, of the nipple, are of especial importance when occurring in a nursing woman, in view of the danger to the child of syphilitic contagion. These chancres are usually derived from mucous patches in the mouths of nurslings, or from similar lesions in the mouths of men. An instance of the latter mode of origin occurred not long since in our own experience.

The areola as well as the nipple may be invaded by these lesions, and less commonly the breast itself. We find in this situation the chancrous erosion, the ecthymatous chancre, and the indurated fissure.

The chancrous erosion is commonly found upon the areola. It consists of a sharply marginated, slightly elevated patch; its surface is flat, smooth, and shining; its contour may be round or oval; its color deep coppery-red. The slight induration at first detected by the finger, gradually becomes well marked. This lesion presents a similar appearance when it involves the nipple, but it is then usually more indurated. Such chancres may be single or multiple—two being the ordinary number—although we have seen as many as five. There is nothing peculiar in their course.

The ecthymatous chancre may occur on the nipple or on the areola; more commonly on the former. It forms a hard, painless, circumscribed nodule, which may involve all or part of the nipple, or a portion of the areola. A dark-green, uneven crust, which is slightly adherent, conceals a smooth, grayish-red, eroded surface. The ulcer becomes thus encrusted in consequence of the absence of moisture. Were the nipple subjected to suction and moisture, the secretion would cease to harden and there would be simply an exulcerated chancre. The name ecthymatous chancre, however, may well be retained, since it suggests appearances necessary to be borne in mind. The induration may be extreme or moderate, and varies in extent. In some cases both the whole nipple and the areola are involved in the induration.

The indurated fissure of the nipple is merely an induration traversed by fissures which have a reddish-gray color. The fissures may be superficial, or they may be extensive, invading the areola. They may exude a more or less purulent secretion, and indeed the whole lesion may become encrusted. These lesions are slowly developed and are attended by scarcely any pain even in the fissured form, features of much diagnostic value. They are seldom inflammatory, but are usually insidious and subacute. In some cases the sebaceous glands of the areola are enlarged and prominent. In all cases the axillary glands are enlarged, and in most the

ganglia at the upper margin of the great pectoral muscle are indurated, the latter being recognized with difficulty in fat persons.

In securing wet-nurses, physicians cannot be too careful in examining for mammary chancres. A woman having a sore in the least degree suspicious should never be allowed to nurse a healthy child. Careful inquiry should be made as to the condition and history of children nursed within at least the last month. A woman who has nursed a child with sore mouth, eruptions, marasmus, or osseous lesions, should be suspended for from four to six weeks, during which time, if she has been infected with syphilis, the initial lesion will appear on her breast.

Chancres of the Uterus.—Chancres of the uterus have been carefully studied within the past ten years by Fournier, Schwartz, and Jullien. They may be seated on one lip of the cervix, generally the lower one, or within the neck. There is generally but one which begins as a bright red erosion of the mucous membrane. It gradually extends and becomes somewhat elevated, and when fully developed looks like a papule. In some cases there is no perceptible elevation of the ulcer, but its margins are circumscribed and are frequently surrounded by a dark-red areola. The floor of the chancre is smooth, of a grayish- or yellowish-red color, or it may be covered by a false membrane like chamois skin. The lesion, when seated on the outer surface of the os, is rounded or oval, and about the size of an almond; within the os it may be limited to one segment or may surround the opening in the form of a ring. Its secretion is scanty and viscid. The degree of induration varies, being limited to the neighborhood of the chancre, or being diffused.

In a case of prolapsus with uterine chancre, seen by Ricord, the os was enlarged and very dense, and in other instances the whole neck has been found involved in the induration.

The course of these chancres is indolent and painless. Fournier states that in five cases of chancre of the os uteri he observed vulvar and perivulvar herpes, and he thinks that the presence of these lesions should always suggest the possible syphilitic character of the uterine ulcer. He also calls attention to the fact that uterine chancres often disappear within a few days, leaving no trace. There is generally no enlargement of the inguinal ganglia during the course of a uterine chancre.

CHAPTER V.

INDURATION OF THE GANGLIA AND OF THE LYMPHATICS.

As already mentioned, the induration of the base of a chancre has been supposed to be most developed in regions most copiously supplied with lymphatic vessels, and was consequently regarded by Ricord and others as consisting essentially in a specific lymphitis. But even if this supposition be incorrect, it is certainly true that we find a condition of the lymphatic vessels and ganglia in anatomical connection with a chancre, closely resembling the induration of its base, and of even greater diagnostic value than the latter. We may, therefore, regard this affection as an offshoot or prolongation of the induration of the base of the initial lesion of syphilis previously described.

Of the two—induration of the ganglia and induration of the lymphatic vessels—the former is by far the more frequent, just as we find adenitis, rather than lymphitis, the more constant attendant upon a chancroid.

Induration of the Ganglia. (Syphilitic Bubo.)

I have already stated the reasons which led us to exclude this affection from under the head of "buboes," but if it still be called a "bubo," the adjective "syphilitic" belongs to it exclusively, and is so applied by recent French writers.

Constancy.—*Does induration of the ganglia necessarily attend a chancre?*

Rollet, in his own clinical experience, states that its absence is a "rare exception."

Ricord regards induration of the ganglia as "*fatale*," "*obligée;*" "it follows a chancre as a shadow follows a body;" "never a chancre without induration of the ganglia may be boldly asserted as a pathological law."

Fournier says: "With very rare exceptions, it is a *constant* symptom of primary syphilitic infection." The testimony of most other modern observers is the same.

For my own part I have never met with a chancre which was not attended by induration of the neighboring lymphatic ganglia, although this induration has been doubtful for a time, in a few instances, especially in strumous subjects, or has been masked by the occurrence of acute inflammation. I regard it as by far the more valuable symptom of a chancre than induration of the base of the ulcer itself, since it is less likely to be

counterfeited by extraneous influences, and is even more constant and persistent.

Yet it would appear that this, like every other isolated symptom of syphilitic infection, may in very rare instances be wanting. In the twenty-six cases of artificial inoculation of the syphilitic virus upon persons previously free from syphilis, collected by Rollet, induration of the ganglia is mentioned in only twenty, but we are left in doubt whether this was due to its absence or to the imperfection of the observation.

Bassereau carefully examined the condition of the ganglia in three hundred and eighty cases of chancre, the diagnosis of which was confirmed by the evolution of secondary symptoms, and found induration in three hundred and fifty-five. But here, again, the question may arise whether, in the twenty-five exceptional cases, induration had not previously existed but had disappeared at the time of the examination.

Fournier reports 265 cases of chancre, of which the ganglia were involved in 260, but in 3 cases only was the absence of induration from the outset certain.

The instances in which this attendant upon a chancre is likely to be wanting or of doubtful recognition may be classified as follows:—

I. Strumous subjects. I have met with a number of patients of strumous habit who stoutly asserted that the enlargement of the inguinal ganglia had existed long before the sore upon the penis, and their evident scrofulous diathesis has added weight to their statements, and rendered the diagnosis for a time doubtful.

II. In corpulent persons the mass of adipose tissue may render it difficult to recognize the condition of the ganglia by means of external palpation. Ricord, it appears, would go one step further and regard corpulent subjects as less prone than others to exhibit this lesion in its full development. He says: "The ganglionic system is usually in the inverse ratio, in respect to its development, to that of the adipose system. In very fat persons the ganglia are small; in connection with a true chancre they are often only slightly enlarged; sometimes, though rarely, they are not perceptible." (Oral communication to M. Fournier.)

III. Again, Ricord and Fournier both assert that if a chancre be attacked by phagedæna, the ganglia will remain unaffected. "Phagedæna would appear to be one of the conditions which prevent syphilis from affecting the ganglia." In my own experience, phagedæna has attacked a chancre in most cases, after induration of the ganglia had already appeared, so that I am unable to confirm this statement.

IV. According to Fournier, "in very rare instances," induration of the ganglia is wanting "in connection with a chancre in the form of a superficial erosion, or an exulcerated papule, presenting a scarcely perceptible or doubtful induration." For my own part, in such instances I have always referred to the ganglia to confirm my diagnosis, and have never known them to fail me.

V. Finally, we have those cases, studied especially by Diday, and endorsed to this extent by Ricord, in which the rare inoculation of the

syphilitic virus upon persons previously infected produces only a local sore, without reaction upon the ganglia or the system at large. I have nothing to offer on this point, because I have never met with such cases well established.

The absence of induration of the base of a chancre and of its neighboring ganglia may, in rare instances, be admitted, without materially detracting from the value set upon their diagnostic and prognostic indications; for why should absolute constancy be expected in syphilitic symptoms any more than in those of other diseases, and in the whole range of pathology it would be difficult to find two which are more uniformly present than these.

SEAT.—As already stated, the ganglia affected are those in direct anatomical connection with the initial lesion or chancre. Since a chancre is most frequently situated upon the genital organs, induration of the ganglia is commonly found in the groins. Chancres of the interior of the urethra in both sexes, of the perinæum, of the anus, of the cervix uteri, of the buttocks, of the lower portion of the abdomen, and of any point of the lower extremities, will likewise manifest their presence by induration of the *inguinal* ganglia. According to Ricord, when the chancre is situated at the anus, it is the external portion of the inguinal group near the anterior superior spine of the ileum, that is involved.

With chancres upon the fingers the situation of the indurated ganglia varies. In one case of a chancre upon the forefinger I found a well-marked indurated ganglion in the web between the forefinger and thumb. More frequently, in these cases, the ganglion on the internal side of the elbow, or those in the axilla are involved. Again, ganglia between the points mentioned—the hand and elbow, or the elbow and axilla—may become indurated. Thus, in a case under my care, the chancre was upon the thumb, and the ganglionic induration showed itself at the elbow (epitrochlear gland), and also in a gland situated about half way between the elbow and axilla on the inner side of the arm. Chancres of the breast also affect the axillary ganglia.

Chancres upon the lips, both upper and lower, upon the tongue, and upon the chin, cause induration of the submaxillary ganglia; those upon the eyelids, induration of a ganglion situated directly in front of the ear. Fournier mentions a case of a chancre occupying the palatine arch, in which a large ganglion was present in the thickness of the cheek; also another case in which infection was "very certainly" the result of catheterization of the Eustachian tube, and in which there were two voluminous ganglia in the parotid region, one directly below the ear and the other somewhat beneath it under the ramus of the jaw.

Thus the situation of ganglionic induration points to the approximate seat of a chancre, even after the latter has disappeared, and may be of essential service in unravelling the history of obscure venereal cases. For instance, in the spring and summer of 1863, a young man had two attacks of what was apparently simple gonorrhœa. In the autumn he applied to

me with syphilitic iritis, alopecia, acne capitis, and post-cervical engorgement, and there could be no doubt that he had had a chancre somewhere near the genitals, although he was quite unconscious of the fact, since each groin presented the characteristic indurated pleiad. One of his attacks of gonorrhœa was probably complicated with a urethral chancre.

Again, a young physician called upon me with well marked syphilitic papulæ, which he attributed to contagion incurred in attendance upon a midwifery case "*five weeks before*," and he showed me a scar upon the forefinger which he said was the seat of the chancre, at the same time denying any other exposure. It was so improbable that his eruption had been developed thus rapidly, that I examined his groins, and the induration of the ganglia nailed the lie, which he subsequently confessed.

The following table, borrowed from Fournier, gives at a glance the situation of the indurated ganglia, according to the varying seat of the chancre:—

Seat of the Chancre.	Corresponding Bubo in the—
Chancres of the genital organs, *i. e.*, of the penis, scrotum, the labia majora and minora, the fourchette, the meatus urinarius, the urethra, the entrance of the vagina, etc.	Inguinal ganglia.
Peri-genital chancres (those of the perinæum, the genito-crural folds, the mons veneris, the thighs, the buttocks, etc.).	Inguinal ganglia.
Chancres of the anus and the margin of the anus.	Inguinal ganglia.
Chancres of the lips and of the chin.	The submaxillary ganglia.
Chancres of the tongue.	The sub-hyoidian ganglia.
Chancres of the eyelids.	The preauricular ganglia.
Chancres of the fingers.	The epi-trochlear and the axillary ganglia.
Chancres of the arm.	The axillary ganglion.
Chancres of the breast.	The axillary ganglia and sometimes the sub-pectoral ganglia.
Chancres of the uterine neck.	Theoretically the pelvic ganglia. Generally nothing is found in the groins. Exceptionally an inguinal bubo.

Time of Appearance.—According to Rollet, in cases of artificial syphilitic inoculation, induration of the ganglia appears on an average eleven days after the commencement of the chancre. In practice, however, we find it earlier, and usually at the same time as the induration of the base of the sore. In exceptional instances, its development is delayed, but, according to Ricord, never beyond a fortnight. In some doubtful cases of venereal ulcers I have been obliged to defer my diagnosis for a week or ten days until induration of the ganglia became well marked and removed all doubt. Fournier refers to a case, which he says has been *unique* in his experience, of the induration not showing itself until the twenty-seventh day after the appearance of the chancre.

Symptoms.—Induration of the inguinal ganglia may affect one or both sides; in the former case it is usually the side upon which the chancre itself is situated, although occasionally this rule is reversed, as with buboes attendant upon a chancroid.

Wherever, as in the groin, a number of ganglia form a group, most of them, at least, are usually involved, but to an unequal extent. A "pleiad," as it has been called by Ricord, of small olive-shaped or globular tumors is felt, cartilaginous in hardness, freely movable upon each other and the surrounding tissues, and without attachment to the overlying integument. One is commonly developed more than the rest, and attains about the size of an almond; the others as large as a bean or cherry, surround it like satellites.

There are no symptoms of acute inflammation. The change has taken place insidiously and often without the patient knowing it. The skin is not altered either in color or temperature. Firm pressure sometimes reveals slight tenderness, but rarely excites severe pain; and motion is usually not impeded. Indolence is one of the chief characteristics of a "syphilitic bubo."

Less frequently, only a single tumor is felt in the groin, varying in size and shape in different cases: sometimes it may be compared to a good-sized plum, while at other times it is elongated, about the thickness of the finger, and corresponds in direction to the inguinal fold. In several instances, as the tumor subsided, I have found it resolve itself into several, showing that it was composed of a number of coherent ganglia, and this fact has been demonstrated by Bassereau in post-mortem examination.

When a chancre is situated at a distance from any group of ganglia as upon the fingers or face, only one or two of these bodies are usually involved.

Course and Termination.—Induration of the ganglia usually reaches its full development in the course of a week or fortnight. If mercury be given for the primary sore, it may somewhat diminish for a time, but commonly undergoes a recandescence upon the evolution of secondary symptoms, resembling in this respect the induration of the chancre. It is usually more persistent than the latter, but its ultimate duration varies in different cases, from several weeks to five or six months, or even longer. Ricord states that he has found unequivocal traces of it several years after infection in exceptional cases.

Resolution without suppuration is almost the constant termination of syphilitic induration of the ganglia, but to deny that suppuration never takes place as some authors have done is to assert that induration protects the ganglia from every cause of acute inflammation, which is evidently absurd. Since the indurated ganglia are not in a healthy condition, the only wonder is that they do not more frequently inflame and suppurate, but the rarity of this termination is now well demonstrated.

Bassereau found only sixteen cases of suppurating buboes in 383 cases of syphilis.

In the large number of true chancres treated by Ricord at the Hôpital du Midi, and in its out-door department, in the year 1856, there were only three which were accompanied by suppurating buboes.

Rollet has found 17 cases of suppuration in 320, at the Antiquaille Hospital; Fournier only 2 in 265. In speaking of the rarity of suppuration in this form of adenopathy, it is of course understood that no chancroid coexists in the neighborhood or has been implanted upon the site of the chancre itself, constituting the so-called "mixed chancre," and capable of exerting its own peculiar influence upon the glands.

The causes which may favor the occurrence of suppuration in indurated ganglia are the same as those mentioned when speaking of buboes, but the most frequent is a strumous diathesis or general debility. In the following case several influences probably had a part:—

B. belonged to a strumous family. His sister, aged 17, had been afflicted with an aggravated form of chronic eczema since early infancy. His brother, after hardship and exposure upon a wreck, was confined to his bed for six months with suppuration of the inguinal glands. B., who had always enjoyed good health, contracted a chancre in June, 1859, followed by glandular induration. Syphilitic erythema appeared in September, when the glands, which until then had been indolent, became inflamed, suppurated, and remained open six weeks. The general symptoms proved to be very obstinate, and he was still under treatment in July, 1860, when, after violent exercise at leap-frog, another abscess formed in the same groin.

It will be noticed in this case, that the inguinal glands remained in a quiescent state for nearly three months after the healing of the chancre, and their suppuration at the end of this time can only be ascribed to the strumous diathesis of the patient, and also, in a measure, to the febrile excitement preceding the syphilitic eruption.

The value of suppuration of the glands in a suspected case of syphilis as an element of diagnosis is a question of considerable practical importance. A patient with general symptoms of a doubtful character seeks advice of a surgeon, who learns that several years ago he had a venereal sore, but can obtain no accurate description of its symptoms. On further inquiry he also ascertains that there was tumefaction of the glands in the groin, and the patient rarely fails to remember whether they suppurated or not—a fact which may also be determined in most cases by the presence or absence of a cicatrix. What light will this investigation throw upon the nature of the sore? If the description above given be correct, *the fact that suppuration took place will favor but will not absolutely prove the supposition that the sore was a chancroid. It is a common but not invariable rule that general syphilis does not follow an open bubo.*

In the rare instances in which suppuration takes place the pus is never auto-inoculable like that of the virulent bubo; whether it contains the syphilitic virus and that its inoculation upon a person free from syphilis would produce a chancre, is a question which has never been solved by experiment.

Diagnosis.—Induration of the ganglia is most liable to be confounded with strumous engorgement; the history of the case and the concomitant symptoms must decide the diagnosis.

Only great stupidity could lead the attending physician to regard cancerous degeneration of the inguinal glands with an ulcerated cancerous tumor of the glans penis as syphilitic, although this has actually occurred in a case to which I was called in consultation.

Induration of the ganglia is so distinct from the simple inflammatory and virulent bubo that I need not dwell upon their points of difference.

Induration of the Lymphatics.

As both the simple and virulent bubo have their occasional attendants in simple and virulent lymphangitis, so has glandular induration its accompanying induration of the lymphatics, a more constant companion, though not invariably present, than either of the former.

Specific engorgement of the lymphatics is dependent upon changes in the walls of these vessels identical with those which occasion induration of the base of the chancre and of the ganglia, and is characterized by the same three important symptoms, viz., induration, absence of inflammation, and persistency.

The indurated vessel feels like a hard cord running from the neighborhood of the chancre towards the pubes along the upper surface of the penis in the course of the dorsal vein and artery, or, in a few instances, it occupies the side of this organ. It is generally single, but sometimes multiple; of the size of a crow or goose-quill; in some cases of uniform diameter, when it communicates to the fingers a sensation like that of the vas deferens, while in others it is swollen at regular intervals like a necklace, or is, as botanists would say, moniliform. The distal extremity arises in the induration surrounding the chancre, and the cord can generally be traced for two or three inches towards the pubes, sometimes to the base of this prominence, but rarely as far as the indurated ganglia in the groin.

Induration of the lymphatics is most frequently observed upon the penis, but is not limited to this region. Bassereau relates a case of chancre upon the cheek, in which a hard cord could be traced from the indurated base of the sore to an indurated ganglion beneath the angle of the jaw.

Induration of the lymphatics appears about the same time and in the same manner as that of the base of the chancre, and the two generally correspond in degree of development. As already stated, the former is less constant than the latter, but if sought for may be found in a large proportion of cases.

Induration of the lymphatics usually undergoes resolution about the same time as that of the base of the sore; but in a few rare instances it becomes inflamed and terminates in suppuration, when fistulous openings may form along the course of the vessel. Bassereau met with three cases in which the induration of the chancre took on inflammatory action and was transformed into a phlegmonous tumor, the cavity of which was found

to communicate with the interior of an hypertrophied lymphatic, through which a probe could be passed up to the pubes. In one instance he was able to make a post-mortem examination, the patient having died of an intercurrent acute disease. The dorsal vein and artery were found to be intact, and the fistulous canal evidently consisted of an hypertrophied lymphatic with hard and thickened walls, which could be traced from the induration of the chancre to the right inguinal ganglia.

Induration of the lymphatics may readily be distinguished with care from the dorsal vein and artery. It is more liable to be confounded with simple or virulent lymphangitis. The diagnostic symptoms have already been given when describing the latter.

This symptom of a chancre has the same prognostic signification as the induration of the base of the sore and the inguinal ganglia, and denotes that the constitution is already infected and that general syphilis will soon make its appearance.

Treatment of Induration of the Ganglia and Lymphatics.

Uncomplicated cases of indurated ganglia require absolutely no local treatment whatever. When, therefore, an otherwise healthy patient with a chancre and induration of the neighboring ganglia anxiously inquires whether he is likely to be laid up with a suppurating bubo, he may be assured that there is no danger unless he commit some great imprudence. Under the mercurial treatment required by the constitutional infection which has already taken place, the indurated ganglia gradually diminish in size and lose the slight degree of tenderness which they possessed. In the exceptional cases of suppuration the treatment is the same as for inflammatory buboes, though generally less active.

The same remarks apply to the treatment of induration of the lymphatics.

CHAPTER VI.

STATE OF THE BLOOD; SYPHILITIC FEVER; AFFECTIONS OF THE LYMPHATIC GANGLIA.

State of the Blood.

A series of analyses of the blood performed by M. Grassi under the direction of Ricord, shows that this fluid undergoes a material change in the early stage of syphilis, consisting chiefly in a diminution of the blood corpuscles, which, on an average amounted to a loss of one-seventh, and, in one instance, to one-half of the usual number. Under the administration of iodide of potassium the number of the blood corpuscles was found to increase; but no improvement took place from the use of mercury. This chloro-anæmia is confined to the early stage of syphilis; the blood soon recovers its normal composition and retains it throughout the whole course of the disease unless syphilitic cachexia supervenes. Though foreign to our present subject, it may be mentioned incidentally, that the blood of persons affected with chancroids was shown in a second series of analyses by Ricord and Grassi to remain unchanged; and thus these experiments, which were performed before the question of the duality of the chancrous virus had been mooted, are confirmatory of the distinction which is now recognized between the chancroid and syphilis.[1]

These results of Grassi have more recently been confirmed by Wilbouchewitch,[2] who, in a series of ten observations, also determined that the red blood globules are diminished and the white globules increased in number. The following table of this observer shows the modifications in the number of globules during the primary stage of syphilis.

[1] Ricord, Leçons sur le Chancre, 2d ed., p. 184.
[2] Arch. de physiologie, pp. 509, 537, 1874.

	Red.	White.	No. of red to one white.
Healthy man	4,200,000 to 6,477,000	6,900 to 8,550	603 to 757
Syphilitic subject:—			
1st count	4,170,000	9,000	421
2d " 3 days later . .	5,510,000	10,000	437
1st "	5,282,000	13,900	380
2d " 4 days later . .	3,864,000	11,550	336
1st "	4,338,060	10,000	433
2d " 3 days later . .	3,908,000	12,800	325
1st "	5,040,000	6,950	725
2d " 3 days later . .	4,269,000	5,600	762
1st "	4,392,800	8,800	565
2d " 4 days later . .	3,960,600	7,000	565
1st "	4,314,800	13,900	332
2d " 3 days later . .	3,614,000	10,800	347
1st "	3,950,600	7,900	564
2d " 4 days later . .	3,600,300	7,600	473
1st "	6,338,400	6,950	912
2d " 4 days later . .	4,297,800	7,000	612
1st "	4,886,400	11,200	436
2d " 6 days later . .	4,200,800	13,600	308
1st "	4,300,600	8,000	537
2d " 3 days later . .	3,600,400	11,200	321

From this it appears that the average diminution in the number of red globules as found in the second count was 638,870, and the increase in white was 550; the proportion of white globules to red in the first enumeration was 1 to 530 and in the second 1 to 448.

Syphilitic Fever.

The fact that elevations of the temperature of the body occur during the course of syphilis has long been known. Much valuable information on the subject has been furnished of late years by Fournier, Courteaux, Lancereaux, Bremer, Jarnovsky, and especially by Dr. T. E. Güntz, of Dresden.

In the first volume of the Archives of Dermatology, N. Y., p. 345, may be found the results of observations made by us with reference to this subject in sixty-two cases. Güntz is of the opinion that syphilitic fever occurs in only about 20 per cent. of patients, but we believe that careful examination will discover it in the majority of cases. It may be transitory or persistent; it may be so mild as to escape notice, or it may be moderately intense. It presents two forms; in one the febrile condition is continuous, in the other it shows distinct remissions.

Let us first consider the continuous fever which accompanies the evolution of syphilis, well-named by the Germans the "eruption-fever." It seldom occurs before the thirtieth day of the secondary period of incubation, that is, ten days prior to the evolution of secondary symptoms. In at least half the cases of syphilis there is no febrile reaction until within three or four days of the first evidences of constitutional infection. In

rare cases the temperature may reach 103° or even 105° within twenty-four or forty-eight hours. Frequently it does not exceed 101°, remaining at that point until the eruption appears, when it again rises possibly to 105°. It then, as a rule, falls gradually or abruptly to about 102°. In almost all cases there is a difference of about one degree between the morning and evening temperature. In other cases a temperature of 105° is observed ten or twelve days before the end of the secondary period of incubation, and continues, without remission, until the eruption appears, when it falls abruptly to 102°, where it may remain for several days. In the majority of our cases 102° has been about the average temperature.

Some observers consider the febrile reaction a reliable indication of constitutional infection, but in some cases the eruption precedes the fever by an interval of a week or ten days.

The remarkable effect of mercury upon the temperature has been noticed. Its use causes a reduction nearly or quite to the normal standard in some cases within ten days, whereas without it the febrile condition may persist for several months.

Early in the secondary period the fever is prone to relapse, possibly at the same time with a recurrence of general or special syphilitic symptoms. In these cases the temperature rarely goes above 102°.

When phagedæna attacks the initial lesion and syphilitic cachexia appears early, the fever is likely to be excessive and prolonged. In weak and sickly persons the elevation is notably greater than in the robust, and in women it is higher than in men. We fully agree with Fournier that syphilitic fever occurs more frequently in females than in males. The febrile reaction accompanying an erythematous syphilide is often as extreme as in a simple eruptive fever. In most cases of papular eruption the fever is moderate. In cases of pustular eruption and of iritis accompanying general secondary symptoms, it is more marked. In general the febrile reactions of the early years of syphilis are more intense than those occurring later. Indeed lesions of much gravity may occur after the lapse of years, unaccompanied by fever. On the other hand it may coexist with the various nervous and visceral affections of the tertiary stage.

Syphilitic fever not infrequently presents a distinctly remittent type, a peculiarity which may be noticed in the early period, but is generally not observed until late in the course of syphilis. We have seen but two cases in which the fever began in a remittent form ten days before the general outbreak, and retained its character for nearly three weeks. When remittent fever occurs early, it usually accompanies the development of constitutional symptoms. It is never very protracted. The exacerbations occur as a rule daily and towards night, beginning, perhaps, between six and eight o'clock with a general cold sensation, soon followed by fever. The chilly feeling may be insignificant, or it may be quite marked, and may last for an hour or more, being accompanied by a feeling of lassitude and soreness, and perhaps by headache, more or less severe. Thirst seems to be less than in other forms of fever. The sweating stage is incomplete, there frequently being only slight moisture of the surface. It thus differs

from malarial fever in this respect, as well as in the fact that the stages are neither of them clearly defined, that of heat being most marked. The elevation of temperature varies from 102° to 105°. The pulse rate is not proportionately increased. Relapses are quite common, even after long intervals. The gravity of the fever is greatest in cachectic subjects, in whom it may assume a typhoid type.

This form of fever occurs most frequently in the secondary period during the first two years of infection; yet it may appear in the tertiary period, possibly coexisting with lesions peculiar to that stage. The prognosis depends wholly on that of the associated syphilitic diathesis.

Quinine has been found ineffective, but the remittent as well as the continuous form is strikingly amenable to mercury. The curious fact is reported by Jullien to have been observed by Domenico Copòzzi, that in one instance the salts of quinia converted a quotidian syphilitic fever into a tertian and then to a double tertian, when it relapsed to a quotidian, which finally yielded to mercury.

The relation of the febrile reaction to tissue metamorphosis has been made the subject of special study by Vajda. This observer found marked increase of urea in a patient who had mercurial stomatitis, the urea diminishing under the use of proper doses of mercury. Uric acid and creatinine were not found to be increased. The excretion of the phosphates was greater in exanthematous than in bone syphilis. In some cases a distinct relation was observed between the excretion of urea and phosphoric acid; and sulphuric acid was found to be increased in the papular syphilides in proportion to the extent of the eruption, while in bone lesions, under mercurial treatment, it at first increased and subsequently diminished. Much remains to be done in the investigation of this subject.

Affections of the Ganglia.

Engorgement of the Superficial Ganglia.—A very important symptom of the early stage of syphilis, and one which the surgeon should never fail to look for in cases of difficult diagnosis, is engorgement of the lymphatic ganglia in various parts of the body, and especially those situated upon the lateral and posterior portions of the neck. We are not here speaking of the induration of the ganglia in anatomical connection with the primary sore—the indurated ganglia, which assume their cartilaginous hardness about the same time as the base of the chancre. The symptom referred to is an engorgement—not induration—of glands at a distance from the point where the virus entered the system, and first appears some six or eight weeks after the chancre in conjunction with other early secondary manifestations.

This symptom is present in a large majority of cases at this stage of the disease. Ricord speaks of it as "perhaps the most constant, the earliest, and the most characteristic symptom of constitutional syphilis."[1] Basse-

[1] Iconographie, Remarks on the case figured in Plate XLV.

reau[1] found it in ninety per cent. of all the cases of syphilitic erythema which came under his observation; and in most of the exceptional cases the patients had taken mercury or were not seen for some time after the eruption appeared. It is an early syphilitic symptom, and occurs, if at all, within a year after contagion. Ricord states that it is rarely seen in persons who contract syphilis after forty years of age, though Bassereau met with one case in a man aged sixty-three, and another in one aged seventy-four; from which it would appear that this rule is by no means invariable.

The glands most frequently affected are those situated along the upper two-thirds of the posterior border of the sterno-cleido mastoideus muscle; but those on the back of the neck beneath the occiput, and one just posterior to the ear and over the mastoid process may also be involved. All the glands in the regions mentioned are not, however, implicated in the same person; the number is frequently but one or two, and rarely exceeds six or eight. In a state of health these bodies can with difficulty be detected; but, when enlarged by syphilis, they may attain the size of a bean or almond, and are often so prominent as to be recognized by the sight as well as the touch, and even to attract the notice of the patient's unprofessional associates. As a general rule, their number and size correspond to the extent and severity of the neighboring eruptions upon the scalp.

Other glands besides those of the neck may be engorged in the same manner. Sigmund has especially insisted upon enlargement of a lymphatic gland situated between the biceps and triceps muscles just above the internal condyle of the humerus, where we frequently observe it, although we do not believe it to be as constant as Sigmund's remarks would lead one to suppose. Bassereau has found the glands of the axilla affected, but only in case there was a papular or pustular eruption in the neighborhood of the shoulder. The submaxillary ganglia are also not unfrequently tumefied, when the throat is the seat of syphilitic angina or when the mouth is made sore by the use of mercury.

This engorgement of the ganglia almost invariably terminates in resolution. In one case only, so far as I am aware, has suppuration been known to take place. This occurred in a patient, aged 30, of a scrofulous habit, under the care of Bassereau, in whom two collections of matter were formed in the cellular tissue around the gland, attended by severe febrile excitement and requiring puncture.

Some difference of opinion has been entertained as to the question whether this engorgement is necessarily dependent upon a neighboring eruption upon the scalp or integument. Ricord believes that it is not, and states in support of his opinion that it often occurs before the slightest trace of an eruption is visible; and to meet the objection that a pustule of ecthyma might be concealed in the hair and escape notice, this surgeon has repeatedly shaved the head and proved the scalp to be intact. Admitting, however, that the engorgement of the glands precedes the eruption, it does not disprove the connection between the two, which is

[1] Op. cit. p. 68.

rendered probable by the correspondence in their intensity; and swelling of the submaxillary glands, as is well known, is often anterior to an eruption of erysipelas upon the face. Diday is confident that engorgement of the ganglia does not exist without the presence of some affection of the neighboring integument or mucous membrane, and that it corresponds in intensity with the severity of the latter. For instance, the epi-trochlear gland is always most enlarged upon whichever side syphilitic squamæ upon the hand are most marked.

Deep Lymphatic Ganglia.—Lancereaux regards changes in these ganglia as among the most frequent and most constant of the effects of tertiary syphilis. They bear the same relation to syphilis of the viscera that adenopathy of the subcutaneous lymphatic glands does to syphilis of the skin; in other words, they are its constant accompaniment. The affection of the deep lymphatic glands may, however, exist without any lesion of the viscera, just as the post-cervical and epi-trochlear glands may be enlarged without any eruption upon the scalp or arms.

The glands most frequently affected are the prevertebral, lumbar, iliac, and femoral; the mesenteric glands and those of the extremities are rarely involved. The changes are various. Most frequently there is hyperplasia of the glandular elements; the gland is increased in length rather than in breadth, is friable, of soft consistency, of a reddish or yellowish-gray color, its surface injected, and its substance cheesy. In other cases the connective tissue of the gland appears to be the chief seat of the lesion, and this body becomes indurated. Suppuration is never present, which is an important diagnostic sign between this and the affections of the glands in typhoid fever, and in tuberculosis.

Two forms of syphilitic adenitis are described by Cornil; the secondary, and the other of the tertiary stage of syphilis. In the former the microscope shows, besides the lymph-corpuscles, large spheroidal cells, more numerous in the cavernous than in the follicular structure of the gland. The cells contain several nuclei, the larger of which inclose nucleoli. There is also slight increase of the connective tissue, so that there exists cell-proliferation combined with a moderate degree of sclerosis. In tertiary adenitis the swollen ganglia form soft whitish masses of a medullary appearance. Round and granular lymph-corpuscles, and large multinucleated cells crowd the cavernous tissue and the lymph-passages of the ganglia. This is therefore a kind of catarrhal inflammation. Two forms of tertiary adenitis have been recognized and made the subject of a thesis by Gonnet,[1] who calls them sclerous and gummatous adenitis. He says they may occur together, and the former may be converted into the latter.

Thyroid Body.—In the post-mortem examination of old syphilitic subjects, this gland may be found to be hypertrophied, and to have undergone more or less complete fatty degeneration. The existence of gummy tumors has not been noted.

[1] L'adénopathie syph. tertiare, Thèse de Par., 1878.

CHAPTER VII.

CACHEXIA, CHLORO-ANÆMIA, ASTHENIA.

At certain periods during its course, syphilis produces an adynamic condition of the system, called "syphilitic cachexia." These periods are at, or just before, the evolution of the disease, during its secondary stage, and towards the close of its tertiary stage.

In those cases, fortunately rare, in which *phagedæna* complicates the initial lesion, there may be observed, soon after the onset of this process, loss of appetite and strength, emaciation, and a pale, sallow appearance. The pulse becomes rapid, weak, and small, and the temperature rises. The patient feels dejected, nervous, and apprehensive. The condition becomes graver in proportion to the extent of the local destructive process, and unless this be checked, complications, consisting of numerous functional disorders, accompany the inauguration of the secondary stage. Headache, neuralgic, or rheumatoid pains, with severe nocturnal exacerbations, may torment the unfortunate sufferer, whose mind is equally harassed by many forebodings, as for instance, in the case of phagedæna, by the prospect of losing his genital organs. Decided ganglionic enlargement usually accompanies this condition, and is a valuable symptom, since the secondary lesions of the skin and mucous membranes may be so trifling as to elude search, and the masked character of the initial lesion obscures the diagnosis. We have often noticed the disproportion between the character of the primary lesion and that of the early general manifestations, and we have seen several cases in which the very considerable extent of the local process, and the insignificance of the secondary symptoms have prevented any suspicion of syphilis, the severity of the systemic disturbance being attributed to the phagedæna. The necessity of thorough and repeated scrutiny of every possible seat of secondary symptoms in all cases is evident.

In some cases, secondary and tertiary lesions of an extremely severe type, may coexist with the primary lesion, and the patient may lapse into a typhoid state, or serious nervous affections may be developed, and even terminate fatally. Fortunately such a result is rare, but it is not uncommon to see a phagedenic chancre accompanied by a cachexia, which may continue for several months, and from which recovery is tedious and attended by repeated relapses.

The cachexia of the secondary period of syphilis may begin a few months after the onset of the disease. It is seen chiefly in weakly persons oftener than in the robust; and again, more frequently in those who have had imperfect, or no treatment whatever; hence we have reason to infer that early and adequate treatment will prevent its occurrence. The gene-

ral symptoms of cachexia, already given, are repeated in this stage of syphilis, in a milder form. Frequently nothing can be found to account for the condition, and the only suspicious feature of the case is the occurrence of headache or pain, due to a low grade of inflammation in bony or fibrous tissue, and which are more severe at night.

In most instances there is no reason to anticipate an unfavorable result, but in others, these vague symptoms are so alarming as to suggest serious visceral lesions. We have sometimes found slight enlargement and tenderness of the liver and often marked splenic hypertrophy. The urine, in uncomplicated cases, is usually of very low specific gravity and deficient in mineral ingredients.

In spite of the serious nature of the case, gradual restoration to health may be expected under appropriate treatment.

The cachexia of the tertiary stage is most frequently seen in severe and protracted cases occurring in persons of weak constitution, or in those who have failed to observe the laws of hygiene or who have not been subjected to proper treatment.

The condition is less alarming than that of the secondary stage, but more chronic and rebellious. Tertiary lesions have probably been developed early and severely, and very likely have relapsed with increased severity.

No definite order of symptoms accompanies the cachexia of the tertiary stage. There is emaciation and debility; the patient is of a pale, earthen hue, which differs from the yellowish-white of the cancerous cachexia, and resembles the tint of the miasmatic cachexia. Remissions may occur during which, even if the patient's appearance does not improve, his strength is increased, and his general condition is better.

The causes of tertiary cachexia are various. In some instances it is due to the long and severe course of the disease; in others to the exhaustion from extensively destructive lesions, and in others still to visceral lesions.

The prognosis must vary in individual cases. Unless the case has gone too far, treatment may induce cure or decided amelioration, while in other instances nothing more can be accomplished than temporary retardation of the fatal result. Even visceral lesions, if not too extensive or too chronic may be relieved.

Fournier, the results of whose studies regarding syphilis in women are very valuable, considers that the female is usually more seriously affected than the male sex. He thinks that syphilis produces in the former two conditions, one "chloro-anæmia," and another more severe, "asthenia."

The chloro-anæmic woman has a pale leaden color, slightly tinged with yellow, is emaciated, weak, and subject to palpitations on slight exertion. Frequently an anæmic bruit may be heard in the large vessels. The patient complains of *muscæ volitantes*, of vertigo and of excessive nervousness. The appetite may be impaired or it may be ravenous, large quantities of food being taken and not assimilated. Fournier terms this "*boulimie*," or a temporary exaggeration of the appetite. While admitting its occurrence in those who present many nervous symptoms, he insists on its specific origin. It is probable that "boulimie" and the unnatural thirst

termed "polydipsia," which are often associated together, are hysterical symptoms resulting from the depressing influence of syphilis.

The condition of asthenia is regarded by Fournier as totally distinct from chloro-anæmia, since those women who are the subjects of it, show no evidence of anæmia in the countenance. They complain of great weakness and prostration, and are low spirited and indisposed to any kind of exertion, and even gentle exercise induces fainting. Fournier says that the debility is greater than is observed in cases of profuse hemorrhage or in convalescence from adynamic fevers. The pulse is weak, respiration is slow, digestion is deranged, and nutrition is imperfect. Nervous depression is indicated by dulness of hearing and sight, and by inability to sustain prolonged mental effort.

This condition is often combined with chloro-anæmia, and, like the latter, varies greatly in severity, and is amenable to proper treatment.

The danger in each of these conditions is from the diminished resistance of the system, which lends a malignant feature to any intercurrent affection that may attack the patient.

CHAPTER VIII.

INFLUENCE OF SYPHILIS UPON THE CONSTITUTION.

The division of syphilis into two distinct varieties, mild (*faible*) and severe (*forte*), as suggested by prominent French syphilographers, is too sharply drawn and is not now generally accepted. In all countries where syphilis has existed for many years, its course is much less severe than it was originally, and the disease of to day is really mild in comparison with what it was when first observed in Europe. It is well established that syphilis is especially malignant when appearing for the first time in a community. Numerous instances are recorded of the frightful ravages produced by it under such circumstances. The initial lesions are said to have been phagedenic and to have been followed by severe secondary symptoms, while necroses and visceral lesions were almost invariable and precocious. This malignancy gradually diminishes in successive generations until a comparatively mild form of the disease is established. It seems that a certain protective influence is secured to progeny by the occurrence of syphilis in their ancestors, which, although not conferring absolute immunity decidedly modifies the course of the disease. Thus our ideas of the nature of syphilis are free from that fear with which our forefathers were accustomed to regard it, and we no longer look upon it as an incurable disease.

Various circumstances have contributed to this change. Undoubtedly the progress of civilization has been of signal influence in establishing improved hygienic and sanitary conditions. Thus the standard of nutrition has been raised and the ability to resist disease increased. In our own country the people of the poorer classes are in general better nourished and better cared for than in many European communities. It thus happens that among us scrofula, rickets, and other adynamic conditions are much less frequent than abroad.

Another potent influence in lessening the severity of syphilis is found in our improved knowledge of its treatment. Within the past ten years great advances have been made in the therapeutics of this disease. Many errors have been eliminated, and new principles have been established on a more correct basis.

The severity of syphilis is largely modified by the constitution and temperament of the patient. As a rule, in persons of good health and habits, its course is mild and, provided treatment be followed, it becomes extinct in a few years. It is likely to be more severe in persons of light complexion and reddish hair, and who have a nervous temperament, than in those of dark complexion.

Syphilis affects persons variously at different ages. The hereditary disease is often very malignant, but acquired syphilis in children is usually not remarkably severe. About the age of puberty the lesions of syphilis are apt to be very extensive, and the consequent impairment of nutrition very great. In females, its course is generally severe, especially at puberty. After maturity the constitution is less affected, and fortunately the disease is most often contracted at this period, when the vital processes are most active and the powers of resistance most energetic. When contracted in old age, syphilis is frequently a very serious disease. The secondary stage is then remarkable for the number, severity, and malignancy of its lesions. The tertiary lesions are prone to appear early, and visceral complications and nervous affections are frequent.

It is obviously difficult to determine positively whether the severity of syphilis depends or not on the intensity of the infecting poison. It would certainly seem very natural that virus from a recent and active syphilis is likely to produce an intense form of the disease, and *vice versa*, but we have no facts to confirm the opinion. On the other hand, we often see two patients, who derive their disease from the same source, presenting one a mild and the other a severe form of syphilis. We are therefore warranted in believing that the constitution of the patient has much more influence in shaping the character of his disease than the quality of the virus absorbed. With rare exceptions the severity of the disease is in proportion to the general health of the patient. Persons of lymphatic temperament or of scrofulous habit are particularly liable to active and prolonged attacks of syphilis. They exhibit an especial tendency to ulceration and destruction of tissue. The debility and impaired nutrition left by the continued fevers, diphtheria, and other exhausting diseases, have a very unfavorable influence on the course of syphilis. Alcoholism seems to increase the gravity of the cachexia and the destructive tendencies of the lesions. It is in alcoholic cases that we meet with many of the instances of malignant syphilis called by the French "*galloping*" (*syphilis gallopante*).

As we have already observed, the course of syphilis is in a great measure governed by the treatment. If the use of medicine be begun early, and carefully continued, even in those whose constitution is not very good, the disease may be cured, if we may be allowed to assume a person cured who for years presents no manifestations of the disease, and who propagates healthy children. The majority of authorities now hold the opinion that syphilis is a curable disease. In this we concur, and we believe it right to promise any patient, whose health is not seriously undermined by some other disease, that he may expect complete recovery by undergoing treatment for the first two years of his disease, and by paying ordinary attention to hygiene. The importance of the early use of mercury after the development of secondary lesions cannot be overestimated. A far better effect is secured than if its use is postponed. In our experience tertiary lesions have been almost unknown where the disease has been gradually and carefully treated from the outset. In the vast majority of

cases of tertiary syphilis under our care for many years, the histories showed neglect or inadequacy of treatment, and, in many of them, the iodide of potassium had been relied upon during the first year when mercury should always be given.

Influence of Syphilis upon Diseases in General.

Syphilis may exert an influence upon various intercurrent diseases, first on those of an acute course, second on chronic diseases, and third on those of traumatic origin.

Influence on Acute Diseases.—Very little is known, beyond a few isolated facts, as to its influence on acute diseases. Bamberger and Fronmüller speak of the transformation of variola pustules into syphilitic ulcers and tubercles in infected subjects, and Lancereaux thinks that in an epidemic of smallpox observed by him there were more cases of the hemorrhagic variety in syphilitic patients than in those not infected with syphilis. In an epidemic of scarlet fever, Woakes observed a fatal result particularly in infants afflicted with hereditary syphilis. Acute rheumatism, occurring in the early months of the syphilitic diathesis, has been observed to run an exceptionally severe course and to be prone to relapse. Pneumonia, bronchitis, and pleurisy, during the course of syphilis, are liable to be more or less modified. Pneumonia, complicating a severe cachexia in the early months of syphilis, is a most serious accident, and often leads to a fatal result. In later stages, though less malignant, these diseases are often rendered much more severe and protracted. Little can be said of the influence of syphilis upon the specific fevers. It is safe to assume that the severity of the fever will be proportionate to the gravity of the syphilitic cachexia.

Influence on Chronic Diseases.—The difficulty of obtaining facts on this subject leaves our knowledge with regard to it sadly deficient. The opinion has long been held that syphilis has an unfavorable influence on scrofula and tuberculosis, and that indeed it may produce them. It is now known that the so-called scrofulous lesions have a distinct morbid origin, and are pathologically different from those of syphilis. Like any depressing disease, syphilis may increase the severity of scrofula and of tuberculosis. Tubercles are not a syphilitic product, and their occurrence in a syphilitic subject is a mere coincidence. It is not worth while to consider the different speculations on this subject. In the section on affections of the lungs we shall refer to the various changes which are etiologically related to syphilis. As regards the relation between syphilis in parents and tuberculosis in children, the observations of Thoresen are worthy of attention. This author followed the family history of three hundred and eighteen cases, and was unable to trace phthisis in the child to syphilis in the parents, while in every case of a tuberculous child there was evidence of tuberculosis in the parents.

In nine tuberculous individuals who became syphilitic, the course of the disease was very disastrous, and in twelve syphilitic persons who

belonged to a tuberculous race, though the syphilitic lesions were severe, no evidences of tuberculosis or of chest affections ever existed.

Among other important chronic diseases gout and rheumatism are no doubt largely affected by syphilis, particularly in its late period of cachexia. It may be safely predicted, that, when a person subject to chronic inflammation becomes infected with syphilis, he will suffer in after years from a combination of the two diseases, unless treatment be most thoroughly followed. It is useless to speculate concerning the reason of this fact, but as to its being a fact we have positive evidence. Such a patient is especially liable to recurrent attacks of muscular pains, more severe at night. They come on at varying intervals, often seemingly influenced by damp and cold weather, and are seldom accompanied by febrile movement. Chronic inflammation of the fibrous tissues of the joints is especially common and persistently recurrent. Periostitis, particularly of the long bones, is common in these cases, and the development of a marked form of cachexia is especially noticeable. This cachexia is attended by all the symptoms of profound systemic depression; it may become rapidly fatal, or health may be established after a tedious convalescence, recurrences, however, being not uncommon. Some of these cases are seriously complicated by visceral affections, especially of the liver.

The relation between syphilis and gout, although supported by so reliable an observer as Sir James Paget, is not generally accepted. A gouty subject, in whom syphilis, after running a chronic course, settles into a state of cachexia, presents a condition characterized by inflammation of fibrous tissues and of joint structures, recurring at intervals, or, in other words, a modified form of gout. Moreover, cerebral symptoms, not often congestive but still quite formidable, are frequently present, while disturbances of respiration, of the heart, and of the stomach, referrible to gout, may be manifested. The etiology of cases of this kind should be carefully studied, the subject being one of the most important in syphilography.

The absence of etiological relation between lupus and syphilis is now fully recognized. There is not the least evidence to support the opinion that lupus of the child is due to syphilis in the parents. Lupus is a distinct form of skin disease, whose histological features somewhat resemble those of syphilis, but it is in no way related to the latter disease, and it decidedly resists anti-syphilitic remedies.

In patients suffering from scorbutus and the hemorrhagic diathesis, syphilis has been known to be very severe. Its lesions are likely to be complicated by hemorrhage and ulceration, and a severe cachexia is not infrequent. Effusion into serous cavities often occurs, and joint affections are peculiarly distressing.

In cases of Bright's disease syphilis usually takes a very rapid course, and has an especially adynamic influence.

Patients with an hereditary or an acquired predisposition to nervous diseases are, after infection, especially liable to syphilitic affections of the brain and nerves.

The Influence of Syphilis upon Traumatism.

The importance of this subject is very great in respect to surgical operations. To the labors of Vernenil we owe the clearest statement of this influence, which is given in the following conclusions, taken from the thesis of J. L. Petit, a student of the accomplished French surgeon.

1. In cases of severe syphilis or of ordinary syphilis, which has been untreated or indifferently treated, traumatic lesions may present a peculiar aspect or take an abnormal course.

2. These characters may be observed either immediately, or a few days or weeks or even several months after the receipt of the injury.

3. Sometimes the wound becomes a true syphilide; again it ulcerates without assuming specific features; or, finally, it does not cicatrize, or does so very slowly.

4. When syphilitic lesions exist at the time of its infliction, the wound assumes an appearance similar to that of syphilitic ulcerations in process of evolution.

5. Traumatism supervening in syphilitics of whom the diathesis is latent (the period of infection being somewhat remote) may induce syphilitic manifestations in the wounded region (local manifestations), or at a point more or less distant (manifestations at a distant point), or upon a surface more or less general (general manifestations).

6. These manifestations or lesions are induced as readily in the tertiary as in the secondary period.

7. Syphilis may localize itself at the seat of a traumatic lesion in a region previously free from any of its manifestations.

8. The syphilitic affection may then be either an ulceration destroying the cicatrix, or a tumor which follows the usual course of a gumma.

9. Traumatic lesions of syphilis generally have the characters distinctive of its natural manifestations, and are cured by similar treatment.

10. In certain cases, syphilis seems to be the determining cause of the complications of wounds.

11. These complications are also capable of inducing syphilitic manifestations.

12. At first the specific nature of traumatic affections and the complications of wounds may be difficult of recognition, sufficient information being almost always unobtainable. When a wound assumes an ulcerating character, and shows no reparative tendency, no other morbid cause being discovered, it is well to bear in mind this possibility, and to employ remedies appropriate to syphilis.

13. Previous to the performance of an operation, which is not urgent, in particular autoplasty (and indeed any operation attended by solution of continuity), upon a patient who recently presented syphilitic symptoms, it would be prudent to prescribe mercury or the iodide of potassium.

14. In case of failure of this operation, the patient should be again

placed under treatment, and the operation should not be repeated until at least six months after the disappearance of syphilitic symptoms.

Instances are on record of fractures occurring during the active stage of syphilis, which have failed to unite until treatment had been followed for a long time. Under similar conditions the callus of fractures has been known to be destroyed, leaving the fragments ununited.

CHAPTER IX.

PROGNOSIS OF SYPHILIS.

The opinion very generally prevails, that syphilis is a disease which, if left to itself, will always go on from bad to worse, attack in its progress the deeper and more important organs, and probably terminate in death. The correctness of this opinion, at least so far as concerns its invariability, may well be called in question, since syphilitic patients are rarely allowed to go without treatment, and consequently little opportunity is afforded for observing the natural progress of the disease; and we cannot logically infer, because certain cases, in spite of remedies, pursue a disastrous course, that the same would have been true of others, which have terminated favorably, if the treatment had been less thorough, or had been altogether omitted. It would be more reasonable, though less flattering to ourselves, to conclude that, as art has been comparatively impotent in the former, it can claim for itself but a portion of the credit in the latter; in fact, that very much depends upon the severity of the disease, which varies greatly in different cases.

There is reason to believe that, in many instances, under favorable circumstances, this disease tends to self-limitation. I have been struck with the fact that some patients, who either through neglect or ignorance fail to pursue any continued course of treatment, still live in comparative comfort, and, after several attacks of general symptoms, extended through a number of years, are finally free from further annoyance; the disease probably remaining dormant in the system, but ceasing to betray itself by any external manifestation. I have seen, as probably nearly every surgeon has who has had much to do with venereal, patients now perfectly well, but bearing evident marks of former syphilis, and who are yet totally ignorant that they ever had the disease, and who certainly have never been treated for it. Two cases, out of a number that might be related, will suffice to illustrate this point.

A young man, aged 21, was brought to my office in consultation for so-called morbid sensibility of the retina. On examining his eyes, I find posterior synechia, indicating an attack of iritis at some previous time. After considerable trouble in unravelling his case, I ascertain the following facts: At the age of 16 he contracted an ulcer upon the penis from impure intercourse; three months after he had sore throat, scabs in the hair, alopecia, and an eruption upon the skin; six months after he had an inflamed eye, attended with considerable intolerance of light, and pain. He was at the time young and ignorant of any such disease as syphilis; was told by his attending physician that he had caught cold in his eye, and had never

suspected the nature of his complaint. The well-informed physician who brought him to my office told me that he had been under his observation for the last two years, and had never presented the slightest symptom of syphilis, and the most careful examination failed to discover any activity of the poison at the time.

Again, a young lady, aged 18, accompanied by her mother, came to my office to be treated for interstitial keratitis. Believing, as I do, in the general truth of Dr. Hutchinson's views as to the specific character of this affection, I at once examined the teeth and found that conformation of the central upper incisors which is so characteristic of congenital syphilis. After closely questioning the mother, there could be no doubt that she, shortly after her marriage, was infected with syphilis by her husband, but she had never had the slightest suspicion of it nor had she ever been subjected to specific treatment, although she is now in the enjoyment of perfect health.

Again, evidence of a tendency to self-limitation is found in many cases in which treatment is faithfully pursued, and in which the disease, under the best management on the part of the surgeon, and the utmost obedience of orders by the patient, repeatedly recurs for a time, and yet ultimately disappears, without our being able to attribute this happy termination wholly to the accumulated effect or prolonged use of remedies, which have failed to afford permanent relief in the earlier attacks. I have so often found this to be the case, that I do not hesitate to assure patients, when discouraged by the reappearance of symptoms which they supposed were cured, that the tendency to return will probably cease after a time, and leave them in the enjoyment of a fair state of health; although never, after treatment however prolonged, do I promise certain immunity for the future. I can recall to mind quite a number of patients whom I treated for syphilis ten or fifteen years ago, and whose disease repeatedly returned, and was apparently uncontrollable by medicine for a period of from one to three years, but who have since been exempt from further trouble, and many of whom have married, and become the fathers of healthy children; and I cannot honestly ascribe their present immunity *wholly* to the remedies employed, but in a measure to the fact that the activity of the disease has been exhausted.[1]

This tendency to self-limitation—or, as it may be called, *spontaneous quiescence*—of syphilis, has been carefully studied by several authors, notably by Diday and Zeissl. Diday's mode of practice has afforded him a most excellent opportunity for deciding this point, since, in the great majority of syphilitic cases, he withholds all treatment, unless compelled to its resort by the urgency of the symptoms. As the results of his experience since adopting this course, Diday remarks, in the first place, that he has been struck with the regular evolution and succession of syphilitic phenomena, and afterwards goes on to say, that in many cases, the

[1] "That all the constitutional forms of syphilitic affections, if left to the unaided powers of nature, have a constant tendency to wear themselves out, I am fully convinced."—Egan, *Syphilitic Diseases*, p. 245.

disease never passes beyond the secondary stage; that, after several successive attacks—as, for instance, of mucous patches, exanthematous or papular eruptions, etc.—the symptoms diminish in intensity; the virus appears to be eliminated by the natural powers of the system; the tendency to fresh manifestation disappears, and a permanent and spontaneous cure is obtained. In other cases, on the contrary, he has found the disease become more serious and more deeply rooted by time; hence, he admits two classes of cases, in one of which syphilis naturally decreases, and in the other increases in intensity; in the former, he resorts to hygienic measures alone; in the latter, he employs specifics, but not to the neglect of hygiene.[1]

Out of forty-three cases, treated by the non-mercurial plan, in twenty-six the general symptoms never assumed a serious character and consisted merely of syphilitic fever, acne capitis, roseola, and mucous patches. These lesions reappeared on several occasions, but always with decreasing severity; the disease never passed into the tertiary stage; and finally the general health was completely re-established. In eighteen of these cases, sufficient time had elapsed to render the permanence of the cure all but certain; thus, the period between the last syphilitic manifestation and the date when the patients were last seen in perfect health was in—

3	cases	$3\frac{1}{2}$ years.
3	"	4 "
4	"	$4\frac{1}{2}$ "
3	"	5 "
1	"	$5\frac{1}{2}$ "
1	"	6 "
1	"	8 "
1	"	9 "
1	"	16 "

On the other hand, in seventeen of the forty-three cases treated without mercury, the symptoms assumed a more serious aspect, threatening impairment of various organs and permanent injury to the constitution; some of them passed into the tertiary stage; and the safety of the patients demanded the administration of mercury, which was accordingly given. The following table exhibits the difference in these two classes of cases in respect to the number of the successive appearances or outbreaks of general symptoms:—

Number of outbreaks.	In the mild series.	In the severe series.
1	3 cases.	
2	14 "	3 cases.
3	8 "	4 "
4	1 "	3 "
5 or 6		7 "

Besides being more numerous, the outbreaks of general manifestations, as a general rule, occurred at shorter intervals in the severe than in the mild class of cases.

[1] Nouvelles doctrines sur la syphilis, p. 302 et seq.

According to Diday, the following are the most valuable indications to show that an attack of syphilis in a given case will be mild: a long incubation and a superficial character of the initial lesion, or chancre; simple roseola without papules as the first manifestation upon the skin; a gradual diminution in the size of the engorged ganglia; infrequent outbreaks of general manifestations, separated by comparatively long intervals, and decreasing in severity.

On the other hand, a severe attack is indicated—by a short incubation and deep ulceration of the primary lesion; by the eruption upon the scalp assuming a decidedly pustular character; by ulceration of mucous patches in positions where, in mild cases, they are almost always superficial, as upon the sides of the tongue, on the scrotum, margin of the anus, or vulva; a papular, vesicular, pustulous, or squamous eruption as the first syphilide; persistency, or having once subsided, tardy reappearance of the glandular engorgement; frequency and increasing severity of the successive outbreaks of general manifestations.

The severity of the attack does not appear to be in direct ratio with that of the syphilitic fever which commonly precedes or accompanies the earliest outbreak of general symptoms, the fever frequently being most severe in those cases which prove the mildest; nor, so far as we know, can any indication be drawn from the length of the period of incubation of general manifestations. Hereditary origin has an aggravating influence upon syphilis, both in the infant and in any person to whom the latter may communicate it; on the contrary, syphilis contracted from a secondary lesion (of acquired, not hereditary syphilis) has been supposed to be of a mild type.[1] The above indications, however, should be received with much caution, as they are founded upon a small number of statistics, and require further investigation. In my own experience, they have repeatedly been falsified, although I am not prepared to deny their value in general.

Zeissl's views with regard to the self-limitation of syphilis and its expectant treatment (given in the Wien. Med. Wchnschr., 1879, Nos. 1, 2, 3, 4) are essentially the same as Diday's, yet he freely confesses that he rarely carries them out in practice, either in hospitals or in private—not in the former, because economy requires that patients should be relieved and discharged as soon as possible; nor in the latter, because patients are unwilling to submit to a prolonged duration of their symptoms and demand speedy relief.

While fully concurring with these views of Diday and Zeissl as to the self-limitation of syphilis in many cases, I am convinced that their tendency, unless great caution be used, is mischievous in underestimating the value and importance of treatment. It is true that many cases of this disease will do well under a merely expectant treatment, but no one can tell, *a priori*, which cases will do well and which will do badly. There is a dark side of the picture which must not be forgotten while looking at the light one,

[1] Diday, Histoire naturelle de la syphilis.

and the former includes the many evils—the physical deformity, public infamy and disgrace, and the ignominious death—to which syphilis, when neglected, exposes its victim. Prolonged treatment, adapted to the requirements of each case, is the surest safeguard for every one who has been so unfortunate as to contract this disease.

CHAPTER X.

IRRITABILITY OF THE SKIN AND MUCOUS MEMBRANES. CHANGES IN THE SENSIBILITY OF THE SKIN.

In the early stages of syphilis the skin and mucous membranes are peculiarly susceptible to inflammation; the tendency becomes less marked as the diathesis grows older. It is greater in some subjects than in others, those having a delicate white skin possessing it more decidedly. The integument of those who have had pustular and ulcerating syphilides is more liable to become inflamed from a slight cause than of those who have had erythematous and papular rashes. This altered condition of the skin and mucous membranes is seen in its most simple form in the extreme inflammation attending slight cuts and abrasions, and in a greater degree in the excessive ulceration and suppuration during the course of certain non-specific skin diseases, such as acne, eczema, impetigo, and pemphigus. Not infrequently herpetic vesicles, in recently infected syphilitic patients, become very much inflamed and present the features of chancroids with their peculiar destructive tendency. (See p. 30.) Doubtless owing to this condition of the tissues, blennorrhagia sometimes becomes especially virulent. Examples of auto-inoculation with blennorrhagic pus are not uncommon. Brought in contact with an abrasion or herpetic vesicles about the genitals, or becoming lodged in the follicles, it causes violent reaction and ulcers resembling chancroids.

Our knowledge of the influence of various irritants upon the integument has been much extended by numerous experiments in inoculation with pus from venereal lesions, and by the observation of cases of syphilis treated by syphilization. The results have confirmed what is sometimes seen clinically. It is proved that the integument of some persons is more susceptible than that of others, and that certain kinds of pus are more active than others. The secretions from chancroids and from ulcerating syphilitic lesions are much more active than those from wounds or from simple skin lesions. The experiments of Wigglesworth, already referred to, and of Morgan, who produced, with vulvo-vaginal pus, ulcers which resembled, and which were essentially chancroids, illustrate this abnormal irritability of the skin. Repeated inoculation is known to lessen this tendency to ulceration, until finally scarcely any effect is produced. Moreover, dilution of the pus diminishes its action.

Irritation of the skin of syphilities may also cause infiltration with or without ulceration. A splinter of wood, imbedded in the skin, has been

known to give rise to a tubercle, having all the appearance and character of a specific lesion. In many cases of artificially produced ulceration infiltration coexists, and remains long after cessation of the destructive process. Wounds, bruises, and ulcers are liable to become complicated by this nodular infiltration. This tendency to infiltration ceases with the extinction of the syphilitic diathesis, whereas the tendency to ulceration persists long after the completion of cure. This fact is exemplified in the ulcerations and fissures occurring in the mouths of smokers, when syphilitic manifestations have long since disappeared.

This peculiar condition of the skin is worthy of special consideration in connection with the serpiginous syphilides. These creeping ulcers undoubtedly originate in true syphilitic lesions, but the decided absence of characteristic features in their future course warrants the suspicion that they become simple chronic ulcers developed upon a favorable soil.

The fact that during syphilis slight abrasions and herpetic vesicles may give rise to ulcers resembling chancroids is of great practical importance, and its thorough recognition will enable the physician to avoid doing injustice to innocent persons.

Changes in the Sensibility of the Skin.

As first noticed by M. A. Fournier, syphilis very commonly gives rise to various disorders of the general sensibility, especially in women. The most frequent of these is a loss of the perception of pain, or analgesia, with which is sometimes combined the absence of the sense of touch and of temperature. In such cases, for instance, a pin may be thrust deeply into the flesh without the patient's suffering any pain, or she may be also insensible to the touch of the fingers, or cannot distinguish between hot and cold substances.

Syphilitic analgesia varies in degree in different cases, and also in the extent of the surface affected. In some instances it extends from head to foot, in others it is confined to particular regions, when the extremities of the limbs, as the hands, the lower half of the forearms, the feet and ankles, are almost invariably involved. The back of the hand, over the dorsal surface of the metacarpus, is a favorite site, where it is likely to be found, if anywhere. This disorder occurs during the early secondary period, and most commonly lasts for several months. Fournier says that he has observed over a hundred cases within two years.

Cases of this affection have frequently come under our observation both in the male and the female sex. It would probably be found oftener if looked for, but its presence is of no special value either in the way of prognosis or treatment, and is hence for the most part neglected.

CHAPTER XI.

SYPHILIDES.

Lesions of the skin may appear at any period in the course of syphilis, being among its earliest symptoms and not infrequently among its latest.

Syphilitic eruptions are caused by two distinct morbid processes, hyperæmia and cell infiltration, each of which is extremely chronic in its nature. The hyperæmic or erythematous syphilides present several varieties, and are peculiar to the early stages of syphilis, being very rarely seen later than two years after infection. While hyperæmia is the essential morbid process, we not infrequently find associated with it a certain degree of cell increase, sometimes so slight as to be inappreciable to the naked eye, and again so marked as to form well-defined patches or nodules. The infiltrating cells of the syphilitic dermal lesions are round, granular, nucleated bodies, averaging $\frac{1}{3000}$ of an inch in diameter, similar to the white blood-corpuscles in general appearance, and analogous to the cells of the initial lesion and of the later gummatous tumors of syphilis. The surprisingly numerous and varied appearances, resulting from these two simple processes, are modified and complicated by various subsequent changes.

As a general rule the cell-infiltration is in proportion to the age of the syphilis. Thus, in the secondary period the superficial layers of the skin are involved, and papules are developed; while at a later period, the infiltration being deeper and more extensive, tubercles are formed. In the former the changes take place chiefly in the papillary and Malpighian layers; in the latter the derma and the subcutaneous tissue are involved. A tubercle, therefore, is simply a papule of large size. Evidently there can be no distinct line of division between the two lesions, and we frequently meet with intermediate grades of infiltration, to which we may apply the term *papulo-tubercle*. Tubercles may, however, appear early in the course of syphilis, but are usually not seen until after the evolution of a general superficial eruption. A syphilitic pustule may be looked upon as a pus-producing papule, the secretion of pus generally being secondary to the formation of the papule. In some instances, however, the formation of pus seems to precede or to be coincident with the cell infiltration.

The occurrence of a vesicular syphilide is rare, and has indeed been denied by some authors. It is true that vesicles, similar to those of herpes and eczema, are not developed, but it is not uncommon to find minute collections of serum beneath the epidermis at the apices of papules, especially those small conical papules which have a more acute character.

The existence of a true bullous syphilide in the acquired disease has also been doubted, but we are convinced that it is occasionally developed at

a late period in cachectic subjects. The degree of cell infiltration at the base of bullæ is usually much less than in any other syphilitic eruption.

Thus we find in syphilis lesions of the integument which correspond to those of non-specific origin: erythemata, papules, pustules, vesicles, bullæ, and tubercles, but the syphilitic eruptions present certain peculiar features whose recognition is important.

In addition to the above-mentioned lesions are the syphilitic *gummata* or *gummatous tumors*. These result from cell infiltration in the subdermal tissue, either limited to this region or involving secondarily the entire thickness of the skin, which may be destroyed, thus forming gummatous ulcers.

A syphilitic eruption may be composed exclusively of one or another of these lesions, or several may be simultaneously developed.

Much confusion has followed the application to syphilitic skin lesions of the classification of non-specific eruptions instituted by Willan, who placed lichen among the papular, impetigo among the pustular, eczema among the vesicular, and psoriasis among the scaly affections. Such a nomenclature in syphilis is far from being as useful as might be expected. For instance, a papular syphilide, in its early stage, would be called "lichen;" but suppose it to be capped with pus, as frequently happens, and the name "impetigo" must be substituted, or we must designate it by the term "pustulating syphilitic lichen." Should the lesion lose its pustular feature, and, becoming chronic, assume a scaly character, no term now in use could express the exact condition, and we should be compelled to add the term psoriasis.

Another objectionable feature in the nomenclature of syphilitic dermal lesions, is the use of the word "lupus" in describing certain tubercular syphilitic lesions whose features and course resemble those of the non-specific affections.

We have, therefore, thought best to apply the qualifying adjectives, "erythematous," "papular," "pustular," etc., to the generic term "syphilide," using the words "ulcerating," "serpiginous," etc., in addition, as the peculiar features of an eruption, in exceptional cases, may require. We thus avoid the erroneous inference that many of the chief varieties of simple skin affections are caused by syphilis.

Although we may use the word "scaling" in describing certain syphilides, it must be remembered that desquamation does not constitute the lesion, but that the latter consists of infiltrations into the skin, in the form of papular or tubercular eruptions, exfoliation of the epidermis being secondary. In some cases the dermal irritation is so excessive that desquamation continues long after the original lesion has faded. It must then be considered merely a sequel of the specific process.

Besides the classification of syphilides in accordance with their elementary lesions, we have one based on the recognized fact that each symptom has a favorite period of development. A strict chronological order is not followed, for a tubercular rash may be met with at an early date, or a papular eruption may be developed very late in the course of syphilis.

Some French authors call the early eruptions precocious syphilides (*syphilides précoces*), and limit them to the first eight months of the disease; those of later appearance they term intermediary (*intermédiaires*), which may appear as late as the second year; while the very latest are called tardy (*tardives*), which may appear at any time before the tenth or the twentieth year.

A division which is simpler and more practical, and which we shall employ, is that which places erythematous, papular, pustular, and vesicular syphilides among *secondary* lesions, and tubercular, bullous, ulcerative, and gummatous among *tertiary* lesions. Certain peculiarities are presented by these two classes of lesions.

The early lesions of the secondary stage are distributed symmetrically and generally over the body, involving the superficial layers of the skin; the later lesions of this stage, although extensively and symmetrically spread, are less copious, and show a tendency to localization, and, moreover, invade deeper portions of the skin. The lesions of the tertiary stage are always profound, and are less profusely distributed, but they involve more extensive portions of particular regions for which they seem to have a predilection, and they are frequently unsymmetrical. The course of the tertiary lesions is decidedly more prolonged and indolent than that of the secondary.

Much difficulty is experienced in the study of specific skin affections in consequence of numerous modifications which they are prone to undergo. Familiarity with the features of the simple eruptions is essential to an accurate knowledge of syphilitic eruptions. Let us now consider some of the characteristics by which the latter may be recognized.

Their course, as compared with that of simple eruptions, is marked by chronicity and absence of inflammatory features. They may be accompanied by a moderate degree of systemic reaction. In some erythematous and papular syphilides of the early period of syphilis, the intensity of this reaction and the active character of the eruption may render the diagnosis from one of the simple exanthems very difficult. The actual nature of the eruption is demonstrated by its quickly assuming a subacute course. With the progress of the syphilis the tendency of the eruptions to present a chronic, apyretic character is more marked. Some local exciting cause may usually be found for the hyperæmia and inflammation sometimes attending tubercular, ulcerative, and gummatous syphilides.

Absence of Itching and Pain.—Owing to their indolent nature syphilitic eruptions do not, as a rule, cause any irritation of the skin.

Itching may be present in connection with an early eruption, whose evolution is particularly acute. It is never so intense as in a simple eruption, and is much more ephemeral. It is perhaps more troublesome with an eruption occurring on the scalp than elsewhere, and, when complicating an early rash, it is generally limited to the extremities, the upper more often than the lower.

Too much reliance must not be placed on the statement of a patient that an eruption itches. We must remember that the irritation may be caused

by pediculi, or by the wearing of flannel, and that some persons have an excessively irritable skin.

Pain is even rarer than itching in syphilitic dermal lesions. A few instances have been recorded of its occurring in connection with a tubercular or a gummatous syphilide.

Polymorphism.—The simultaneous occurrence of several varieties of lesions in the same eruption is an important and common feature of syphilis. It is due to three causes: the chronic course of syphilides, their relapsing tendency, and the changes occurring in the lesions. A similar feature may be observed in some of the simple eruptions, as eczema, acne, and scabies, but in their case the diversity evidently consists of modifications of the original lesion, while in specific eruptions it is in part due to the development of new forms of eruption before the disappearance of preceding ones. Polymorphism is most frequently observed early in the secondary stage, since eruptions are then more numerous; yet it may exist even with the late tubercular eruptions.

Color and Pigmentation.—It is important to distinguish the color of the syphilides from the pigmentation which frequently follows them.

Their usual tint is pinkish-red, being much more subdued than that of simple eruptions. Even in exceptional cases of acute invasion, in which the color may be unusually bright, it is less intense than in the simple exanthemata. The hue soon fades to a brownish, which, after involution of the eruption, changes to a copper-colored, yellowish-brown maculation. Pressure dissipates the color during the early stages of an eruption, but finally the pigmentation, which has been compared to "the lean of ham," to the color of copper, and to a combination of yellow and brown, becomes permanent.

These pigmentary changes are not peculiar to syphilis, being equally well marked in lichen planus, and in cases of protracted dermatitis. They are probably due to deposit of coloring matter of the blood in the affected spots.

In persons whose circulation is feeble the color of the pigmentation may be light yellow, and in cases where the hyperæmia is slight and of short duration, no pigmentation at all may be induced.

It is claimed by some authors that syphilis may produce a primary pigmentation, independently of any preceding pathological process. This condition is to be described in the section entitled "*Pigmentary syphilide.*"

Tendency to Assume a Circular Form.—The early eruptions are generally distributed over the surface without definite order, except in rare instances in particular regions, where they may be arranged in a circular manner. This peculiarity is more commonly seen in the case of small papular rashes and in the erythematous syphilide. The latter often relapses in the shape of distinctly marked rings, differing from the papular syphilide, in which the bases of the papules generally merge together and form simply wavy lines, or segments of circles, or perhaps complete circles. In certain large papules, and in some papulo-tubercles, involution begins at their centres, leaving the periphery in a ringed form. A similar process

may be observed in psoriasis, but in the latter extension of the patch may take place, which is usually not the case in syphilis. Ulcers of the later stages of syphilis may likewise exhibit this tendency. Many other, though less constant, features of syphilitic eruptions will be considered when describing individual lesions.

Influence of Mercury.—By many mercury is considered so infallibly curative of syphilitic eruptions that it is termed the "touch-stone" in their diagnosis. Its influence is certainly wonderful in most cases, especially in early lesions and in those of an infiltrative character; but certain ulcerative and chronic forms, particularly those attended by much scaliness, are often quite rebellious.

In general, mercury is very efficient in uncomplicated cases, but in those complicated by other morbid changes, and especially in those which have had a long existence, its effect is much less pronounced.

The Influence of Intercurrent Diseases on the Course of Syphilides.—The course of syphilitic eruptions is not infrequently interrupted or even permanently arrested by some acute disease. Numerous instances have been reported of the disappearance of an eruption at the outset of an inflammatory affection of the lungs, of acute articular rheumatism, of various adynamic fevers, and of acute cerebral disease. Jullien mentions the remarkable case of a young man who was vainly treated by Diday for lingual mucous patches and a scaling palmar syphilide, who was finally cured during a general eruption of furuncles.

Variola and varioloid have been known to have a similar effect. It was once claimed that syphilis could be cured by vaccination, but careful trial of this means has proved its uselessness.

Our knowledge of the influence of erysipelas on the course of syphilitic eruptions is derived chiefly from the French.[1] Not only superficial lesions, such as papules, mucous patches, and condylomata, but deep and diffuse tubercles and even active ulcerations are affected; not only lesions within the actual range of the erysipelatous process, but even those at a distance are influenced by it in some obscure way, even after the failure of well-directed treatment. When, however, the syphilitic diathesis has a malignant character, erysipelas is likely to be a fatal complication.

That traumatic as well as idiopathic erysipelas may have a curative effect was proved in a case reported by Mauriac, in which well-marked syphilitic lesions were dissipated by an attack of the disease which followed their excessive cauterization. The practical value of this fact is limited by our inability to excite and control an erysipelatous inflammation.

Intercurrent diseases have no influence upon the syphilitic diathesis, and therefore no power to prevent relapses.

[1] The most complete brochure on this subject is that of the celebrated syphilographer, Mauriac (Étude clinique sur l'influence curative de l'érysipèle dans la syphilis); and more recently an important case has been reported by Dealna (Vrtljschr. f. Dermat., B. iii, 1876, p. 57).

Unusual Modes of Evolution.—The appearance of a general eruption is looked upon as the indication of constitutional infection, but the first eruption may be limited, and a general rash may not be developed for several weeks. In some cases only two or three dermal lesions can be found at the usual date of invasion. Should the eruption be erythematous, the spots soon become coppery, and remain in a chronic condition; if papular, the papules are sluggish, and usually leave a pigmented spot. In connection with these scanty lesions, the patient may suffer from syphilitic pains in the head, in the bones, etc., and perhaps may have erythema of the fauces and high temperature. Within two to six weeks the usual general eruption follows.

The Localization of the Syphilides.—Syphilitic eruptions are often found in regions where simple skin lesions are seldom or never developed.

Secondary eruptions appear on the scalp and especially at its margin on the forehead, at the angles of the mouth, on the alæ of the nose, about the anus and upon the genitals, near the umbilicus, in the inguinal fold, between the toes, and upon the palms and soles. The supra- and infra-clavicular and sternal regions, where simple and parasitic eruptions are often found; are rarely the seat of specific exanthems, and on the dorsum of the hands the latter are not often seen. Regions rich in sebaceous and hair follicles are, as a rule, less frequently invaded by simple than by specific eruptions. The annular forms of simple erythema may occur on any part of the body, while these forms of the erythematous and the papular syphilides are more likely to be limited to the neighborhood of joints, the anterior and inner surfaces of the extremities, and the gluteal regions.

The papular syphilides are prone to be developed on the palms and soles.

Later eruptions are generally seated upon the nose, the lips, and the scalp; they are found upon the scapular, sternal, and gluteal regions, and more often on the legs, near the joints, than on the thighs.

Characters of the Scales and Crusts of the Syphilides.—The scales of specific eruptions are thinner, less numerous, and less glistening than those of simple eruptions, and they are very rarely imbricated. They may consist of epidermis only, when they have a dull white color, or they may be formed chiefly of serum, when they are yellowish or brownish. The scales are never removed in large patches, as in psoriasis, since the inflammation is of such a low grade that exfoliation is slow and scanty.

The crusts of syphilitic pustules and ulcers are also peculiar. Those of small pustules soon dry, and are seated upon an indurated base; those of impetigo and eczema are placed in a slight depression of the inflamed skin. The crusts of larger pustules are dark brown or greenish-black, differing from those of ecthyma and scabies, which are yellowish-brown.

If elevated, the syphilitic crust is seated upon a deep ulcer with brownish-red, infiltrated base and margins; in a simple eruption the ulcer is more superficial, its base is inflamed, and it has reddish, violaceous borders.

The crusts of rupia have no analogue in dermatology. They are of a brownish-black color, are conical and distinctly laminated, and they rest upon a surface which is bathed in viscid pus, or as Zeissl puts it, "they swim upon and are kept afloat by pus." Their shape and structure are due in a measure to their slow formation.

The crusts of late syphilitic ulcers have a brownish-black color and a rough uneven surface, and resemble a dirty oyster shell; the crusts of lupus are of a bluish-brown mixed with yellow.

Peculiarities of Ulcers and Cicatrices.—Syphilitic ulcers may be round, oval, kidney-shaped, or of the form of a horseshoe. The ulcers of lupus frequently assume similar forms, but the lesions of syphilis are generally more numerous, more extensively distributed and more polymorphous than those of lupus. The character of the crusts, the rapid progress and regular margins of the ulcer, and its proximity to a joint, the general history of the case, and its amenability to treatment, distinguish a syphilitic lesion. The margins of a lupoid ulcer are everted, softer and more violaceous, and are frequently studded with reddish-blue tubercles, while the surrounding tissues are much swollen. The cicatrices of syphilitic ulcers, especially where they have been numerous, are often diagnostic. They are distinctly rounded or oval, quite smooth and seldom traversed by fibrous bands except at the joints; they are frequently perforated with minute holes, the sites of former follicles, when they are more or less depressed, and when mature, are quite pliable. Their brownish-red color slowly fades from the centre to the periphery, until there remains a white shining surface, surrounded by a narrow areola of brown pigment. A lupoid scar, on the contrary, is generally irregular in outline; its surface, which is not always depressed, but may be on a level with the general surface or even elevated by the subjacent thickening, is very uneven and is crossed by numerous fibrous bands; it has not a shining appearance, and its areola is bluish-red. Finally, false keloid is more frequent upon lupoid than upon syphilitic cicatrices.

The cicatrices which sometimes follow papular syphilides are small, more or less aggregated, and at first pigmented. They are recognized by the situation and grouping of the scars, the coexistence of other lesions or their sequelæ, and by the history of the case.

The Odor of Certain Syphilitic Lesions.—Some observers claim that syphilis always gives rise to a distinctive odor. There is no doubt that the discharges from certain lesions possess an offensive and somewhat peculiar smell. Mucous tubercles, when seated upon the genitals or in folds of integument, yield a secretion, often combined with that of sebaceous and sweat follicles, which has a sickening, penetrating odor certainly

never perceived in other lesions. The odor in some cases of extensive gummatous and tubercular ulcerations, where the secretion is abundant and the patient uncleanly, is heavy and nauseating.

General Hints in Diagnosis.—In the diagnosis of syphilides the foregoing features collectively are of the greatest value. In every case the whole eruption should be reviewed; its extent, copiousness, configuration, and general appearance should be carefully noted; its mode of invasion, its concomitant symptoms, and its course should be determined by careful questioning and observation. With regard to the eruption itself we must observe whether it is composed of one variety or of several forms of lesion, and, if the latter, which predominates. For instance, in a roseolous eruption we judge of its extent, its tendency to development in certain localities, its configuration, whether the spots are isolated or grouped in rings; then we consider whether the spots themselves are in their early hyperæmic stage, or whether they have become pigmented or perhaps slightly papular and scaly. By comparing the number of erythematous and of pigmented spots we assure ourselves of the age of the rash, and whether its course has been rapid or chronic. We must also learn the general condition of the patient and whether other tissues have been affected.

In case papules, pustules, and scaling patches are associated with erythematous spots, we must decide which lesion predominates, and whether they are not mere phases of development of the same process. We may perhaps learn that the red spots become pigmented and slightly papular, while here and there are papules which change into pustules, vesicles, ulcers, or scaling spots. We observe whether the lesions have a tendency to unite and form patches. In this feature syphilis is peculiar, differing radically from most of the simple eruptions.

In case of several varieties of lesions which may undergo various changes, each one runs its course quite distinct from the other. This is quite different from what happens in simple polymorphous eruptions. We may have simple erythematous patches, papules and pustules associated, but they are related to each other in the development of one inflammatory process, and they have a tendency to blend and form a homogeneous eruption, as in eczema and scabies. In some cases of acne, papules and pustules are scattered together, yet a bond of union is always found to exist between them in their inflammatory, follicular origin, while they have other features which differ from those known to be peculiar to syphilis.

The Erythematous Syphilide.

(Syn. Syphilitic Roseola, Macular Syphilide, Exanthematous Syphilide, Syphilis Cutanea Maculosa.)

The erythematous syphilide is usually the earliest syphilitic eruption. It probably exists in all cases of syphilis, but may escape observation on account of its scantiness, or by reason of its forming only a part of an eruption which is chiefly papular or pustular.

The lesion consists of round or oval spots, with distinct or irregular outlines of an average diameter of about one-third of an inch. Their color varies from a delicate rosy pink to a decided red or even a purple hue. In some cases there may be only a mottling of the skin, or the eruption may be so faint as to be invisible except on careful inspection or in an oblique light. Exposure to cold brings the spots into prominence, while they disappear in the general hyperæmia of the surface from increase of temperature, and show themselves more clearly in the reaction which follows. At first the spots may be effaced by pressure, but about the end of the first month they may assume a grayish-brown or coppery tint, which is permanent. This tint appears earlier in exposed regions and on the legs, perhaps owing to peculiar conditions of the circulation. Sometimes the eruption disappears without this change of color. There is seldom either elevation or scaling of the surfaces of the spots.

In mild forms of this syphilide there is probably no other change than temporary capillary stasis and occasionally, in debilitated subjects, hemorrhagic effusion. In chronic cases a proliferation of cells occurs which is described by Biesiadecki as follows: "We find the walls of the capillaries studded at this point with numerous nuclei, projecting on their inner and outer surfaces, and surrounded by a row of cells here and there interrupted. These cells exactly resemble in size and structure white blood-corpuscles or the cells of dermatitis. They are situated around the vessels in a clearly bounded space. The adventitia of the vessels in the region of the macule incloses round and spindle-shaped cells. This exuberance of cells is most marked in the adventitia of vessels running towards the papillæ; their calibre is contracted, while that of the capillaries in the papillæ is somewhat dilated. Neither the cells nor the fibres of connective tissue show any appreciable change, only here and there granules of brownish-yellow pigment are interspersed. The syphilitic macule must therefore be regarded as a disease of the bloodvessels as shown by the increase of their granular and cellular elements." Further microscopic observations have been made by Kaposi, who confirmed the occurrence of cell-changes in the capillary walls, and also observed cell-infiltration of the papillæ. It is quite probable that these combined changes occur in erythematous spots, which are more or less papular.

The incomplete papules, resulting from this limited cell-increase, mingled with the hyperæmic patches, form an eruption which has been called by Bazin "*roséole papuleuse*," and by Fournier "*roseola urticata.*"

In very chronic eruptions several minute specks of darker tint, appear on the surface of some of the roseolous patches, indicating a more intense hyperæmia at follicular openings. They are usually a little above the level of the patch and are frequently traversed by a hair, and their pigmentation is generally more persistent than that of the surrounding patch. Fournier calls this modification, "*roséole piquetée*," or "*granular roseola.*"

The erythematous syphilide requires a week or ten days for its complete development, but individual patches reach their full size in a day or two,

and show no tendency to coalesce or to form circles. In rare cases of great intensity, or from any cause which stimulates the capillary circulation, the whole body may be invaded by the eruption in a single day.

The spots may be first seen in the vicinity of the umbilicus, soon extending to the thorax, sometimes following the line of the ribs, and finally, in severe cases, being closely crowded together over a large portion of the surface. In exceptional cases they appear first on the face. In mild eruptions the spots are most numerous on the sides of the trunk and on the inner surfaces of the extremities. On the genitals of either sex the macules are prone to hypertrophy, and hence we frequently see condylomata lata coexisting with roseolous patches in these regions. Similar changes are noticed about the anus, the umbilicus, the nose and the mouth, and in the fold of integument below the breasts. A limited number of patches may be found on the palms and soles, which may be diffuse or slightly elevated and scaly. The dorsal surfaces of the hands and feet are rarely invaded. A common region is the lower two-thirds of the forearms and the wrists. The neck is frequently exempt, or an eruption on the trunk may extend by occasional spots along the back of the neck to the scalp.

When the face is invaded the macules are developed more freely about the nose, mouth, and chin, and especially on the forehead at the border of the scalp,[1] where they are often associated with minute follicular elevations, which become crested with sebum and may be mistaken for pustules. Many of the so-called "scabs" on the scalp have this origin. These patches at the margin of the scalp are often very irregular and confluent. This eruption on any part of the face is usually covered by fine adherent scales of epidermis or by thin yellowish-white crusts, which give it a smooth, shiny appearance.

The course of the erythematous syphilide is slow, and, except in cases of active invasion, it is not attended by special irritation or heat of the skin.

Its duration depends on the degree of the hyperæmia and on treatment.

A faint rash often disappears spontaneously, even within a week, under the use of mercury. After pigmentation has taken place, internal treatment needs to be supplemented by the external use of mercury in ointment, lotion, or still better the vapor bath.

A relapse of this syphilide may occur during the first year of contagion, and is generally less copious than the primary eruption. The macules are more localized and are likely to assume the circular form, which is never seen in the initial eruption, and they are attended by less febrile reaction. In certain cases as many as three and four recurrences have been observed, the forearms and gluteal regions being the parts most often affected.

Coexisting Lesions and Symptoms.—On account of its early appearance

[1] The early eruptions, especially the papular syphilide, are very likely to form a segment of a circle at the border of the scalp, which has been called the "*corona Veneris*." It is a mistake to suppose that the papular eruption is the only one which may be developed in this way.

the erythematous syphilide is often associated with many other lesions, one of which is the fully developed initial lesion. Indurated ganglia may also be found, and hyperæmia or mucous patches of the fauces. Where two surfaces of integument are in contact, the confluence of erythematous spots may form large inflamed patches, sometimes mistaken for intertrigo.

They have sharply circumscribed margins and superficially ulcerated surfaces, which secrete a viscid offensive fluid. They are often accompanied by papules about the hair follicles, or even by pustules and condylomata lata. Alopecia and affections of the nails sometimes occur at this period. Slight periostitis and, in bad cases, osseous affections may be present. Superficial scaling of the palms or even of the soles may be observed. Iritis is rarer than in a general papular eruption. In a person with a long prepuce and of uncleanly habits, patches of erythema on the mucous membrane of the glans may result in quite destructive ulceration.

Diagnosis.—The diagnosis of the erythematous syphilide is to be made in its form of hyperæmic patches, in its pigmented condition, and in its ringed form.

In its hyperæmic stage it may be mistaken for rubeola, scarlatina, or the erythema following the ingestion of balsams or the use of mercury.

The mode of invasion, the absence of severe general symptoms, and the circumscribed and indolent character of the rash, will usually enable us to distinguish it from rubeola and scarlatina; moreover, the presence of catarrhal and conjunctival symptoms in the former, and of gastric and throat symptoms in the latter, will be of assistance.

The rash caused by cubebs, copaiba, tar, etc., is always attended by high fever and serious gastric disturbance, and the patches are many of them very large and œdematous, or like the wheals of urticaria. It soon fades on cessation of the exciting cause.

An eruption may be caused by either the internal or external use of mercury. It appears suddenly in the form of very large hyperæmic patches, of a bright red color, which soon become dull and quickly fade, leaving no trace. It is not infrequently mistaken for a relapsing eruption.

One of the most frequent errors in the diagnosis of syphilitic eruptions is that of confounding the pigmentary stains of the erythematous syphilide with tinea versicolor. They somewhat resemble each other in color, but that of tinea is more yellow, and many of its patches are very large, and they are always accompanied by some extremely small ones. Tinea is, moreover, slightly pruritic, and its scales contain the *microsporon furfur*. The patches of tinea are always found over the sternum, where syphilitic eruptions are rare, and they are much less scattered than those of the syphilide.

In rare instances of slight elevation and scaliness, the rings of the erythematous syphilide may be mistaken for tinea circinata. The syphilitic rings are much more numerous, do not increase in size, and the area of inclosed skin is unaltered. The scales of tinea circinata always contain the parasite *tricophyton tonsurans*.

The Papular Syphilides.

This most important dermal lesion of syphilis is composed of circumscribed infiltrations into the superficial layers of the skin, and presents two varieties, the *conical* or *miliary* and the *lenticular* or *flat.*

It may constitute the first symptom of the secondary stage, or it may be combined with the erythematous syphilide. In relapses it frequently occurs alone, or is by far the larger proportion of a recurring eruption. It may be seen even in the tertiary stage, and it merges into the tubercular syphilide by intermediate grades of papulo-tubercles. Some of these intermediary papules are attended by an epidermal proliferation, and have therefore sometimes been erroneously called "squamous syphilides." The various changes of form and distribution which the papules undergo sometimes gives them a strong resemblance to simple skin lesions.

The Miliary Papular Syphilide.

The *miliary papular syphilide* has two distinct varieties, one composed of *large* and the other of *small papules.*

Some of the *small papules* are about the size of a pin's head, while others are two or three times as large. They consist of distinctly limited, conical or rounded elevations of the skin, sometimes umbilicated, and, in their early stages, they have a deep pinkish-red color. When forming the first eruption of the secondary period, or an early relapse, they are distributed over the whole body, sometimes closely packed together, and particularly copious on the forehead, about the nose and chin, on the back of the neck, on the outer surfaces of the extremities, and upon the scapular and gluteal regions. The papules may be arranged in groups, in the form of circles or segments of circles, or like the letter S or the figure 8. Sometimes the papules composing rings, which may have a diameter of half an inch or two inches, fuse together and lose their individual shape. The circular form is assumed only in the regions referred to, while elsewhere papules may be seated without definite order.

In a general eruption papules may be seen on the backs of the hands and upon the scrotum and penis, where they usually become excoriated and are transformed into condylomata. Unlike the flat papules, these are rarely accompanied by condylomata about the anus in the male and the vulva in the female. After frequent relapses the papules are generally less numerous and less confined to particular regions, while the ring form becomes a more prominent feature. When the eruption occurs late in the secondary period it may be seen in but one region, and may even be unsymmetrical.

This eruption usually begins about the face and neck and is fully developed at the end of two weeks. In some instances its evolution is so rapid that it has been called the "acute papular syphilide." In late relapses the papules appear as slowly as any other syphilitic eruption. Many of the papules are seen to be at the openings of follicles, a feature which is more noticeable in this than in any other form of syphilitic papule.

After their complete development the papules remain unchanged for a time. In some cases new papules, and exceptionally pustules, appear among the old ones. Soon their color changes to a sombre brown, and finally to a coppery hue. Small scales of epidermis, frequently in the form of rings which correspond to the margins of papules, are detached by the infiltrative process beneath. This feature was regarded by Biett, who first described it, of considerable diagnostic importance. A marked tendency to further desquamation is observed only in chronic cases and in regions where the epidermis is thick; it is sometimes so decided as to resemble the early stage of psoriasis.

Frequently a few of the papules are converted into vesicles or pustules by the accumulation at their apices of a minute quantity of serum or pus. They may remain in this condition for a long time. Generally the fluid dries and forms a minute crust which may fall off spontaneously, leaving the papules apparently in their elementary state. In some cases pustules form, which may dry or become ulcers.

Jullien, (*Mal. vénériennes*, p. 716) says that sometimes no fluid escapes on puncture of the apparently vesicular apex of one of these papules. In such case he thinks the appearance is due to "œdematous softening of the neoplasm." We have observed this feature less frequently than Jullien.

The occurrence of distinct groups of papules which have undergone these changes, generally on the face, about the mouth, and on the forearms and backs of the hands, has perhaps led some authors to admit the existence of a vesicular syphilide.

In some instances papules about the nose and mouth have a yellow crust composed of sebaceous matter from the follicles around which they are developed. On account of the appearance of the crust and the superficial infiltration of the papules the case might be mistaken for one of seborrhœa.

When uninfluenced by treatment the course of the eruption is chronic. In its early stage it yields slowly to treatment, but after long persistence it becomes very obstinate and requires local as well as general treatment. Its rapid and early disappearance is desirable, since permanent atrophic spots, like those of variola, remain after a lesion which has had a long existence. These spots are pigmented, and they become white only after several months. Pigment may also be deposited when atrophy has not occurred.

The diagnosis is generally easy, at least in the early stage. The eruption may be mistaken for the punctate form of psoriasis, or for certain cases of lichen pilaris and lichen planus.

In psoriasis the papules tend to form patches of an inch or more in diameter, and the scales are copious, silvery and imbricated.

Lichen pilaris is an inflammatory affection, chiefly of hairy regions, and is accompanied by intense pruritus, and the papules often form patches of thickened skin.

In lichen planus the papules are flatter, less uniform, more commonly

umbilicated, are always pruritic, and are more likely to lose their original character by confluence.

Moreover, with the syphilide we have the specific history and possibly the coexistence of other and distinctive lesions.

In addition to the small conical papules, there are others as large as peas, markedly conical, and having an elevation of about a line. They rarely appear in large numbers, or constitute an early general eruption, but are found at the time of a relapse mingled with the smaller papules, with pustules, or with an erythematous syphilide. They are more profuse on the back and buttocks than elsewhere. Their evolution is slow. Their bright red color soon fades, and they are quite apt to pustulate and form ulcers. They have no orderly arrangement either in groups or in circles. They yield more readily to treatment than the small papules, and seldom leave atrophic and coppery spots.

This form of papular syphilide may be mistaken for acne, especially on account of its appearance on the back. In acne the lesions are most abundant about the face and shoulders; they vary greatly in size, and are accompanied by more hyperæmia. Acne usually begins about puberty, and has a history of many recurrences.

The Lenticular Papular Syphilide.

There are two varieties of flat papules caused by syphilis—the *small* and the *large*. The *small papules* frequently occur in the form of a general eruption; this is rarely true of the large papules, which are usually seen concurrently with a small papular eruption, an erythematous, or perhaps a pustular syphilide. These two forms of papules present striking differences.

The small Flat Papular Syphilide.

The *small papules* begin as minute red spots, which rapidly increase until they reach a diameter of one-eighth to one-fourth of an inch, and an elevation of one-third to one-half a line. They are either round or oval, have flat surfaces, and rounded and distinctly limited margins. A few papules may be slightly depressed at the centre, but we do not find them surrounding follicular openings or pierced with hairs. In the early and general eruptions the papules are scattered, and show no tendency to fuse together. In relapses they are less numerous, and are more likely to be grouped and arranged in a circular form.

Mode of Distribution.—The papules are first seen about the shoulders, or at the back of the neck, or on the sides of the thorax, and are soon followed by others on the forehead at the margin of the hairy scalp, with perhaps a few on the face, about the nose and mouth, and on the anterior surface of the neck, rarely on the ears. At the same time, or soon after, the trunk is invaded, particularly the back, and the papules may follow the line of the ribs. As a rule, the supra- and infra-clavicular regions are wholly spared. The papules are copious in the hypogastric region;

but few are seen over the sternum; they are numerous over the anterior surface of the shoulders, but comparatively sparse on the outer surface of the arms, while they are more numerous on the inner or flexor surfaces, especially near the joints. Few are seen on the dorsum of the hands, while the palms are more freely supplied. They are unusually numerous on the gluteal regions, and are not infrequently found upon the penis, the mons Veneris, and in the inguinal region. They are more plentiful on the inner than the outer aspects of the thighs, and they either do not extend below the knees, or are sparsely distributed upon the inner surfaces of the legs and sometimes upon the soles. The face is spared by this syphilide more frequently than by the small miliary variety. It sometimes assumes the form of the so-called "corona Veneris," and occupies the forehead where the hat presses; it is seen upon the alæ nasi and about the mouth, and shows a marked tendency to development near the junction of the skin with mucous membranes. In rare cases the papules are very copious and hypertrophic upon the face, where they cause a peculiar expression, similar to that sometimes seen in true leprosy, which is called by some authors "syphilitic leontiasis."[1]

The color of the small flat papules varies in different regions of the body, and in different persons. In their early stage it is a pinkish-red, which soon becomes brownish or coppery; this change occurs first on the face, especially the forehead, then on the legs. In persons with delicate skin or feeble circulation the color is at first very light red, which changes to a light yellow tinged with brown. On the legs, the papules sometimes become of a purple color, owing to blood stasis or effusion. This condition may be general in broken-down or scorbutic subjects. In rare cases some of the papules on the face are of the color of the normal skin; they are always accompanied by others which are colored. On parts freely supplied with sebaceous follicles some of the papules are covered by a thin yellowish crust, which, being easily removed, exposes a shining surface with no evidence of ulceration. This crust, formed of epithelium and sebaceous matter, is generally coextensive with the papule.

There is a marked difference in the amount of scaling of the papules in different persons and in different parts of the body. The epithelium at the border of fully developed papules may be detached and form a fringe around them, as in the case of miliary papules. The scales on the surface of the papules are generally small, adherent, and not of the silvery white color of those in psoriasis. On surfaces where the epidermis is thick the papules are not infrequently lost in a desquamating patch; this is apt to be the case with late papular syphilides of the palms and soles, which have received the name "syphilitic psoriasis."

These papules are of softer consistence than the small miliary papules, and do not give to the finger the rough, firm sensation of the latter.

In exceptional cases a peculiar necrotic change takes place upon the

[1] A similar but more marked condition obtains also in certain tubercular syphilides.

surface of many of the papules. Their epidermis is thrown off either by scaling or by molecular decay, and is replaced by a dirty-brownish membrane of a fibrous nature, which is removed in fragments or in mass, and exposes a granular ulcerated surface. This seems to be a diphtheritic deposit. We have seen but few instances of this complication, and only in cachectic subjects.

Like all other syphilitic papules these disappear by absorption of their cell elements. Under the use of mercury the process is rapid; otherwise the papules slowly flatten, and are gradually replaced by copper-colored spots of pigment, which, though quite persistent, are not so obstinate as those left by the small miliary papule. Although internal treatment causes the absorption of the papules, it is almost powerless against the pigmentation left by them.

As a rule atrophy of the skin does not follow the absorption of the small flat papules, although in very chronic cases, minute depressed cicatrices result from absorption of some of the cells of the skin itself, as well as of those of the papules. This occurrence is more common on the face than elsewhere.

The invasion of this syphilide is usually subacute, but it may be hastened by excessive heat, hot baths, alcoholic drinks, or similar influences. It never appears as rapidly as the small miliary papular eruption, and is never accompanied by itching. A period of a week or ten days usually elapses before the eruption is complete The number of papules varies; when this syphilide is the first manifestation upon the skin, as it is in about twelve per cent. of the cases, the papules are very numerous, so that the tip of the finger can scarcely be laid upon the skin without touching one or more of them. This may be true also in a first relapse following an erythematous syphilide.

Although the eruption may be less copious it is usually widely distributed. Relapses are quite amenable to treatment. Uninfluenced by mercurials this syphilide is very indolent; while some papules are undergoing resolution, new ones appear, so that all stages of development may be represented in a single case. Treatment quickly dispels the eruption and influences the copiousness of succeeding lesions. This fact is particularly noticeable in private practice, where patients seek advice early; with careless persons, on the contrary, a relapse may be extensive and profuse.

A relapse of this syphilide may be expected at any time within two years after infection. In one occurring after the sixth month the papules are limited in number and extent, and their color is generally darker than that of an early rash. A few papules may appear over the trunk, upon the face and on the inner aspect of the limbs near the joints, either scattered or in a ringed form. In relapses of this syphilide the papules tend to appear on the elbows and knees, sometimes in the form of circles or segments of circles, and perhaps accompanied by papules, either scattered or grouped in rings, about the shoulders and trunk. Psoriasis presents certain similar features and is particularly prone to appear in these regions.

The syphilide may be found upon the elbows alone; it is rather unusual to see it upon the knees and not upon the elbows. Generally a few papules are scattered over the body.

Careful examination of the patches shows that the rings are formed either by fusion of the papules or by their interrupted distribution. With care it is seen that the basis of the eruption is papular, and that there is no morbid change in the encircled area of skin. This is quite different from the condition in psoriasis, in which a papule increases centrifugally, until it reaches a diameter of an inch or more, when evolution takes place at the centre of the lesion, the periphery remaining unchanged.

Other points of distinction are yet to be spoken of.

Coexisting Symptoms and Lesions.—When this eruption is the first dermal manifestation, it is always accompanied by several others, such as buccal and pharyngeal lesions, swelling of ganglia, alopecia, pains of various kinds and perhaps iritis. The latter affection occurs more frequently with this than with any other form of papular syphilides. Having a marked tendency to relapse at any time during the secondary period, this syphilide may coexist with any of the manifestations peculiar to that period.

Diagnosis.—General eruptions of this syphilide are so peculiar in the distribution, shape, and appearance of the papules, and are so often accompanied by other syphilitic symptoms that the diagnosis is usually clear. In some sparse eruptions which are especially chronic and in which papules are extraordinarily scaly, there may be some doubt between syphilis and psoriasis in its guttate stage. The latter disease is essentially scaly and the patches are not uniform in size; it generally begins in early life and recurs in subjects apparently healthy; its scales are silvery, imbricated and plentiful, while those of syphilis are of a more sombre hue, are not imbricated, and usually not very copious. In psoriasis there is a history of numerous similar eruptions, in syphilis there may be relapses of similar papules, but they are likely to be less copious and more localized with each succeeding outburst. In syphilis there is the history of the initial or other lesion and perhaps the coexistence of other symptoms and usually a condition of ill health. Arsenic cures psoriasis but not syphilis; syphilis is curable by mercury, an agent which is powerless in psoriasis.

In those cases in which the papules are developed in a ringed form upon the elbows and knees, the general distinctions just given apply. On examination of the rings or segments of rings they are found to be formed by the fusion of individual papules. They are less scaly, more copper-colored, and more sharply defined than the rings of psoriasis, which are formed by absorption of the centre of a circular patch and which continue to increase in diameter.

The large Flat Papular Syphilide.

The large flat syphilitic papules are either round or oval and have a diameter of three-eighths to one-half of an inch, and exceptionally of fully

one inch. They begin as minute spots, which as a rule rapidly increase. Their surface is flat, but occasionally there is a well-marked sloping depression at the centre. They are distinctly elevated, with rounded, sharply defined edges. A few small adherent scales lie upon the surface, and at the margins of the papules an epidermal fringe or rim may be seen. They generally have a decidedly red color, which soon becomes coppery. In rare cases they are bright crimson red, and exceptionally they have a deep purplish-red tint. They run a chronic course, and cause neither pain nor itching. The surfaces of the papules in rare instances undergo superficial necrosis and become covered with a thin, dirty-looking diphtheroid membrane. Such an occurrence is always indicative of a depressed condition of the system, and of a severe form of the disease.

This eruption occurs under a variety of circumstances. In some instances a few papules may be found with an erythematous syphilide or an eruption of small flat papules on the forehead, the neck, and about the genitals. In rare cases this syphilide is the first eruption, and it then resembles the small flat variety in its mode of appearance and its course. It occurs upon the palms and soles with about the same frequency as the latter, and in these regions it may develop the so-called palmar and plantar psoriasis. When occurring as a first general rash, this syphilide shows no tendency to a circular arrangement, and, although the papules may be more closely aggregated on such parts as the face, neck, shoulders, inguinal and gluteal regions, and near joints, they do not coalesce except in parts continuously irritated. Owing to irritation their area sometimes becomes greatly increased.

In general this syphilide belongs to the middle and late periods of the secondary stage, and is with good reason classed by some French authors as an intermediary syphilide. While, therefore, it is rarely observed as the first rash, it is often met with as late as the second and even the third year of syphilis. As a rule the earlier its appearance the more copious is the eruption. Appearing on the subsidence of a first general rash, it may consist of quite a large number of papules scattered irregularly over the body; such a rash may be composed of less than two hundred papules, or even one third that number. Provided treatment is followed relapses are composed of even a more limited number of papules, which then show a tendency to appear on the palms and soles, on the face, abdomen and near joints, seldom, however, in an annular form. About the beginning of the second year, sometimes later, the distribution of this syphilide is even more limited. A few papules appear on the arms or palms, run a chronic course, and are followed by a few on the abdomen, thighs, or forehead. In late eruptions, where the papules are so few, they are often much larger than those of earlier stages, though they rarely exceed a diameter of one inch. In these cases the term papulo-tubercle is perhaps more strictly expressive of the character of the lesion.

When seated on the face and on parts freely supplied with sebaceous follicles, as in the case of the small flat papules, thin, yellowish, non-adherent crusts are sometimes observed on the surfaces of these papules.

Not infrequently the margins of some of them become elevated into distinct rims. Again an annular crust, of a dirty yellow color, may occupy the periphery of a papule. Sometimes this rim is so yellow as to give the impression that it is composed of pus, but its removal shows no ulceration beneath, and no pus-cells can be found in it. Exceptionally superficial ulceration may occur on some of the papules, which, in broken-down subjects, are sometimes entirely converted into ulcers. Sometimes, on freely movable parts, superficial or deep fissures may form.

A rare metamorphosis of this syphilide is sometimes seen. The papules become somewhat larger and more elevated. At first their surface is slightly granulated, the appearance suggesting an extraordinary swelling of the *papillæ cutis.* The surface soon looks warty and resembles a raspberry. The prominences are smooth and red, and vary greatly in size, and between them there may be slight ulcerations, from which escapes a secretion, which dries and forms a crust. Sometimes, when copious, the secretion has a sickening odor. When thus hypertrophied these papules may be elevated to the extent of two or three lines or more : their surface may be level or markedly rounded. This condition is most prone to occur upon the face, on the scalp, about the shoulders and near the genitals. When thus changed this syphilide has received the names "framboesoid," "vegetating," and "verrucous." The extent of the process varies, in some cases being limited to a few papules.

A similar feature is sometimes observed on the surface of flat condylomata, and in a more hypertrophic form on some syphilitic tubercles.

Upon surfaces that are in coaptation or covered with moisture, as between the toes, around the navel, at the margin of the nostril, and on the perinæum, these papules may become superficially excoriated or transformed into condylomata lata. This is well seen in some cases of papules on the thighs of women. Those on the lower part are simply scaly, those near the genitals are superficially eroded and emit an offensive secretion, while those on the vulva are truly condylomatous.

Under mercurial treatment the papules composing this syphilide are, as a rule, slowly absorbed, a more or less deeply pigmented spot being left. The earlier treatment is begun, the less in degree will be the resulting pigmentation. The later and more scattered eruptions are often more rebellious. They remain indolent, causing more or less desquamation, in which feature, as well as in their color, they sometimes resemble psoriasis.

Not uncommonly, in the retrogressive stage of these papules, particularly in late eruptions, absorption of the centre of the lesion occurs, leaving a ring which may be scaly, and which is itself finally absorbed without showing any tendency to centrifugal increase.

When occurring as the first general eruption, this syphilide coexists with the numerous symptoms peculiar to the early period. When of later occurrence it is not infrequently accompanied by pustular eruptions on hairy parts, iritis, alopecia, onychia or perionychia, condylomata and often by

cachexia. When of very late appearance it may be the only manifestation of the disease, and it often recurs in a limited degree, to be finally replaced by lesions of the tertiary period.

Prognosis.—The early appearance of this syphilide indicates an active and severe form of syphilis, and calls for prompt and careful treatment, otherwise the supervention of cachexia and of tertiary lesions may be expected. A relapse of the eruption indicates continued activity of the disease. As to the eruption itself, its disappearance is merely a question of time and of treatment.

Diagnosis.—A general eruption of this syphilide presents such distinctive features that errors in diagnosis are scarcely possible. Where it occurs in limited numbers and runs a chronic course, particularly when there are several outbursts of papules at short intervals, no other lesions being visible, it may be mistaken for psoriasis. The question may be still further complicated by the appearance of papules upon the elbows and knees. A distinction can, however, generally be made by attention to certain points. In syphilis the papules have a uniform size not seen in psoriasis; in psoriasis the spots are likely to blend and form gyrate patches, while in syphilis they gradually pass away after reaching maturity. The color of the psoriatic patches is pinkish or deep crimson; that of the syphilitic papules is deep brown or dull crimson. It must be confessed, however, that a diagnosis must, in some cases, be established by other features. The scales of the syphilitic papules are not as copious and usually not as silvery as those of psoriasis; they are simply more or less adherent flakes of epidermis. By scraping a patch of psoriasis much epidermal debris is collected, and there is exposed either a shiny, thin pellicle covering the patch, or a granular bleeding surface. Similar treatment of a syphilitic papule gives much less epidermal debris, and shows that we are tearing a solid tissue. In the ringed form, from absorption of the centre of the papules, the resemblance to psoriasis is sometimes striking, but the scantiness of the scaling, the uniformity in size of the rings, and their stationary condition are in contrast with the abundant scaling, the varying size of the rings and the tendency to centrifugal growth and fusion seen in psoriasis. The sharply defined border of syphilitic papules is seldom observed in psoriasis. Moreover, in syphilis there is a history of some other symptom or lesion, or there may be other specific lesions on the body at the time. There may also be cachexia in syphilis, while patients with psoriasis are generally remarkably healthy. The age of the patient is sometimes a point of importance. As a rule psoriasis begins in early life, and only exceptionally after puberty. The syphilide is more common after puberty on account of the more frequent occurrence of syphilis after that period. Finally, mercurial treatment has no effect upon psoriasis, while it is especially beneficial in this form of syphilide.

Scaling Papular Syphilide of the Palms and Soles. (Syphilitic Psoriasis of the Palms and Soles.)

Papular syphilides of the palms and soles are often peculiar and difficult of diagnosis. They may occur at any time in the secondary period, or may coexist with tertiary lesions; they run a chronic course, unaccompanied by pain and itching, and are generally rebellious to internal treatment.

The erythematous syphilide is often developed on the palms in scattered spots, which have a deep red color, are slightly elevated, and covered by a layer of epidermis. In favorable cases, subjected to treatment, scaling soon occurs, leaving a smooth, rosy, slightly depressed surface, surrounded by an undermined rim of epidermis. The mode of development of these spots, when not treated, will be described later.

In a general eruption of flat papules a few sometimes occur in the hollow of the palms and soles. They are small, decidedly elevated, and have a deep red or purple color. Exceptionally they are very numerous in the above regions. They disappear under treatment, but, if left to themselves, they become chronic.

In some cases, usually early in the secondary period and coexisting with dermal or other manifestations, or perhaps being the only evidence of syphilis, a varying number of small, firm, hard, colorless elevations or minature corns appear on the palms. Usually there are about a dozen on each hand; there may be only two or three, or they may be much more plentiful. They cause neither itching nor pain, but are in rare instances tender under pressure. They run an indolent course, and disappear chiefly by scaling. They are composed of dense masses of epidermal scales, which can be dug out with a knife. Usually they are of little importance.

The well-marked scaling syphilides of these parts may appear as early as the third month of syphilis, at the time of a relapsing eruption, or even at a much later period. They usually begin during or at the decline of an eruption of the flat papular syphilide, but they may be developed independently. In the hollow of the palm or sole a few flat papules of a diameter of one or two lines appear. At first the elementary lesion can be distinctly recognized, being elevated, sharply outlined, and of a deep red color. If treatment is neglected they soon become flattened, and lose their color and well defined margins. Meanwhile other papules may be formed on the borders of the palms, which likewise soon lose their characteristics. They all increase in size, and may form irregular patches by fusion. In severe cases the entire palm and the fingers may be invaded, when we find either a number of small patches or a large one in the hollow of the hand, with smaller ones around it.

These patches constitute the true scaling syphilide of these parts, and are called by most authors "syphilitic psoriasis of the palms and soles." By careful examination we find general thickening of the epidermal layer, with much scaling and redness of the surface. The papules are frequently seated in the furrows of the hand, which, in severe cases, may be con-

verted into superficial fissures or "rhagades." When thus developed, this syphilide may persist for months or years, causing annoyance by the desquamation and the feeling of stiffness produced, and giving rise to pain when fissures are formed.

In some cases the disease creeps slowly up the fingers until it reaches the nails, which then become thickened and brittle. In some instances one or more well marked rings of papules occur on these localities. If not cured, these soon coalesce and form a patch, which runs the usual course.

As a rule, the affection spreads by the formation of new distinct papules at the border of the original patch. Exceptionally when a large patch has formed in the hollow of the hand, the disease extends by a crescentic margin, a line or more in width, which is distinctly elevated, and, as it invades healthy tissues, the parts left are scaly and subacutely inflamed. In this way the whole palm or sole, with the corresponding surfaces of the fingers or toes, may be involved. Sometimes the lesion progresses in this crescentic manner up the inner side of the foot towards the ankle, and around the radial or ulnar borders of the hand, generally not invading the dorsum and not passing the line of the wrist. The lateral surfaces of the fingers may likewise be affected.

Several years are occupied by this process, and as a result we sometimes find general cornification of the dense parts of the epidermis with thickening of the thinner parts. The dense, hard stratum of epidermis covering the sole, and rather less frequently the palm, often becomes perforated with minute holes, while from it may be dug hard masses of epidermis having a chalky appearance. This affection is called by some "*Syphilis cutanea cornea.*" All of these forms of epidermal thickening are very often wholly uninfluenced by internal treatment, and always require vigorous local measures.

To the question whether syphilis produces genuine scaling eruptions we must answer that, while they may be scaly and no infiltration of granulation cells can be found in their later stages, all syphilitic scaling eruptions begin as a true papular syphilide. Owing to the fact that the integument of the palms and soles is so firmly bound down and is subject to such constant compression and attrition, and also to the fact that the cell-infiltration in these regions is not limited to the vicinity of follicles, the lesion becomes spread out into extensive patches. Probably the specific feature of the process is the deposit of cells, which are subsequently absorbed; resulting from this is a low grade of inflammation and a chronic epidermal cell-increase. Therefore, while the papular lesion is characteristic of syphilis, the scaling which follows is in all essentials similar to that of psoriasis. The application of the term psoriasis is, however, objectionable. Moreover, the result of treatment shows that the papular affection is influenced by mercury, while the scaling condition is unaffected.

The diagnosis of the early papular syphilides of the palms and soles is generally easy, since neither eczema nor psoriasis produces similar appearances. In their early stage the color and situation of the patches indicate their nature, while the history of the case and the coexistence of other

syphilitic lesions furnish additional evidence. When the patches are diffuse, their resemblance to psoriasis is almost perfect. The latter, however, is often more scaly, is usually more scattered, and is scaly from the first, or begins as rosy red patches and scaling spots.

It is always important to get the patient's idea of the manner in which the affection began. In cases of psoriasis similar conditions have been observed elsewhere on the body. Psoriasis usually begins in early life, the syphilitic affection generally occurs after puberty. It is very rare indeed for psoriasis to appear exclusively in these localities; when seen here it may usually be found elsewhere, especially on the elbows and knees. Some authors mention as a point of distinction that the scales of psoriasis are silvery, while those of the papular syphilide are dull and dry. We have seen the scales of the specific affection silvery, resembling asbestos. In many old chronic cases the diagnosis cannot be made from the study of the eruption itself, but only after a careful consideration of its history and of the case in general. Certain chronic palmar eczemas resemble the scaling syphilide. Usually there is more thickening in the former, and there is always much itching. It is more diffuse than the syphilitic affection, and has a tendency to invade contiguous parts.

The Pustular Syphilides.

These syphilides constitute an important group of eruptions, which, though less common than the erythematous and papular forms, may appear at the earliest stage of syphilis, at any time in its secondary period or even late in its tertiary period. They vary in severity from a mild and ephemeral eruption to one of the gravest character. The size of the pustules varies from that of a pin's head to that of a ten-cent-piece; they may be acuminate, globular, or flat; they are generally round, but sometimes oval; and they are surrounded by a dull coppery-red areola. Some have a well-marked papular base, the pustule being a minor part of the lesion; beneath all of them there is more or less infiltration. They may begin as papules or as distinct pustules. They vary greatly in number, sometimes covering the entire body, or, on the contrary, being limited to special regions. They show a marked tendency to appear on localities rich in hair and sebaceous follicles, while certain ones are prone to be developed in particular regions. The pustules may be either scattered or in groups, and are almost always symmetrically placed. Relapses of this syphilide are common; the earlier the eruption the more rapid is its invasion and the more numerous are its lesions, while later eruptions appear slowly, in limited numbers and with a marked tendency to localization.

Some pustules become encrusted more quickly than others; as a rule the secretion of the large ones dries sooner than that of the small. In all cases the size and form of the crust correspond to those of the pustule. The crusts of the small pustules have a greenish-brown color, those of larger and later ones a greenish-black color, similar to that of an oyster-shell. They are usually of firm consistence, and somewhat adherent.

Their surface is rough and sometimes distinctly laminated, and may be flat or conical. Their shape may be round, oval or like a horse-shoe. Under small crusts there is usually little, if any, ulceration, and their removal exposes a well-marked papule; under larger ones is an ulcerating surface, more or less deep, of a grayish-red color, covered with a quantity of thick brownish-yellow pus.

The earlier eruptions, being papulo-pustular, usually cause no destruction of the skin, while the late ones, being extensive, deep and localized, leave cicatrices, which remain pigmented for a long time, but finally become shining white.

Though the visible changes are pustulo-crustaceous, the base of all of these lesions consists of an infiltration of small round granulation cells similar to that of papules. In the early history of these lesions molecular decay and pus formation seem to be in proportion to the cell-infiltration, the destruction of tissue very often being limited to the death of the new cells, since perceptible change in the skin itself seldom exists. In other cases the derma melts away with the infiltration, leaving nothing of the original framework.

The Acne-form Syphilide.

This syphilide is thus called because, like *acne vulgaris*, it attacks the hair and sebaceous follicles, and because it is a papulo-pustular lesion. It consists of conical or slightly rounded pustules varying in diameter and elevation from one-third of a line to a line. Sometimes the pustules are as small as a pinhead. The pustules may form the whole eruption, or they may be mingled with miliary papules or the erythematous syphilide.

When appearing at the beginning of the secondary stage as a general eruption, they are usually accompanied by fever, which sometimes reaches the highest point observed in syphilis, and by other symptoms peculiar to that stage. The mode of invasion may be rapid or subacute. In the former case the small red spots rapidly become papular and then pustular, the lesion reaching its full development within twenty-four or forty-eight hours. In such cases the pustules are generally numerous and scattered over the whole body. In the subacute form they appear slowly, and for several days may look like papules, on the apices of which a small quantity of pus slowly forms. The lesions are less numerous, more localized, and more likely to be grouped than in the acute form. The fever in the latter mode of invasion often rises abruptly, and continues at a high grade for several days, when it may fall abruptly or slowly to a point between 99° and 101°. In the subacute form it usually rises slowly to 100° or 101°, and may remain at or about that elevation for several weeks.

The color of the base of the pustules is at first bright red, but, as in the case of miliary papules, it soon becomes dull brownish-red. This change first occurs on the legs and face, and upon the former the pustules are sometimes accompanied by hemorrhagic effusion. The apex of the pustules is at first yellow, but is soon transformed into a greenish-brown,

slightly adherent crust. In many cases, particularly of small pustules, the purulent apex is thrown off, leaving a papule, which may be surrounded by the detached rim or collarette already described as a feature of the papular syphilides. Subsequently the papule is absorbed, leaving a small pigmented spot. In cases not treated, and especially in badly nourished subjects, the pustules become small ulcers. Their base extends, being very hyperæmic, and the crust enlarges with the extending ulceration. It may thus happen that some of the pustules run together, although there is no general tendency to fusion; and they may be distributed in the form of complete or partial rings.

This eruption generally begins about the face, scalp, back of neck, and shoulders, and may thence invade the trunk and extremities, being more copious on the scapular, sternal and gluteal regions, and on the outer aspects of the limbs. We frequently find syphilitic papules or erythematous patches on the inner surface of the arms and legs and on the anterior aspect of the trunk. When the pustules are scattered over the entire body, they may be closely crowded together or separated by marked intervals. The first eruptions are always more copious than relapses, in which the pustules appear possibly grouped in patches or in a ringed form about the face, scalp, or shoulders, usually having been preceded by an erythematous or papular syphilide.

This eruption, which generally appears from the third to the sixth month of the secondary period, may run a chronic course, occupying several months in the development and complete disappearance of the lesions. Having run its course it usually does not relapse in its original form, but in the form of larger and deeper pustules or tubercles.

Commonly the skin is not destroyed, the pustules merely leaving small brown spots which disappear in a few months. The hair of the scalp falls from the affected follicles, but is usually replaced; exceptionally the follicle is destroyed, and a minute cicatrix results.

The prognosis of this syphilide is not so good as that of other earlier forms. The eruption itself is troublesome, and the general health is rather more frequently impaired after this rash than after others.

The concomitant symptoms vary with the date at which the eruption appears. If it is the first rash it is of course accompanied by symptoms and lesions peculiar to the period of invasion; at a later period it may coexist with alopecia, onychia, mucous patches, iritis, neuralgias, nervous symptoms, and perhaps lesions of the bones and testes.

Diagnosis.—The history of the case, the usual presence of other lesions, and the appearance of a generally distributed pustular syphilide preclude the possibility of mistake. Acne vulgaris resembles it in certain particulars. Acne, however, generally begins about puberty, and is confined to the face and back and rarely attacks the hair of the scalp. It is never attended by systemic reaction. Moreover, it presents papules, pustules and comedones, which have no uniformity of size: some are indeed miniature furuncles, and all have at some time a more or less hyperæmic areola. The pustules retain their character indefinitely, and, on pressure, pus ex-

ules from a cavity, whereas in the syphilitic lesion, the pus surmounts a papular base. Acne attacks exclusively the upper parts of the body; syphilis may be general.

In its papular stage the pustular syphilide, when grouped, may resemble lichen, the distinguishing points of which have been given in describing the miliary papules.

Some French writers have called this eruption a "vesicular syphilide," since the purulent contents of the pustule are occasionally so thin as to resemble serum. About the face, and especially the chin, a few well-marked vesicles may, in rare cases, be seen. They are very minute, may be grouped in a ringed form, and they either become pustular or they flatten, scale, and become pigment spots. Usually pus is present from the first.

In exceptional cases pustules are found on the sides of the thorax along the line of the ribs, presenting some resemblance to *herpes zoster*. They are always symmetrical, whereas herpes is rarely so. The syphilitic lesions are not preceded nor followed by pain as is the case in herpes. In the latter affection, moreover, the lesions are generally limited to the intercostal spaces and, if found elsewhere, follow the course of some nerve, whereas in syphilis the localities are quite definite and other specific lesions may coexist.

The Variola-form Syphilide.

This eruption is much less common than the acne-form variety, and is interesting chiefly in its resemblance to varicella and variola. It is rarely the first eruption of syphilis, but appears after any of the early rashes.

It consists of round, superficial pustules, the epidermis covering the pus being rather thin. It begins in the form of red spots, which within a day or two become pustules with a diameter and an elevation of one or two lines. These pustules are surrounded by a limited, deep-red areola, and there is evidently not very much thickening at their bases. When fully developed they flatten slightly at the centre, some presenting marked umbilication. The epithelial cover of the pustules slowly shrinks, becomes darker, and finally, in a few weeks or sooner, deep, greenish-brown crusts, about half a line in thickness, are formed, which adhere somewhat closely to a slightly exulcerated base. In general the pustules run an indolent course and do not increase much in size, but in aggravated cases they become very large and may run together. They may be disseminated over the body or grouped in particular regions, and they sometimes form circles and parts of circles.

These pustules have no tendency to a follicular origin, but are found on parts where the skin is soft and delicate, frequently like other syphilides, upon the forehead and at the line of junction of skin with mucous membrane. They are generally sparse on the outer aspect of the extremities, more numerous on the anterior of the trunk, and often abundant near the genitals and in the inguinal region. In rare cases they are found on the

palms, and still more seldom on the soles: we have seen but one instance of the latter, and very few such cases have been reported.

On account of the large size of the pustules this syphilide has been called by some French writers "*pemphigus syphiliticus*," and, owing to its occasional development upon the palms, it has been claimed that pemphigus may occur here in acquired as well as in hereditary syphilis. The large pustules which may form in these regions in acquired syphilis are not, however, pemphigoid bullæ. The thickness and firm attachment of the skin of these parts prevent elevation of the epidermis to a great degree; hence the pustules spread out and run together, thus coming to resemble bullæ. While admitting the rare occurrence of pemphigus in acquired syphilis, we do not believe that it is developed upon the palms and soles.

The mode of invasion of this eruption is generally rather slow, and is seldom accompanied by very pronounced febrile movement. It begins about the face and thence spreads slowly over the body in the course of one or two weeks. The crusts, which form when the pustules reach their height, fall off, leaving pigmented spots. Sometimes new crops rapidly succeed old ones, so that an eruption may last several months. The eruption is greatly influenced by treatment; although its full arrest is difficult, future outbursts may be prevented.

We cannot say from our own experience how such an eruption, if left to itself, might progress, but it would probably ulcerate deeply and induce a condition of marasmus. Under such circumstances, when the eruption seems to assume a malignant type and is accompanied by cachexia, we have an illustration of a somewhat rare form of syphilis called by the French "*precocious malignant syphilis*" (*syphilis maligne précoce*) or "*galloping syphilis*" (*syphilis gallopante*). Any form of pustular syphilide may assume these characters.

A very limited eruption of this syphilide sometimes occurs on the face or body, or symmetrically on the arms. Such a rash runs a slow course, usually without much fever, and generally occurs in cases where treatment has been stopped too early.

This eruption rarely appears earlier than the third month, and may be seen as late as the second year of syphilis. With it may be found lesions peculiar to this period, and frequently a sparse papular eruption, mucous patches, or condylomata lata.

The diagnosis of this syphilide is generally easy. Prodromal symptoms observed in smallpox and varicella, such as backache and eruptive fever, are noticeably absent, and there is much less general disturbance. In the acute eruptions there is great heat and tension of the skin, and at the outset small shot-like papules may be felt, which rapidly pustulate. More or less diffuse patches of hyperæmia, accompanied by sensations of itching and burning of the skin, are present. Variola progresses so rapidly that its character is perfectly clear after the second day. The slow development of the syphilitic eruption, and the absence of subjective symptoms are distinctive points in the diagnosis.

The Impetigo-form Syphilide.

This syphilide, like the preceding, is a pustulo-crustaceous eruption, and attacks the more superficial layers of the skin, differing from it, however, in the fact that the lesions are not so distinctly circumscribed, but have a tendency to involve a much greater surface and often to assume a serpiginous character.

The resemblance of this eruption to simple impetigo is in the grouping of the pustules, in their fusion, and chiefly in the somewhat similar appearance of the crusts. The pustules of the specific eruption are usually much larger and flatter than those of the simple form, and their resemblance is hardly so close as to warrant the term impetigo-form applied to them. They dry so quickly into crusts that the pustular stage is soon lost.

This syphilide almost never occurs as the first exanthem, but rather during a late relapse, its earliest appearance being at the decline of the initial rash, and its usual time of evolution being about the middle or latter part of the first year of syphilis. In cases not treated, it may occur during the second or even the third year. Most of the pustules have a peri-follicular origin, and are found on hairy parts, rarely on the hands and feet. When this syphilide occurs early, the pustules are rather discretely distributed over the whole body; when it appears later, they are distinctly localized and grouped, the eruption in the latter case being called *impetigo syphilitica conferta*.

The pustules begin as circumscribed red spots which rapidly become elevated by yellow pus seated beneath the epidermis. These spots, few of which are papular, are sometimes small and round, and again are very large and irregularly oval. After the effusion of pus, each patch becomes covered by a dark-brown adherent crust. The crusts of several pustules may run together, their mode of formation being indicated by incomplete lines of separation. Their surfaces are usually flat, their edges rounded and in relation with the margin of the ulcer, and they are surrounded by a narrow dull-red areola.

Upon the face, at the margin of the hairy scalp, in the scalp itself, about the alæ nasi and commissures of the lips, upon the chin and in the beard, these crustaceous pustules run together and form patches, usually not more than two inches in diameter. In the hairy parts the outline of the incrustations is generally not at all regular. Only in late eruptions do the pustules unite and form large patches. On the trunk, a few may be seen over the sternum and in the hypogastric, inguinal, and gluteal regions. On the anterior aspect of the forearms, and more rarely of the thighs, some may also be found, and here they are likely to be grouped and to increase rapidly in size, a pustule sometimes reaching a diameter of an inch or more within two weeks. The pustules usually retain their circular form as they increase in size, but sometimes they become kidney-shaped; this peculiarity is noticed rarely on the face, but more commonly on the forearm.

In some untreated and broken-down cases, these pustulo-crustaceous

lesions take a serpiginous course, invading the superficial layers of the derma, generally of the upper extremities. They progress by a ring of ulceration, covered by a crust and inclosing an area of skin already healed. This ring of ulceration is prone to extend in a circular form on the face and in an oval form on the arms. When the patch is a few inches in diameter, the aspect of the original lesion is wholly lost. We then find a distinctly raised ring, one to three lines in breadth, of a yellowish-brown or black color, which incloses a round spot of slightly hyperæmic skin. The ring gradually extends until the whole forearm and part of the arm, the greater part of the face, or the entire sternal region may be invaded. Even in the worst cases, surprisingly little alteration of the skin follows this process, and, in many, no change whatever is apparent.

Besides this superficial form of the serpiginous syphilide there is a similar lesion which attacks the tissues more deeply and induces destruction and cicatrization of the skin. This latter eruption we shall call the *serpiginous tubercular syphilide*. The *superficial serpiginous* syphilide may also begin as a variola-form pustule, and may persist many months or even years. While it usually attacks large areas superficially, it may also attack deeper portions of the skin. In the latter case, the areolæ of the pustular ulcers become thickened and more red, and the crust becomes more elevated and uneven. Underneath the crust, ulceration progresses, and, instead of the superficial grayish-red ulcer usually found, there is a deep and sharply cut excavation, with a red, uneven surface, freely covered with secretion. When the eruption takes this course, it has been called *syphilitic impetigo rodens*, but there is no reason to consider it a distinct eruption rather than a complication.

The ulcerations vary in size; in neglected cases, we have seen them large and deep on the scalp and in the beard, and more superficial upon the forehead. In some cases the alæ of the nose may be lost. The destruction of tissue is generally greater about the face and head than elsewhere. Severe cachexia may occur coincidently with this eruption and other serious lesions may follow, until we have an instance of malignant precocious syphilis, which is attended by much suffering and may even imperil the patient's life. Usually, however, now that syphilis receives early and careful treatment, this eruption does not assume these destructive features; healing takes place under the crusts, which are then thrown off, leaving a smooth, deep-red surface, which may be slightly scaly and deeply pigmented for several months. On raising the crust from a fully-developed patch on the arm, we usually find a smooth, reddish-gray ulcer without undermined edges; on the face, however, the surface is likely to be uneven and frequently covered by little papillomatous elevations, over which the crusts are accurately fitted. This warty appearance, which is seldom seen on hairy parts, is the result of an increased cell-infiltration around follicular openings. These uneven surfaces gradually become flat and lose their color.

The course of this eruption is usually very chronic. On its invasion the pustules may be very numerous, or a few only may first appear on the

head. Thus for long periods new pustules may appear as old ones fade. In other cases, a general, extensive rash may run its full course in a comparatively short time.

Coexisting lesions are those peculiar to the period at which the eruption appears. Rarely being an early eruption, we seldom find it coincide with the erythematous syphilide, except during a relapse of that lesion. It is not uncommonly found, in a sparse and limited form, with, or at the decline of, one of the papular syphilides. Condylomata lata are frequently present on regions which this eruption attacks, and very often it is continuous at the angle of the mouth with a mucous patch of the lip or cheek. Since it may occur at any time in the secondary or tertiary period of syphilis, any of the intermediary and many of the late manifestations of this disease may be present with it.

This syphilide most commonly attacks persons in a debilitated condition, those who have some organic disease, or who have neglected early treatment. The prognosis must, therefore, be based upon the patient's general condition as well as upon the eruption itself. The presence of the eruption, however slight, is an indication for careful and continued treatment, and for attention to the patient's nutrition and hygiene.

This syphilide may be mistaken for impetigo in its disseminated and in its confluent form. The lesions of impetigo retain their pustular character much longer than do those of syphilis. They are attended by heat and itching of the skin, and have an inflammatory areola; they are much more uniform in size than are the pustules of syphilis, and their crusts are of a greenish-yellow color, instead of the greenish-black of syphilis. The acuteness of invasion in the case of large patches of the simple eruption is in striking contrast with the slow, painless, and indolent character of the syphilide. These features, considered in connection with the history of the case, make the diagnosis clear.

The Ecthyma-form Syphilide.

There are two varieties of this syphilide, superficial and deep. The superficial is the earlier eruption, appearing at any time during the first year of syphilis, and is usually composed of a greater number of pustules. The latter resemble those of non-specific ecthyma in having a solid, elevated base, surrounded by a crust, and in their tendency to ulcerate. The deep form may be an intermediary lesion, or even a rather late one. The pustules of the superficial form vary in diameter from one to three lines. They begin as slight red elevations of the skin, which, in a day or two, become small, conical pustules. The pustules gradually increase in size, and crusts are formed by desiccation of the pus. The crusts grow in proportion to the bases of the pustules, and their yellow color soon becomes brown, which is rendered still darker by particles of dirt, and sometimes by admixture of a little blood. When fully formed their color is yellowish-brown, and their shape round or conical. As the pustules increase in size the crusts become flattened and even depressed at the centre. The

base is at first of a bright red color, which soon becomes a dull reddish-brown, and it is surrounded by an abruptly limited areola. Beneath the crust, which is seldom firmly adherent, is an ulceration, involving the superficial layers of the derma, and having a smooth floor covered by a grayish-red film of molecular detritus, bathed in thick pus. After commencing treatment, and with improvement in the general health, the base becomes less dark, and contracts; the areola fades; the crust becomes hard, dry, and very adherent, and, if removed, a smooth red surface is seen, sometimes slightly papillated. This surface may be again covered by a thin crust made up chiefly of epidermis, which in turn falls off, leaving a smooth, reddish-brown patch, or a slightly elevated, papular, and scaly surface. Under unfavorable circumstances the areola and the base are redder and more extended, pus is secreted in greater quantity, the ulcer increases in depth and extent, in extreme cases reaching a diameter of one or two inches, and perhaps several ulcers may unite. In such cases the syphilis assumes a malignant form, and there is much systemic prostration. The course of such an ulcer is similar to that of the impetigo-form syphilide when the latter becomes serpiginous.

The superficial ecthyma-form syphilide begins by the development of pustules either in a disseminated or an aggregated form, about the scalp, particularly at its junction with the face and neck. They may appear gradually and without much febrile movement, or in a manner quite the reverse. Soon after, other portions of the body, such as the anterior surfaces of the legs and forearms, the trunk, and the inguinal and gluteal regions, may be invaded. In some cases this is accomplished in a week or ten days; in others small crops of pustules succeed each other at short intervals, and fully a month may be occupied in the complete development of the eruption. When this eruption occurs early, and especially in cases inefficiently treated, the lesions are apt to be extensive and copious; occurring later, it may be limited to one region, and may even be unsymmetrical. The pustules may be isolated or grouped in patches, or in the form of circles or parts of circles. They may or may not leave cicatrices.

The deep variety of the ecthyma-form syphilide is usually a rather late lesion, but it is sometimes precocious. In the latter case it may be very malignant, and it is then the expression of profound syphilitic cachexia, thus constituting another instance of the "galloping syphilis" of the French. This syphilide begins as a papulo-tubercle. A round or oval elevation appears, upon which a quantity of yellow pus soon forms, and this becomes thicker and dries into a crust of a brownish-black color, owing to the effusion of a little blood. When fully formed, we find an incrusted papulo-tubercle, with a diameter of one-quarter to one-half of an inch. The firm, deeply-seated base has a dark coppery-red color, and is surrounded by an areola of a similar hue. The crust is generally rounded or conical, but may flatten out as it extends. A deep, punched-out ulcer, with sharply-cut edges, and a smooth, grayish-red surface, covered with a foul, rust-colored pus, underlies the crust, which can be removed with little force. In some cases the crust fully covers the ulcer, in others it is

smaller, and is surrounded by a ring of ulceration. If untreated, the ulcer continues to increase, and may become serpiginous, invading extensive surfaces. Several ulcers may merge together. Influenced by treatment, the areola fades, the base contracts and becomes slightly wrinkled, and a granulating surface is found beneath the crust, which becomes hard and adherent. In some cases, as a result of stimulation, a layer of epidermis soon covers the surface of the ulcer, but often profuse granulations spring up and may even rise above the level of the surrounding skin. After healing of the ulcer, there remains a coppery-red spot, which gradually fades, and finally leaves a shining white cicatrix, which is for a long time fringed by a narrow copper-colored areola.

This eruption is generally most abundant on the antero-exterior surfaces of the legs; often a few pustules may form on the corresponding surfaces of the arms, or about the face, and on the lower portions of the trunk. It is usually developed slowly, appearing in crops of from two to twelve at intervals of one or several weeks. It may be accompanied by cachexia, and not infrequently by fever of a remittent type. The course of the eruption is very slow and insidious, often extending over many months or even more than a year. In many cases there is no true cachexia, but simply extreme prostration. In such cases the ulcers are not numerous, and show only a slight tendency to spread.

The prognosis of this syphilide is variable. In the superficial form the eruption often gives much annoyance, yet it may disappear without leaving scars. The condition of the system is always below par, and the prognosis should be governed in great measure by the degree of improvement under treatment. In most cases a favorable result may be expected in the course of a few months, but in rare cases prolonged cachexia follows.

The prognosis of mild and limited cases of the deep variety is usually good. In more extensive and relapsing cases, the outlook is less favorable; the presence of the eruption indicates a depraved condition of health, which is greatly aggravated by the irritation and drain of the deep ulcerations. A few months of proper treatment will, however, generally effect a cure.

The diagnosis of this syphilide is almost always quite easy, although it may be mistaken for ecthyma. The superficial form is to be distinguished from a similar ecthyma, by the peculiar course, situation, and appearance of the syphilitic pustules, as compared with the more inflammatory, pruritic pustules of ecthyma, which are more uniform in size, have yellowish-brown crusts, and much less tendency to ulceration. Moreover, ecthyma usually occurs on the legs of broken-down subjects, and is an eruption of papules and pustules, the latter forming only superficial ulcers. In some cases of phtheiriasis, in uncleanly and unhealthy persons, pustulo-crustaceous ulcers, somewhat resembling those of syphilis, are seen, but with care a diagnosis can always be made. The discovery of the pediculus vestimentorum, the presence of minute blood-crusts caused by the bite of the insect, and very often scratch-marks, and a general papular and pruritic condition, establish the diagnosis of phtheiriasis.

The deep ecthyma-form syphilide might perhaps be mistaken for *ecthyma cachectica livida*, since the latter occurs in much debilitated subjects. The histories of the cases, and a comparison of the lesions, render the distinction clear. The lesions of syphilis are less inflammatory than those of the non-specific eruption; they involve much less of the surface, but extend much deeper, and they secrete much less pus. Moreover, the areola of the simple lesion is either bright red or deep purple, and is much more extensive than that of the syphilitic pustule.

Rupia.

This name, derived from the Greek ῥύπος, dirt, is applied to an eruption composed of ulcers surmounted by laminated crusts. It appears sometimes precociously during the first year of syphilis, but it really belongs among the late lesions. It usually shows intense syphilitic infection, and is often accompanied by fever. It has never been seen in hereditary syphilis. Although a pustulo-crustaceous eruption, it partakes of the nature of tertiary lesions, in the deep-seated infiltration always present beneath the crusts.

Rupia may be divided into two varieties: one, in which the crusts are small, numerous, and quite generally scattered; another, in which they are large, less numerous, and more localized. All of the lesions of rupia begin as a red spot, which soon becomes a flat pustule, which dries into a greenish-brown crust. Subsequent changes are very slow and of great interest. The initial crust is usually small, and underneath it is a superficially ulcerated, infiltrated surface. The infiltration and ulceration extend somewhat beyond the original crust, and another layer of crust is formed beneath it by the secretion from the ulcerated surface. Thus several distinct but adherent laminations are formed as the ulcer increases in size, each succeeding one being larger than its predecessor. This result is mainly due to the fact that the pus is quite thick, and that it is secreted slowly and dries very quickly. The process may continue until the crusts reach a diameter of half an inch or even two inches. In rare cases they have been seen with a diameter of fully six inches. When completed, the rupial crust is conical, distinctly laminated, of a brownish-black color tinged with green, similar to a dirty oyster shell. The crust itself is hard, firm, and adherent, although its layers are often perfectly distinct. Underneath it we find an unhealthy, grayish-red, ulcerated surface, bathed in thick, ichorous pus, and surrounded by a slightly undermined margin. The depth of this ulcer is rarely so great as that of the severe ecthyma-form syphilide. It generally involves about one-half the thickness of the derma. Around each ulcer is an areola of a coppery-red color, which merges into healthy tissue. The growth of these encrusted ulcers is quite slow and often intermittent.

The small rupial eruption begins either about the face or on the inner and outer surface of the forearms. It may then invade the trunk and lower extremities. The crusts vary in diameter from half an inch to an

inch. Lamination is first visible when their diameter is about one-quarter of an inch. Their number varies; sometimes upon the face only a small portion of healthy skin is left intact. Upon the face and forearms their height is often greater than their breadth. They are more common on the forehead and near the nose and mouth than on other parts of the face. In some cases only one region is invaded, as the face or the forearms, but the eruption is rarely seen on the lower extremities alone. It generally appears in crops of a limited number, which may follow each other at short intervals, and extend over a period of several months or a year. Proper medication, however, will certainly abort such an eruption more or less promptly. In some cases of an eruption composed of many small pustules, even when no treatment has been followed, the crusts have been known to reach a diameter of nearly or quite one inch and then to dry and fall off, the subjacent ulcer healing meanwhile. In other cases the crusts may run into each other and assume a horseshoe-shape. This eruption may occur during the first year of syphilis, but is generally later.

The eruption composed of large crustaceous ulcers usually presents a limited number of lesions. Exceptionally we find only one crust, but in some cases as many as twenty or thirty. The diameter of a crust in a case that has been long neglected may be even more than two inches. This eruption is most common on the face and trunk, but may occur on the extremities, and may be unsymmetrical. The lesions appear singly, or two or three may be developed at the same time; they grow slowly and painlessly. After having reached a diameter of an inch their growth is much slower, many months being occupied in the growth of á crust four inches in diameter. The ulcers underlying crusts of the large variety of rupia are rather deep, but rarely involve the whole thickness of the derma. They resemble those of the small variety. After removal of one of the conical crusts a thinner one of a similar color is formed, unless the surface is thoroughly stimulated. Profuse granulations may spring up which hinder cicatrization. Under proper treatment the ulcer slowly heals, until a deep red, glazed spot is left, which gradually becomes thinner and lighter colored, and, finally, a white, shining surface is left, which is depressed below the general level, and around which a rim of brown pigment remains for months, corresponding with the former areola. These cicatrices are not traversed by fibrous bands, but scattered over them are minute holes which indicate the openings of sebaceous follicles.

The prognosis of rupia is not good as to the lesion itself, nor as to the general condition of the patient. In some rare cases of precocious evolution this eruption becomes general, the lesions being large and numerous, and the general condition being at the same time much depressed. Without careful and vigorous treatment, this malignant form of syphilis may be fatal. The small and general form of rupia, although accompanied by cachexia, may be cured in a few months. The ulcers usually occasion much annoyance and suffering.

The large form of rupia is of considerable gravity and calls for energetic

local and constitutional treatment. Although many cases recover, death sometimes occurs.

A question of diagnosis cannot arise, since no simple eruption resembles rupia.

During the visit of the late Prof. Boeck, of Christiania, to this country, he treated several cases of syphilis by syphilization, using pus from chancroidal ulcers. Upon each inoculated spot a pustule formed, which rapidly became covered with a crust, that increased by laminæ and in fact was rupial. The bodies and arms of two men were, as a result, covered with rupial crusts, which varied in diameter from one to three inches and were identical in every respect with those caused by syphilis.

The Bullous Syphilide.

Much confusion has been introduced into syphilography by the latitude given to the term pustule. From the fact that some forms of syphilitic pustules are not situated upon an elevated base and are large and globular, with a tendency to run together, the existence of a true pemphigoid syphilide has been asserted. Further study has proved these lesions to be pustular and not bullous; yet in some cases true bullæ are developed on syphilitic patients.

The eruption begins like ordinary pemphigus by an effusion of serum beneath the epidermis, which slowly increases, until, at the end of a week or two, a bulla the size of a pea is formed. The serum soon becomes turbid and milky, and is finally converted into a thick yellow pus. The bullæ vary in size, some being as large as a walnut. They are surrounded by a dull red areola, which on the legs may be due to effusion of blood. The pus soon dries into a dark, greenish-black, adherent crust.

Under favorable circumstances, the underlying ulcer, which is usually not very deep, becomes cicatrized and the crust falls off, leaving deeply-pigmented, more or less atrophic spots. Sometimes, however, no change is produced in the skin. Without treatment, especially in cachectic patients, the ulceration increases in depth and extent, and the lesion may then resemble rupia.

This eruption occurs mostly on the forearms and legs, where it may be aggregated. When it invades the trunk it is more copious about the chest, but is generally discrete. Its invasion is usually very slow. Its course is also very chronic and unattended by any marked symptoms, except soreness and sometimes heat in the bullæ and ulcers. Fresh bullæ may form during the course of the eruption, or after it has once disappeared.

The bullous syphilide is almost always a late eruption. Mistakes have arisen from considering certain exceptionally large pustules, or those which have been formed by the fusion of several of the variola-form pustules, as bullæ, and calling them syphilitic pemphigus. These bullæ are found even at a late period only in those who have had repeated relapses of syphilis in a severe form and in those having visceral lesions. The opinion has been expressed that an eruption of this kind is a mere coincidence, a pemphigus

occurring in a syphilitic subject. In many cases there are certainly no distinguishing marks between the bullous eruption of syphilis and pemphigus, and the diagnosis must then be made from the history and from the associated lesions and symptoms. There are cases in which the syphilitic history is clear, and the bullæ soon form rupial crusts and leave typical tubercular infiltrations.

The Tubercular Syphilide.

This syphilide consists of deeply-seated, circumscribed infiltrations into the skin, resembling in appearance the large, flat, papular syphilide, and being, in reality, nothing more than an exaggerated form of the latter lesion. The whole thickness of the skin is involved, whereas, in the papular syphilide, the deeper layers escape; the latter is a secondary manifestation, while the tubercular syphilide is a tertiary lesion.

The tubercular syphilide seldom ulcerates, but disappears by interstitial absorption; hence, it has been called *non-ulcerative* or *resolutive*.

The resolutive tubercular syphilide may appear even before the second year of syphilis; it is usually developed between the third and sixth years, but may be seen as late as the eighth or tenth year, and, according to some authors, even as late as the fifteenth or twentieth. It is usually met with in cases that have not been thoroughly treated at the outset. Its course is very chronic and marked by numerous relapses, many years passing while it travels over the body. It causes no pain, heat, or itching, but merely produces thickening of the skin. When it appears early, it may form a general and copious eruption; but later, the tubercles may be limited in number and confined to a single region.

The tubercles begin as deep red spots, which slowly increase in size and thickness until, when fully developed, they have a diameter of from one-half an inch to an inch. Sometimes they are as small as a split pea, and again they are more than an inch in diameter. Their surface is flat or rounded, and their borders are sharply defined. The smaller lesions are more elevated and rounder than the larger. Upon the face, they often have a shining appearance, and on parts where the epidermis is thick and rough, they look dull and dry. The color of the tubercles is at first dark-red, with possibly a tinge of crimson, but frequently it is a light pinkish-red. Their surface is usually quite smooth and free from scales, but sometimes a few of small size and quite adherent are seen. Where the epidermis is thick, the proliferation is occasionally free, giving the tubercles somewhat the appearance of psoriasis.

The tubercles first appear on the forehead or back of the neck near the scapulæ. They may be limited to these regions, or may invade the trunk, always more copiously on the back and over the gluteal regions. In front, they are generally scattered, but in some cases they occur in large numbers over the sternal region, on the borders of the axillæ, and over the deltoid muscle. They are more copious on the outer aspects of the extremities near joints, than on the inner. The backs of the hands and feet are spared,

but tubercles are sometimes developed on the palms and soles, and soon pass into a scaling condition.

The course of the eruption is very slow; several weeks or even months may pass before the entire body is covered. When the eruption is general, the tubercles are usually disseminated without order, rarely showing a tendency to circular distribution. Fresh crops often fill the interspaces of those first developed. When precocious, the eruption may be very copious. In the few cases we have seen of recurrence of this eruption, the tubercles were almost in contact with each other. Such cases are rare, and belong to the group of malignant precocious syphilides.

An eruption of tubercles is likely to be general when occurring within two years after infection, and in those who suffer from a severe form of syphilis, or who have been improperly treated during the early months. Far more commonly, several regions are successively invaded.

These tubercles are prone to appear in an irregularly triangular group, with the apex at the glabella and the base near the margin of the scalp. They may form a sort of corona in the latter region, with sometimes a number on the scalp itself. On the face, they sometimes run together and form patches. Again, several tubercles on the nose blend together and extend to the cheeks, forming a butterfly-shaped patch. When the tubercles spread in a rapid manner, a distinctly elevated margin or rim is formed, the inclosed patch being depressed. In this serpiginous form, the whole face may become invaded. The centre of the patch gradually loses its color and becomes thinner until, in bad cases, a cicatricial tissue is left. This process is usually rapid, and then slight destruction of the skin results; when it is slow, more or less atrophy of the skin is produced. In one of our cases, in which resolution was rather rapid, the patient's face was covered by tubercular rings, which merged together, the inclosed spaces being normal. Some authors call this the *serpiginous tubercular syphilide*, but we prefer to reserve that name for an eruption which is serpiginous by ulceration.

These tubercular rings are not seen in all cases; in some the lesion extends merely at certain portions of its margin. Thus, kidney-shaped growths are produced, or new tubercles may form and finally coalesce around the entire periphery of the patch. Tubercular patches seated on non-hairy parts are smooth, while those developed in regions supplied with hair are often uneven and warty. The latter condition is due to fusion of the tubercles and excessive prominence of the follicles and papillæ. Their surface may be covered with a crust of serum and epidermis, or the scanty pus may dry between the numerous elevations. Cases of invasion of the entire scalp in this way have been recorded, and doubtless many of the cases of framboesia of the old writers were nothing more than aggravated instances of this vegetating or papillomatous tubercular syphilide. It has been stated that the papular syphilide may undergo a similar metamorphosis. We have, therefore, two kinds of *syphilide végétante*, or *papillomateuse*, which differ merely in degree, a papular and a tubercular. The head and face are most commonly attacked, but the trunk about the

shoulders, over the sternum, and in the inguinal and gluteal regions may be invaded. When this syphilide is thus altered in character, its course is even more chronic than usual.

Several peculiar features are presented by this syphilide when occurring on the face. In some instances, a thin yellow crust, which is quite adherent, covers the smooth, shining surface of the tubercles. This may be so thick as to be mistaken for pus resulting from ulceration. In very chronic cases, it may form a rim around the margin of the tubercle, the inclosed surface being quite scaly. The skin generally retains its suppleness, although its entire thickness is involved by the infiltration; but, in some cases, especially about the nose and on the lips, it becomes as hard and unyielding as cartilage. Much annoyance is caused by the immobility of the parts and by the hideous deformity which often results. In extreme cases, the skin of the entire face may become thus affected. Although a severe lesion and often very rebellious, the effect of proper treatment in causing absorption of the infiltration, and in restoring the natural softness of the parts, is frequently astonishing. Where this complication has existed for a long time, the effect of medicine may be less rapid.

These tubercles, especially on the face, and exceptionally elsewhere, wherever the integument is soft and thin, sometimes undergo colloid degeneration. When this occurs, the color of the tubercle slowly changes to a dull brown, the lesion becomes less resistant, and on incision a soft, gluey, non-diffluent mass is revealed. Such a tubercle is rather more elevated than others, and appears as if infiltrated with glue. This condition is most frequently seen on the forehead. Usually these colloid tubercles slowly subside by absorption of the cells, leaving a depressed cicatrix.

Next in frequency to the face, the shoulders and forearms are the parts attacked by the tubercular syphilide. Sometimes these parts are primarily invaded.

In the early years of syphilis the tubercles are usually disseminated over the body, but at later periods successive groups appear at long intervals in different regions. The eruption may thus continue for many years, the general health deteriorates, and visceral lesions may be developed.

The course of the eruption depends almost altogether upon treatment. In its early stage it will usually be dispersed by vigorous measures. A limited relapse is very likely to occur in case of inadequate treatment. In no other syphilitic eruption can a prognosis be made with equal confidence. If untreated it will probably invade nearly every part of the integument. We have seen two cases in which more than six hundred tubercles formed during a period of about ten years, leaving permanent cicatrices upon the face and body, particularly on the posterior aspect and on the extremities. Although the alæ of the nose and the lobes of the ears were destroyed, not a particle of ulceration had ever occurred. The atrophy which follows this eruption probably results from some occult change in the normal cells induced by the presence of the infiltrating cells. It is certain that the infiltration and the tissue framework which holds it, degenerate and are absorbed at the same time.

In case of a relapse a group of pustules is usually observed in some one particular region. When the tubercles are scattered over the body we may be sure that the period of infection has been within two or three years. When the eruption is early it is usually symmetrical, but when late it is often unsymmetrical. The tubercles are usually less copious with each succeeding outbreak, but, on the contrary, cases are occasionally met with in which their size and number are about the same with each relapse. The face, back, and forearms are the most frequent seats of relapses. In some cases the face, and exceptionally the scalp, is attacked by recurring tubercles until most of its integument is left in a cicatricial state.

After full development the course of these tubercles is slow and without marked features, and they are generally amenable to treatment. When they retrograde they sometimes first sink in the middle, and may thus be converted into tubercular rings. If left alone they remain unchanged for months. Their red tinge gradually fades to brown, they flatten and finally disappear, leaving a pigmented spot. This syphilide may pass away without causing disorganization of the skin, especially if treated early. Upon the face, and where the tissues are soft and delicate, cicatrices are apt to result. Hence the necessity of active and prolonged treatment. Tubercles that have remained on the face, uninfluenced by treatment, for two or three months, almost inevitably leave cicatrices. On other parts of the body they may remain longer without leaving any deformity, but, as a rule, atrophy of the skin follows when they have lasted three months.

In some cases this syphilide ulcerates, the process usually being limited to a portion of the eruption. This may occur in a malignant and precocious manner, ulcers forming with great rapidity. Happily such cases are rare. When ulceration attacks a tubercle a yellow crust forms on its surface, which soon covers the whole tubercle, and attains considerable thickness. Its color gradually becomes greenish-black, its surface is rough, and it is surrounded by a dull red or even livid areola. Underneath, and coextensive with the crust, is a smooth ulcer, with a foul, grayish-red surface, sharply cut edges, as if "punched out," and, perhaps, a little undermined, secreting an ichorous pus. The progress of the case varies in different patients. In broken-down subjects, especially from alcoholism, the ulcers may extend and merge together, forming large patches. Under favorable conditions the destructive process is more limited, but such ulcers are invariably followed by depressed cicatrices. The face, thighs, and forearms are the parts most frequently attacked. On the face particularly they are very destructive, and leave unsightly scars.

Strange as it may seem, the cicatrices following resolutive tubercles are often as well marked as those subsequent to deep ulceration. When resolution has occurred, without any damage to the skin, coppery pigment spots remain for a time. When a cicatrix is formed, it is always deeply pigmented and surrounded by a similar areola. These cicatrices form very slowly. After complete absorption of the lesion the tissue is tolerably thick, but it gradually becomes thinner and less brown, until in about a year there remains merely a soft, glistening membrane, either perfectly

smooth or perforated with minute holes, the seat of follicles. Very often a narrow coppery areola remains for a long time. When the ulceration has been particularly deep and extensive, and especially when it has occurred near a joint, thick and long fibrous bands sometimes traverse the scar, and in some cases its surface is studded with tubercles of false keloid. The occurrence of these neoplasms has been considered diagnostic of lupus. As a matter of fact they are developed as well, though less frequently, on syphilitic cicatrices.

The prognosis of this syphilide is good, although it indicates an active and persistent form of syphilis. Early treatment may prevent or modify cicatricial deformity which otherwise may be extensive. Persistence in treatment will also prevent or postpone relapses.

Ulceration, complicating this eruption, calls for the exercise of the greatest skill and care. In addition to the use of proper internal and local treatment, the nutrition of the patient should be improved by every possible means. In those rare cases in which ulceration and gangrene attack the tubercles the outlook is very bad; the destruction of tissue may be extreme, cachexia may appear, and a typhoid condition, resulting fatally, may be induced.

This syphilide, when occurring in the secondary period, often coexists with lesions of the intermediary stage, such as perionychia, alopecia, iritis, cerebral affections, testicular lesions, mucous patches, and condylomata. Later on it is generally accompanied by a varying degree of cachexia and sometimes by visceral lesions.

Diagnosis.—This syphilide is to be diagnosed from lupus vulgaris, elephantiasis Græcorum, carcinoma, and psoriasis. Lupus generally begins in early life, and is never so diffusely scattered as the tubercular syphilide. The resemblance is seldom striking except when the latter is limited to the face. Lupus tubercles are usually more irregular in outline and deeper than those of syphilis. They are pinkish-red rather than brownish-red as in the latter disease. Lupus tubercles are more commonly studded with small colloid masses, and are prone to ulcerate. The scars left by lupus are not soft and thin as in syphilis, but are hard and seemingly adherent to the subcutaneous tissues. The crusts of lupus are not so regular and round as those of the tubercular syphilide, and have not their peculiar dark, greenish-black color. The underlying ulcers are not as deep, smooth, and sharply cut as those of syphilis.

In some cases of true leprosy tubercles occur, which resemble in size, shape, and color those of syphilis, but they are usually accompanied by white, anæsthetic patches, large spots of brown pigmentation, nerve swellings with perverted sensations, large nodular infiltrations and ulcerations, or other manifestations which characterize leprosy.

Although superficial carcinomatous tubercles may somewhat resemble those of syphilis, they are never so scattered, and are always much larger, sometimes involving an entire region.

The tubercular syphilide occasionally presents two appearances which resemble psoriasis. The first is when the tubercles are covered with an

unusual number of scales, especially on the outer aspect of the arms, where psoriasis is prone to appear. The second is when the tubercles undergo involution and form rings. Psoriasis, however, is a disease beginning in youth, and is essentially scaly. The tubercles of syphilis are infiltrations, and though some may be covered with scales, others will be found free from them. In syphilis, again, we have the history of the case, and perhaps other manifestations of the disease. In rare cases in which the eruption is limited, and the history obscure, mercurial treatment settles all questions, since it cures a syphilide and does not influence psoriasis.

Some authors call this syphilide *lupus syphiliticus*, a term inapplicable for reasons already given.

The Gummous Syphilide.

This syphilide is almost invariably a late lesion, and, although usually invading the skin, it always begins in the subcutaneous connective tissue. It consists of tubercular infiltrations, some as small as a pea and others several inches in diameter. When great extent of tissue is involved, the lesion is usually composed of several tumors merged together. This is not always the case, Fournier having reported a single tumor fourteen centimetres in length, eight to ten in breadth, and from two to six in thickness. Unlike other syphilides, in which the specific neoplasm is diffused, this lesion is a true circumscribed tumor.

This syphilide is particularly prone to appear in parts where the connective tissue is loose and abundant. It may be limited to the connective tissue, but on invading the skin it usually ulcerates. In the former case we apply to the syphilide the term *gummous* or *gummous tumor*, in the latter case we call it a *gummous ulcer*.

The progress of the lesion varies according to the condition of the parts upon which it is developed; in thick and copious adipose or cellular tissue the tumors may remain a long time without attacking the skin; under contrary conditions or above a bony surface implication of the skin is early and the bone itself may be eroded superficially or deeply. Sometimes the muscles are exposed by complete destruction of superjacent tissues. Blood-vessels, nerves, and sometimes bursæ may be involved by extension of the lesion.

We shall study this syphilide in its three stages: of tumefaction, of ulceration, and of repair.

In the first stage we find from one to six small tumors, which appear simultaneously or in succession and run an idolent course. In exceptional cases, when the eruption appears during the early years of syphilis, the tumors may be numerous, their invasion quite rapid, and the attendant local and general symptoms well marked. Cases have been reported in which there were twenty, thirty, and even forty tumors, and Lisfranc has recorded one instance in which there were one hundred and sixty. When they appear early they are, as a rule, numerous and symmetrical; when occurring later, the reverse is true.

These small tumors are painless and attended by slight tenderness. Their growth is generally slow. At first they are freely movable; they soon become attached to the surrounding tissues, especially when seated over bony surfaces or in regions where the connective tissue is scanty. They give to the finger a sensation of moderate firmness, retaining their shape under pressure, having neither the elasticity of a fatty tumor nor the hardness of scirrhus. In many cases they tend to invade the skin rather than the deeper tissues. Their superficial growth is first shown by slight reddening of the overlying skin, which rapidly becomes thickened and less supple. Finally we observe a tubercular infiltration, round or oval in shape, perhaps slightly elevated, of a deep coppery-red color and surrounded by a well-marked hyperæmic areola. They may remain in this condition for many weeks or even months, and still, under treatment, undergo resolution. Generally, however, their firm structure slowly breaks down until finally fluctuation may be detected. In many cases the soft yielding character of the tumor gives a false impression that pus is confined beneath the skin. On incision of such a tumor a small quantity of thick, bloody pus escapes and a soft mass is found, but no cavity like that of an abscess. In case of true fluctuation, however, there is an actual cavity containing fluid, resulting from disintegration of the tumor. Surgical interference is, however, seldom required. The cavity, in most cases, opens spontaneously, either like a furuncle by a single aperture or by ulceration at several distinct points.

The minute changes leading to this condition are of interest. The immediate product of the death of the subcutaneous neoplasm is a thick gummy mass, the intermingled pus being supplied by the surrounding parts which are secondarily inflamed. The destructive process goes on very slowly until after the occurrence of ulceration. The small ulcers first formed are deep and sharply cut; they extend in all directions until the destruction of the entire neoplasm results in the formation of what may be called a typical gummous ulcer. Such an ulcer is either round, oval, or gyrate from fusion of the small ones, and sharply cut as if punched out. Its floor, which is greenish-red, or sometimes greenish-black, is uneven and bathed with sanious fetid pus. The edges of the ulcer are thickened, and around them is generally an extensive areola of hyperæmia, which may be so persistent as to give the impression that it also is the seat of gummatous infiltration. The course of such ulcers varies with the care they receive. Sometimes they take on phagedenic action, invading extensive surfaces and causing profound or even fatal cachexia. They may remain in an indolent condition for months, discharging a foul secretion, showing no reparative tendency, and inducing great œdema of surrounding parts. Groups of ulcers may be found connected by narrow bands of reddened and detached skin, whose nutrition is but feebly sustained by the superficial vessels; hence these bands soon melt away and expose the subjacent ulcerating surface.

The depth of the ulcers depends largely upon the thickness of the original infiltration. In some cases the gummy deposit is confined to the cellular tissue just below the papillary layer of the skin and the resulting

ulcer is relatively shallow. In other cases it is more deeply seated below the derma, and may be exposed by scraping off the upper layers.

In its early stage the tissue of the gumma is of a reddish-yellow color, and has a soft consistence; at a later period it looks dry, firm, grayish-red and non-vascular. The changes in its appearance are largely due to gradual compression and obliteration of the bloodvessels. Repair can never take place until complete removal of this tissue, which must be hastened by local as well as general treatment. The progress towards cure is especially slow where the surface of muscles has been exposed and when the destructive action has extended even to the tissues of the intermuscular septa.

Under treatment the foul surface of the ulcer is supplanted by granulations which eventually cicatrize. Sometimes these granulations become exuberant and rise above the normal level. As the ulcer heals, the surrounding redness, which on the legs may be of a purple tint, gradually diminishes and, when the cicatrix is formed, there remains a dull coppery areola, which may persist for many years.

The cicatrices of gummous ulcers differ according to the depth of the destructive process. When the ulceration has been superficial the scars are slightly depressed, thin, parchment-like and of a dead white color. All such cicatrices become blanched from their centre outwards.

The cicatrices of deep ulcers are much depressed and often very uneven, owing to fibrous bands and nodules. Some are also peculiar in being adherent to the deeper parts. In case the gummous ulceration has involved the superficial portion of the bone, the cicatrix adheres as firmly as did the periosteum to the osseous surface. In other cases where much destruction of bone has occurred no cicatrix at all is formed, the eroded surface being surrounded by a firmly attached fibrous band, which represents the margin of what might have been a cicatrix.

This syphilide may appear on the scalp, on the face, particularly about the mouth and nose, and also on the neck. It attacks the extremities, generally near the joints, and those parts where the integument is soft and the connective tissue abundant; the palms and soles therefore escape. It invades the back oftener than the anterior aspect of the trunk and is seldom seen on the lower part of the abdomen. The following is a table of fifty-nine cases in which Fournier observed the locality of the ulcers.

The thighs	5	The sub-hyoid region	1
The sternum	2	The neck	4
The lips	1	The feet	1
Integument of penis	2	Metatarsal region	1
Scrotum	5	Cheeks	2
Legs	11	Forearms	3
Back	1	Eyelids	2
Fingers	3	Labia majora	1
Arms	4	Thighs	1
Groin	1	Face	4
Thorax	2	Scalp	1
Breast	1		—
		Total	59

Gummy tumors present certain peculiarities in different regions of the body, and may be complicated by intercurrent morbid processes. Erysipelas may attack the ulcers, especially when seated on the head or extremities. The œdema which accompanies gummous ulcers of the leg may be so severe and chronic as to induce a condition similar to elephantiasis Arabum. Again, in various parts of the body the appearance of the ulcers may be totally changed by a serpiginous or phagedenic process.

Gummy tumors of the scalp are seldom isolated and movable; usually the entire integument is thickened, and, although at first movable over the bones, soon becomes adherent. Small ulcers form at follicular openings, and gradually increase in size. Sometimes the outer table of the skull is destroyed, and in other cases the whole thickness of bone becomes necrosed; the dura mater, however, resists the destructive action in a remarkable manner, and is rarely involved. The scalp over the frontal and parietal bones is most commonly attacked, and not infrequently the forehead, chiefly towards the median line, is invaded. The secretions from ulcers occurring in the latter situation sometimes accumulate between the bone and the integument, and produce much swelling in the supra-orbital regions. The eyes may become closed by swelling of the lids caused in a similar way. A more serious complication of these ulcers of the scalp is erysipelas, which, in some instances, as already stated, may excite reparative action.

Upon the face we find both the movable, subcutaneous tumor and the infiltration which involves the deeper layers of the skin. Such swellings, being discovered here earlier than in other regions, usually receive treatment soon enough to prevent their reaching an extraordinary size. In neglected cases, however, the infiltration may be very extensive. Cazenave has reported an instance in which the face was so distorted as to be unrecognizable, having a leonine expression as in elephantiasis Græcorum. We have seen a case in which the nose, lips, and chin were excessively hypertrophied. The peculiarities of this syphilide in the stage of tumefaction are similar here and elsewhere, except that about the lips and nose it sometimes has a cartilaginous hardness. Hyperæmia is soon seen, and the progress towards ulceration is quite rapid. The resulting ulcer has the peculiarities of similar syphilitic lesions in other regions. The crusts, which frequently form, have a greenish-black color. About the nose much destruction is often produced, either limited to the skin or involving the cartilage and the bones. Erysipelas may complicate gummous ulcers of this region, and, in rare cases, phagedæna, which has been known to destroy the greater part of the face.

The gummous syphilide of the arms and forearms is not especially peculiar, but in most cases, when it is seated over nerves, severe neuralgias are produced.[1] In somewhat rare cases gummy deposit in the fingers

[1] Gummata may be situated in almost any region over a nerve and may then cause pain. Ricord reports one case in which a gumma of the size of a chestnut, seated in the groin, caused pain in the crural nerve; and another in which two

produces a swelling resembling that occurring in a specific lesion called *dactylitis*. Although prone to appear near the joints, this syphilide seldom invades the articulations themselves. In one case, however, a gummous tumor over the sterno-clavicular articulation ulcerated, destroyed the joint and perforated the lung, death resulting. In another case, a gumma, the size of a hen's egg, was developed in an intercostal space, eroded the bone and perforated the pleura. The liability to this accident, in the case of gummata situated on the side of the thorax, should lead to the adoption of very vigorous treatment.

Gummata not infrequently form in the female breast, less commonly in both breasts. The importance of their diagnosis is here very great; failure to recognize their true character may lead to unnecessary surgical interference. They appear, as elsewhere, slowly; they are only moderately hard and are painless. There is no retraction of the nipple, and the axillary glands are unaffected. The ulceration which occurs is characteristic and quite unlike the indurated, fungoid ulceration of cancer. In all cases of limited tumors of the breast, a suspicion of their gummous character should be entertained, especially when the patient is young or of middle age. A mistake is liable to occur only when the gumma is very large and of unusual depth.

The cellular tissue of the buttocks being very copious, gummata of the gluteal regions often attain remarkable size and depth. We have seen several instances in which the sharply-cut walls of the ulcer led down to a base four inches from the surface of the skin. The genitals and thighs are very apt to be attacked by these tumors, which, upon the penis, scrotum, and labia majora, are often almost ligneous in consistence. The perinæum is sometimes the seat of circumscribed gummy deposit. We have seen one case in which urethral fistula resulted from ulceration of a gumma in this region.

Little need be said of gummy tumors of the thighs beyond the fact that they are often of very large size. When they occur on the legs, the question of diagnosis is particularly interesting. The ulcerating gummy tumor is usually seen on the upper and middle thirds of the leg, and where the connective tissue is abundant, differing markedly from simple ulcers, which most commonly form on the lower third, and over a bony surface. They may appear lower down, but usually where the tissues are lax, and

such tumors, seated in the course of the ulnar nerve, provoked severe pain in the forearm and in the two inner fingers. Nélaton reports two cases; in one a gumma of the axilla, besides causing neuralgia in the whole arm and shoulder, produced by compression a souffle in the axillary artery, venous stasis, and œdema of the extremity. The tumor speedily subsided under the use of iodide of potash. The second case was that of a lady who had consulted several physicians on account of pain in the foot, which was found by Nélaton to be caused by a gumma compressing the plantar nerves. In a case seen by Fournier, two gummata were found, one upon the median and the other upon the radial nerve, each of which was the cause of pain, numbness, and muscular weakness. In another case, seen by the same author, a small gumma over the track of the supra-orbital nerve gave rise to considerable pain.

seldom over a bony surface. They are often multiple, but more than four are rarely observed. They select the sides of the leg rather than the posterior aspect. They are always surrounded by intense hyperæmia, and frequently, late in their course, they resemble non-specific ulcers, especially the varicose. Their edges become rounded and callous, and their surface is studded with granulations, thus losing their characteristic features.

In some cases of precocious evolution, groups consisting of six or a dozen of these gummous tumors, form upon the legs, especially near the knees, less frequently upon the buttocks, and even on the forearms and forehead. They rapidly invade the skin and form ulcers, which are at first extraordinarily active, but soon pass into a chronic state.

The extensive hyperæmia which usually accompanies these ulcers of the leg, is the cause of localized œdema. In very chronic and extensive ulceration the œdema begins about the ankle, and involves a portion or the whole of the leg, which becomes swollen, hard, and brawny, the integument above the ankle being thrown into folds. This condition, which is very obstinate, and altogether resists internal treatment, resembles elephantiasis Arabum. When their edges become thickened and callous, these ulcers do not extend rapidly, but persist for many years. Their base is covered by a layer of greenish-black slough, and from it exudes a thin, fetid, bloody secretion.

Phagedæna is happily an infrequent complication of this syphilide. In broken-down subjects the ulceration rapidly destroys the skin and subjacent tissues, sometimes even denuding the bones. The process is extremely painful, and is attended by constitutional reaction, which sometimes reaches a typhoid condition. The parts most subject to this complication are the face, feet, and genitals. Unless promptly checked there may be great destruction of tissue.

This syphilide may appear within the first year of syphilis, but it is generally a late symptom, appearing at any time from the third to the fifteenth or twentieth year. Fournier reports a case of gummy tumor of large size, which was developed fifty years after infection, and was cured by iodide of potash.

The *prognosis* is influenced by the date of the appearance of the syphilide, its extent, and the general condition of the patient. Its early and malignant appearance indicate an active and severe form of syphilis, in which visceral gummata are to be feared. Although only one or two gummous tumors or ulcers may be present, and the general health is not much affected, thorough internal treatment is none the less necessary.

The *diagnosis* is to be made in its stages of tumefaction and of ulceration. When it exists as a movable, subcutaneous tumor, it may be mistaken for a fibrous, a sarcomatous, or a fatty tumor, or perhaps an enlarged ganglion. The syphilitic lesion is usually multiple, and is not compressible like the fatty tumor, nor as hard as the sarcoma. Sarcomata tend to attach themselves to subjacent parts; the gummy tumors invade the skin. The history of the case, the absence of pain in the tumor, and its situation, may be of assistance. Tumor-like infiltrations upon the face,

in the female breast, about the genitals, near joints, and wherever connective tissue is abundant, should always, in case of doubt, be subjected to specific treatment. Numerous cases have occurred, particularly with French surgeons, in which mixed treatment has dissipated tumors condemned to excision.

The general appearance, situation, and history of gummatous ulcers are generally sufficient to establish their character; but sometimes, especially on the face and lower extremities, they may be confounded with ulcerating lupus, or with simple eczematous or varicose ulcers. Lupus begins as small tubercles of the skin, which slowly ulcerate and become partially incrusted, and it extends by the formation of new tubercles, which in turn ulcerate. Lupus usually begins in early life, and on the nose.

Eczematous ulcers are always preceded by eczema of the skin, which lies tense over a bony surface. They are painful, superficial, always accompanied by a good deal of inflammation, and are seated, as a rule, on the lower third of the leg. Similar general features are observed in varicose ulcers, together with enlarged veins and more or less œdema.

The Serpiginous Syphilide.

This syphilide creeps over large surfaces by ulcerating at the periphery of patches while it heals in the centre. It may occur as early as the second, or as late as the tenth or fifteenth year of syphilis, possibly later. Its course is very chronic, and, although unattended by pain, it frequently causes great inconvenience. Its effects on the skin may be slight, or it may leave disfiguring cicatrices. There are two varieties of this lesion, a superficial and a deep.

The superficial serpiginous syphilide begins as a pustule, generally of the impetigo-form or of the variola-form syphilide. In its early stage it consists of a superficial ulceration, which has no characteristic features indicative of its future course, but which extends in the shape of a round or oval patch. If treatment, and particularly local treatment, is not employed, the process continues and crusts form, until the patch reaches a diameter of about two inches; granulations then spring up from the centre, and the crust falls off except at the periphery, where it adheres as an encircling ring. Thus is formed not a continuously incrusted surface, but a ring of crusts inclosing a more or less hyperæmic area of a round or oval shape. The color of the crusts is usually yellowish-brown or greenish-black, and their thickness about one-tenth of an inch. The underlying surface is smooth, of a grayish-red color, and ulcerated at the margins. Around the edges is a narrow, red areola. The ulcerative process slowly progresses at the margins of the patch, a rim of crust at the same time forming. Healing of the inclosed surface keeps pace with the peripheral extension of the ulceration, so that the width of the crust, varying from half an inch to an inch, is steadily maintained. The centre of this surface is blanched, its margins are always red, and they merge gradually into the ulceration. This process may continue many years, and involve extensive

surfaces. When healing begins, the crusts become harder and darker, and the redness of the central patch and of the areola diminishes. Then segments of crusts, having been lifted by the granulations beneath, fall off, and expose an ulcerated ring. Unless cauterized with a solution of nitrate of silver, as it should be, it may persist for a long time. At first the ulcer generally increases throughout its whole periphery; subsequently, it may increase only in one direction, thus becoming oval or reniform. The extension of the ulcer is largely influenced by the tissues on which it is seated. Thus an ulcer on the inner surface of the forearm creeps up the arm much more rapidly than towards its outer surface, where the tissues are firmer; and thus a long, oval ulcer is formed. A similar occurrence is observed on the thighs, while on the face, where the tissues are more uniform, the ulcers are generally round. The result of this superficial ulceration may be simply coppery pigmentation, which lasts several months, or very slight atrophy of the skin. The ulceration may even be extensive and protracted, and yet induce wonderfully little structural change.

The deep serpiginous syphilide has for its focus of ulceration, one of the late or tertiary lesions, such as a tubercle, an ecthyma-form pustule, or an ulcerating gumma. Whatever the starting point, there is soon developed a deep, sharply-cut, active ulcer, with undermined edges and a coextensive crust. This ulcer increases in size, more or less rapidly, until it attains a diameter of two or three inches, when changes, similar to those observed in the superficial variety, may occur. The crust becomes thin at its centre, and thick at its margin; the thin portion soon falls off, leaving a round, deep-red cicatrix, surrounded by a thick, greenish-black crust, less than an inch in width and quite thick. When this syphilide is fully developed, and has attained a diameter of from four to six inches, its changes are more marked. In the centre is a round or oval patch of cicatricial tissue, having a coppery-red color, and as yet firmly attached to the subcutaneous connective tissue. This is completely inclosed by a ring of crust. The ulcerative process is not equally active at all parts of the ring, hence result certain modifications in the shape of the crust. The ulcerating ring, which encircles the central cicatrix, forms a furrow half an inch to one inch in width, and, at its most active portions, a line or more in depth; it has a foul, grayish-red floor, and sharply-cut, somewhat everted, and undermined edges, which have a deep red color, and are continuous with an areola of similar tint. Portions of this ulcerating furrow may be partially filled by granulations, or even entirely cicatrized. Over the more active segments, there is a yellowish-brown crust, slightly depressed below the level of the skin, and which may be raised as a film from the surface. In portions further advanced towards healing, the crust is thicker, harder, slightly above the surrounding level, and of a greenish-brown color; continuous with it, on parts where the process is quiescent, or where healing is nearly complete, the crust is greenish-black in color, is hard and adherent, and its base on a level with the skin. Thus

we can always infer the age of the ulceration from the size, color, consistence, thickness, and prominence of the crusts.

Relapses may occur by ulceration of the cicatrix, sometimes destroying the whole of it. This occurs most frequently in debilitated and poorly-nourished persons, and in those who use alcohol to excess. The cicatrix following such a relapsing ulcer is very rough and unsightly. Sometimes the cure is retarded by repeated relapses at the margins of large ulcers, segments which had healed being again attacked by the ulcerating process, or again, parts more remote may be attacked.

The course of this syphilide is always slow, often occupying many years. In some cases it is accompanied by profound cachexia, while in others there is no disturbance of the general health.

This syphilide is of rather rare occurrence. It may appear as early as the third year, but generally later, even up to the fifteenth year after infection. It appears usually on the inner surface of the forearms and arms, on the breast, and on the legs. It causes little if any pain, but frequently gives great annoyance when near joints. When the resulting cicatrices are small they are generally thin and parchment-like; but, if large, they are thick, uneven, and often traversed by fibrous bands, and covered by tubercles of false keloid. Often, however, even the large scars are thin, a fact of importance in making a diagnosis between this syphilide and serpiginous lupus. Blanching of the cicatrix extends from the centre towards the periphery. In large scars there may be a white central patch surrounded by a dull coppery-red areola, even long before healing is completed. In all cases the pigmentation fades slowly, and remains longest in the areola. Contraction of the scar near joints often results in permanent deformity.

The prognosis of this syphilide is never very good. Still a fatal result is by no means inevitable, and proper treatment is in many cases quite effective.

The diagnosis from serpiginous lupus and serpiginous chancroid is seldom difficult. Lupus usually begins in early life, and attacks the face. Its ulcerations are less definite and sharply cut than those of the syphilide. In lupus, red tubercles of ulceration, covered by crusts of light yellow or bluish-brown are mingled with the cicatrices, which are always uneven and fibrous. The history of the case may add to the certainty of diagnosis.

A serpiginous chancroid usually has such a clear history that no mistake can occur. Its locality, its extensively undermined edges, its fungoid surface, and its erratic course are also sufficiently diagnostic.

In opposition to the view of some that this eruption is not syphilitic, it is only necessary to say that it always begins in a syphilitic lesion, that its ulcers and crusts have features similar to those of other syphilitic lesions, and, finally, that its cicatrices are typical of syphilis.

The Pigmentary Syphilide.

In 1853 Hardy described this lesion, which has since been the subject of monographs by Pillon, Tanturri, Fournier, Drysdale, Fox, and Atkinson, but its nature and origin are still questions of discussion.

It usually appears during the first year of syphilis, but may occur as late as the third year. It is composed of irregularly round or oval spots, with ill-defined or jagged margins, of a brown, *café-au-lait* color, which does not pale under pressure. The color of the patches may be so faint as to require a strong light and a certain position for their detection, and even then they might pass for spots of dirty skin. The patches vary in diameter from one-eighth of an inch to one inch, and are neither elevated nor scaly. They may be discrete or confluent, in some instances being sparsely scattered, and in others occupying a surface of the extent of one's hand, and presenting very different appearances under the two conditions. In the former the spots are small, and separated by wide intervals of unaltered skin. In but one instance of this kind have we found each spot surrounded by an areola of pigment of a deeper color.

When the spots are more numerous they present the peculiar appearance aptly compared by Fournier to a "network of lace with large meshes." The intervening skin seems even whiter than the normal skin, an appearance concerning which there is still difference of opinion, some believing that it is due to contrast with the adjoining brown patches, others that there really is a decrease or an absence of normal pigment.

According to the latter view, there is, therefore, at the same time a decrease of pigment in certain regions and an increase in others. The latter process we regard as the essential one, for some cases are seen, in which whitened patches cannot be detected, and, in any case, they are much less in extent than the pigmented patches.

Tanturri is said to have found, by microscopic examination, as much pigment in the intermacular skin as elsewhere, but the probability is that the results of this observer were obtained in cases in which the brown spots only were present.

On the other hand, it is the opinion of Fox that this eruption is a localized loss of pigment surrounded by regions of increased pigmentation, and he considers the essential lesion to be the oval or circular spots of abnormal whiteness. He gives a case, in which this condition followed an erythematous syphilide upon the neck. We fully recognize the fact that decrease of pigment may, in rare instances, be observed on the previous site of a hyperæmic syphilide, but we believe that the lesion under consideration is spontaneous in its origin, and not a sequel of hyperæmia.

It is impossible to speak positively of the early history of this eruption, because it has never attracted attention until fully developed. Its evolution is probably gradual, like that of chloasma and leucoderma, and like them it is a chromatogenous affection.

The most frequent seat of this lesion is the sides of the neck, where,

according to Fournier, it occurred in twenty-nine out of thirty cases. It may also invade the chest, abdomen, and even the lower extremities. It is much more common in women than in men, and is especially frequent in those of a light complexion. Its course is extremely chronic, and is uninfluenced by anti-syphilitic treatment. It may disappear, perhaps after months or even years, and it leaves the skin apparently unaltered. It is a very uncommon disease in this country.

The question arises whether it is etiologically related to syphilis, or is a mere accident in the course of the disease.

In favor of the former view, we have the opinion of six observers, who studied the lesion independently. Moreover it is supported by the well-known fact that grave systemic dyscrasiæ, among which we must include syphilis, may cause chromatogenous affections.

In opposition to its syphilitic origin, there are the facts that it differs in appearance from every other specific skin lesion, and that it is not influenced by anti-syphilitic treatment. In our opinion there is a remote and obscure connection between the lesion and the syphilitic diathesis.

For a long time the affection was recognized only by the French and Italian observers, whose studies in syphilis were pursued among classes of persons more predisposed to various pigmentary changes than are the members of the Anglo-Saxon race. Yet it is distinctly stated by them that the affection was met with in persons of light complexion, and it is well known that such individuals are more disposed to ephelides and pigmentary changes in general.

We have sought for this eruption in nearly all the cases of syphilis under our observation for the last eight years, and have discovered only six well-marked instances. We have also seen a similar eruption in a patient with chronic renal disease. Two of our cases were French women, and the remaining four were Anglo-Saxons of rather dark complexion.

The diagnosis is to be made from chloasma, leucoderma, and tinea versicolor. From the first, the clinical history and the peculiar appearance of the eruption will generally distinguish it. In leucoderma the white patches have distinct brown margins, and perhaps a background of similar color, just the reverse of the pigmentary syphilide. Tinea versicolor rarely exists on the neck exclusively, but is usually continuous with similar patches on the chest. It is darker in color, slightly elevated, and scaly, and may occasion slight itching. Moreover the few scales from the syphilide are composed of epidermis only, while those of tinea are loaded with the spores of *microsporon furfur*.

Malignant Precocious Syphilides.

Under this title French authors have described certain syphilitic eruptions, which have a malignant ulcerative character, appear early in syphilis and are accompanied by general cachexia. These eruptions vary greatly in extent and duration. In some cases the malignant tendency is exhibited from the first, while in others it attacks a previously mild eruption.

It has already been stated that certain pustular eruptions, particularly the impetigo-form and the ecthyma-form syphilides, and much less frequently the papular rashes, develop this character. In some instances this peculiar feature of the eruption is due merely to the excessively debilitating influence of the syphilitic poison or to a lowered condition of nutrition. Dr. Ory, who has studied the etiology of the malignant syphilides, concludes that alcoholism is a very potent cause, but that any adynamic influence may have the same effect.

These syphilides are divided into three classes: *the syphilide puro-crustacée ulcéreuse*, *the syphilide tuberculo-crustacée ulcéreuse*, and *the syphilide tuberculo-ulcérante gangréneuse.*

The syphilide *puro-crustacée ulcéreuse* is a pustular rash attended by extensive ulceration and formation of scabs. It begins as rounded pustules grouped or irregularly scattered, which soon ulcerate and form flat or conical greenish-black crusts which may blend together. The ulcers are deep, with sharply-cut, undermined edges and a foul base secreting a fetid pus. Such an eruption appears first upon the face or scalp, where the lesions are often in groups; then it invades the arms and may even extend over the entire body, successive crops of pustules being developed in bad cases. There is rarely a tendency to ringed distribution, but sometimes one group of pustules is increased by the formation at its periphery of new pustules.

The syphilide *tuberculo-crustacée ulcéreuse* begins as a small, red tubercle, of the size of a pea, which is rapidly converted into an ulcer with a thick crust. The subsequent course is similar to that of the previous variety, except that the destruction of tissue is often much greater. This eruption is prone to appear first on the head and upper extremities. In some cases these regions only are attacked; in others the whole body is invaded. Upon the face the ulcers are often confluent; upon the arms they are usually scattered, but later on groups may be formed by the continual accession of new tubercles. The invasion of this eruption, like that of the preceding one, may be rapid or slow. Its course is chronic, sometimes occupying six or eight months or even a year. During ulceration the lesions sometimes cause a dull pain, and are at all times a source of much discomfort.

The syphilide *tuberculo-ulcérante gangréneuse*, also called by Auzias Turenne *carbunculus venereus*, one of the most formidable manifestations of syphilis, is happily rare. It is always accompanied by cachexia, and if not fatal, always leaves a condition of permanent ill-health. It begins as round tubercles of a dark-red color, slightly elevated and deeply seated in the skin, which attain a diameter of an inch or more. A small blackish slough forms in the centre of each tubercle, and is at first firmly adherent; it extends rapidly and, soon becoming loosened by the secretions, is cast off as a fetid, cup-shaped mass, looking something like an inverted rupia crust. The ulcer thus exposed is very deep, has a foul, dark-brown surface, with hard, everted edges and secretes a fetid ichor. To the touch it gives the impression of being deeply seated and indurated like a typical initial lesion or chancre. Surrounding each tubercle is a broad, deep-red

areola. Phagedæna may occur and run a course similar to that of phagedenic gummous ulcers. From time to time brownish-green crusts form and are thrown off. In favorable cases the surface of the ulcer gradually assumes a more healthy appearance, the edges become softer and the areola fades. Granulations appear, and true pus replaces the ichorous discharge. The healing process is finally completed, leaving a depressed cicatrix of a coppery-red color, which gradually fades from the centre towards the periphery of the cicatrix. When fully formed the cicatrix is of a dead-white color, flexible and thin like parchment.

The invasion of this syphilide is generally rapid, but its subsequent course is slow. Usually tubercles are developed in region after region, followed, perhaps, by additional crops. They are irregularly scattered, with no tendency to a ringed form. The face, the extremities, the shoulders and buttocks, are its favorite seats. The eruption may persist for several months or even years, although in the most malignant cases it runs a course called by French authors "*galloping.*" In such cases the invasion is very rapid and the result is generally fatal.

At or shortly before the appearance of these precocious syphilides, the patients complain of weakness, and appear pale and sallow. They often suffer from fugitive pains and neuralgias and from a general sense of discomfort. They have no appetite and become emaciated. At the same time some febrile reaction may be noticed. If not checked, this adynamic condition increases *pari passu* with the eruption; the patient falls into a typhoid state and dies. Possibly some intercurrent visceral lesion, of the lungs or of the nervous system, hastens the fatal result. In some cases, no definite visceral affection can be detected, and the patient dies of marasmus. Very often lesions peculiar to a later period, such as nodes, necroses, sarcocele, etc., appear with this malign eruption. In other cases, although the syphilide is essentially malignant, health gradually returns after a prolonged period of impaired nutrition and extreme debility.

The prognosis of these syphilides is always grave, since they indicate a most intense and active form of syphilis. The health of the patient previous to infection, his habits, the extent and character of the eruption and the degree of cachexia must all be considered. The course of the lesions and the influence of treatment must be watched. Death almost always results from the intercurrence of some pulmonary or nervous affection.

As regards treatment, every effort should be made to improve nutrition. Much can be done towards checking the course of the eruption by the employment of local measures. Careful dressing of the ulcers, their thorough disinfection, and the early removal of secretions, not only add to the comfort of the patient but promote healing. In spite of every precaution, indelible cicatrices are generally left. Internal treatment must also be employed. The guarded use of mercury, preferably by inunction, with iodide of potassium, sodium, or ammonium, internally, is indicated. Opium is often found particularly useful in these cases, by calming the restlessness of the patient, and quieting the pain of the ulcers. In a recent case of our own, in which the malignant syphilide was accompanied by profound

cachexia, by severe and persistent rheumatoid pains, and by double iritis, this deplorable condition was, in less than a week, markedly improved by the addition of a little opium to the mixed treatment, combined with tonics. We may sometimes resort to mercurial vapor baths with iodide of potassium or sodium, combined with bitter tonics, internally, beginning with ten- to fifteen-grain doses three or four times a day, and gradually increased by two or three grains daily. Mercury given in this way is supposed to have a beneficial local as well as general effect. The condition of the stomach demands that the most digestible and nutritious food be taken, if possible in small quantity and at frequent intervals. Stimulants, preferably good port wine or brandy, must be given regularly. Such treatment as the above is suitable when the patient is still able to move about. In a typhoid condition, treatment applicable to the adynamic fever is called for, together with the careful use of the iodides. The crusts of the ulcers should be removed after softening them with simple ointment or cosmoline, to which a few drops of carbolic acid have been added. When they cover the whole body, an alkaline bath may be required for this purpose. The exposed surface of the ulcers should be touched with carbolic acid, applied with cotton wool or a brush. Its action is twofold; it allays pain and destroys the diseased tissue. The formation of scabs may be prevented by the application of an ointment or the water dressing. An ointment composed of one part of mercurial ointment, one part of Balsam of Peru, and six parts of Cosmoline, applied on lint and frequently renewed, is of great service. Simple lead water or a solution of the Bichloride of Mercury (gr. xij (0.80) to water ℥xv (460.00) and glycerin ℥j (40.00)) is to be preferred, when there is much hyperæmia. The latter has a special detergent and stimulating effect. As the case progresses, such superficially destructive stimulants as nitrate of silver in strong solution, or fluid carbolic acid, may be indicated. The ulceration is sometimes arrested and repair hastened by prolonged immersion of the body in hot water. These hot baths may be rendered more efficacious by the addition of two or three drachms of corrosive sublimate to each thirty gallons of water. Care must be exercised as regards their frequency and duration. The mercurial vapor bath is often of benefit after removal of all the crusts, but its effect must be carefully watched.

By way of prophylaxis, when the eruption shows a tendency to extend, all possible sources of irritation of the skin must be removed.

Spontaneous Gangrene in the Course of Syphilis.

Very little is known of this possible consequence or complication of syphilis. Prof. Podres, of Crakow, has reported the case of a man, forty-five years old, who, six years after infection, began to have pain in his legs, which became very anæmic, sensitive to cold, œdematous and, finally, gangrenous. This condition necessitated amputation: first of the toes, then of the foot, and finally of the thigh. Microscopic examination showed inflammation of the external tunic of the arteries, degeneration of their

endothelium, with thickening of their walls and obliteration of their calibre. There was also atrophy of the cutaneous glands and nerves. All of these changes were attributed by Podres to syphilis.[1]

Local Treatment of the Syphilides.

The syphilides always require thorough constitutional treatment, and this, as a general rule, should be mercurial. Those of the secondary stage require mercury alone, while those of a later stage are best treated by mercury combined with the iodide of potassium. The opinion largely prevails that gummata of the subcutaneous tissues, being tertiary lesions, demand only the potassium salt, but we regard this idea as erroneous. Under the iodide alone we have often found the result slow and unsatisfactory, while a combination of the two remedies has almost invariably led to a speedy and beneficial action. In spite, however, of the best directed internal medication, some of the syphilides urgently require local treatment.

The exanthematous syphilides are generally ephemeral, and do well under internal treatment alone. In some cases, however, their persistence upon exposed parts, as the face, the hands, and particularly about the wrists, demands something more for their removal. For this purpose, the best application is an ointment or lotion containing a mercurial salt:—

℞. Hydrarg. Oxid. Rubri, vel Ammoniati gr. x–xx . . . 65—1 30
Cerati Simpl., vel Ung. Aq. Rosæ ʒj 30
M.

A small quantity of this ointment is to be rubbed in twice a day, and a liberal quantity be left on over-night. The following may also be recommended:—

℞. Ung. Hydrarg. ʒij 8
Cerati Simplicis, vel Ung. Aq. Rosæ ʒj 30
M.

The five or ten per cent. oleate of mercury is also generally useful in the erythematous and papular eruptions. When using any of the above, brisk friction of the parts should be employed within the bounds of avoiding dermal inflammation. In urgent cases, the ointment may be spread on lint and kept constantly applied to the spots.

Lotions are sometimes of very decided benefit, especially in cases of deep coppery pigmentation so often left upon the forehead, which is very annoying to patients and is but slightly influenced by internal medication.

℞. Hydrarg. Chloridi Corrosivi gr. iv . 25
Ammonii Chloridi gr. x 65
Aq. Cologniensis ʒss 15
Aquam ad ʒiv 125
M.

[1] Centralbl. f. Chir., Leipz. No. 33, 1876.

This should be freely sponged on the parts, or, in obstinate cases, be constantly applied by a piece of lint saturated with it. When the pigmentation is scattered generally over the body, or when the erythematous eruption is very chronic, as also in its relapsing form, mercurial vapor baths are our most efficient remedy. If these are unattainable, baths of corrosive sublimate (℥j–iv to 30 gallons of water, with the addition of ℥ij of the chloride of ammonium to facilitate solution) will answer the purpose.

The papular syphilides are, as a rule, amenable to internal treatment, but in some cases in which this has been neglected, and in others of the small miliary form, they are often annoyingly persistent. If the eruption be confined to small areas, the ointments and lotions just mentioned will be all sufficient. If large surfaces are involved, we may employ these ointments in the form of inunction, but, in general, baths of various kinds are desirable, and should be repeated as often as may be necessary. In some cases, we have derived decided benefit from sulphur baths, and, again, from alkaline baths (one pound of the bicarbonate or the borate of sodium to thirty gallons of hot water). Brisk friction with one of the above ointments will greatly hasten the result.

The most rebellious forms of the early syphilides are those of the palms and soles in their chronic scaly stage. These will persist for long periods unless local be added to internal treatment. The applications should be varied according to the stage of the eruption, and it is desirable to attend to them from their very commencement. When treated early by daily inunction of a salve composed of equal parts of strong mercurial ointment and cosmoline, the papules will rapidly disappear; the cure is hastened by the continuous application of the same, the hands being covered with gloves constantly worn. This ointment will suffice for cases in the true papular stage, but is not sufficient when the papules have become scaly and the skin thickened. We should then adopt the treatment of simple psoriasis, and immerse the parts in hot water, to which an alkali has been added in the proportion of one or two ounces to two quarts. The addition of a handful of bran is excellent when painful fissures are present. This should be repeated every day or two, and the scales be removed when they are softened. After drying the parts, they should be anointed with

℞.	Ung. Hydrarg. ℥ij	8	
	Ol. Rusci, vel Betulæ Alb., vel Olei Cadini ℥ss–j . . .	2	4
	Gelati Petrolei ℥j[1]	30	
M.			

℞.	Hydrarg. Ammoniati, vel Hydrarg. Oxid. Rubri gr. x–xx . . .		65—1 30
	Olei Rusci, vel Cadini ℥ss–℥j .	2	4
	Ung. Simplicis ℥j	30	
M.			

[1] Vaseline and Cosmoline (essentially the same, but the latter more consistent) have received no officinal name, but the suggestion of their manufacturer, Mr. Chesebrough, "Gelatum Petrolei," is good.

a mild mercurial ointment, to which a stimulant tarry preparation is a valuable addition in many cases.

These ointments should be thoroughly rubbed in and applied continuously on lint, retained by gloves. In some cases, gloves of India-rubber are best worn during the day, the ointment being applied two or three times. Cases occur in which the thickening is so extensive and severe, that we are obliged to resort to still stronger solutions, as of potassa fusa or pure caustic soda, in the proportion of from one-half to even two drachms to the ounce of water. After soaking the hands or feet in warm water, they should be briskly rubbed with a small pad of flannel tied to the end of a stick and saturated with one of these solutions, paying particular attention to those parts where the accumulation of scales is greatest. The duration of the rubbing is to be determined by the sensations of the patient and the effect produced, but it is desirable to avoid producing a very raw surface or too acute inflammation, the object being merely the removal of effete epidermal scales. The parts may subsequently be so tender as to require the use of a water dressing for a few hours, but, as soon as possible, one of the ointments above mentioned should be applied. By the judicious use of this treatment, continued if necessary for a considerable time, cases of great severity may be cured.

We have omitted to mention that in some cases of syphilitic psoriasis of the palms, the patches are in an inflamed condition, which must first be relieved. For this purpose we envelop the parts in emplastrum plumbi spread on strips of linen, and later on use the following ointment:—

℞. Emplast. Plumbi ʒvj 24
Ung. Hydrarg. ʒij 8
Ol. Betulæ Alb., vel Ol. Cadini ʒj . . 4
M.

Pustules upon the scalp are commonly so small and ephemeral as to require no special treatment, but in some cases they are so copious and persistent as to render local applications desirable.

Shampooing with an alkaline lotion, careful removal of the scabs, and the application of the following ointment, is all that is necessary.

℞. Unguent. Hydrarg. Nitratis ʒij . . 8
Gelati Petrolei ʒj 30
M.

Pustules of the malignant precocious syphilides, wherever situated, often exhibit a destructive tendency. The removal of the scabs is the first necessity, and to this end one or more immersions in alkaline baths are generally sufficient to soften them so that they can be taken off without difficulty. If the exposed ulcers are very painful, they may be touched once or twice with carbolic acid diluted in water, about one part to five. This application not only stimulates the sores but relieves the pain. If the ulcers are numerous, the subsequent dressings are somewhat tedious. They should be powdered over with iodoform, or this may be used in etherial solution or in a salve, or, again, these and other open ulcers may be covered with the Emplastrum de Vigo cum Mercurio spread on lint or soft leather.

Serpiginous ulcerations may be treated in the same way as the above, or, after the removal of the scabs, a stimulating lotion as the following, may be kept constantly applied.

℞. Hydrarg. Chloridi Corros. ʒss 2
Acidi Carbolici ʒj 4
Glycerinæ ℥j 40
Aquæ ℥xv 460
M.

Profuse granulations may spring up in the ulcerated ring and require pencilling with the stick nitrate of silver. Besides the lotion just mentioned, the following ointment is often very beneficial.

℞. Ung. Hydrarg. Nitratis ʒij 8
Bals. Peruv. ʒss 6
Gelati Petrolei ℥j 30
M.

This treatment is applicable to almost any form of syphilitic ulcerations, and to rupia especially. The vegetating or hypertrophic syphilides should be treated by repeated slight cauterizations with carbolic acid (one or two parts to six of water), or with a solution of nitrate of silver (ʒj to ℥j). They may also be benefited by the various mercurial baths.

The treatment of gummata varies according to their condition. In the stage of infiltration before ulceration has occurred, vigorous internal medication, combined with the constant application of equal parts of mercurial and oxide of zinc ointments, may cause their absorption. When they exhibit fluctuation or point like a furuncle, it may become necessary to incise them, but it is well not to be precipitate, as they will sometimes be absorbed even in this stage; and we then escape any solution of continuity in the skin. Gummatous ulcers vary so much in depth and in the amount of morbid tissue at their base, that no absolute rule can be laid down as to their local treatment. When we find a foul, indolent, necrotic base, thorough cauterization should be made with a strong solution of caustic potash or soda (ʒj–ij to ℥j of water). Healing will not take place until the gummy tissue is destroyed, hence it is necessary to cauterize until a healthy, granular base is seen. After the cauterization, a water dressing may be applied until all inflammatory action has passed off, when the ulcer may be dusted with iodoform, while to the reddened areola the mercurial and zinc ointment, already mentioned, may be applied. As the base of the ulcer becomes more superficial, the necessity of cauterization ceases, and should exuberant granulations spring up, as is often the case, they may be touched with nitrate of silver.

The latest application for ulcerating syphilides, recommended by Guillaumet,[1] is the bisulphate of carbon. Other than a slightly stimulant action, it possesses no medicinal qualities, and its use is much restricted by its disgusting smell.

[1] J. de thérap., Paris, No. 3, 1875.

CHAPTER XII.

CUTANEOUS HEMORRHAGE IN SYPHILIS.

Any of the secondary eruptions of syphilis may be accompanied by hemorrhagic effusion, either around or into the substance of the lesion. It may occur on the lower extremities of those whose general health is unimpaired and is then not of serious import; or it may occur on various other portions of the body of broken down and scorbutic persons. In all of these cases the effusion is secondary to the specific process, spontaneous transudation of blood into the skin of syphilitics being quite a rare occurrence. A case of much interest has been reported by Bälz,[1] as follows: a man, aged twenty-five, healthy but having had typhus fever, when syphilitic one year, suddenly and without premonition became covered with a blood-red exanthem. This was composed of discrete and confluent spots, varying in size from a millet seed to a silver dollar. The blood-red color rapidly faded and left slightly scaly, reddish- and greenish-yellow patches similar to those seen in scorbutus. Coincidently he had swelling of the joints of the little finger, wrist, right elbow, and both feet, due to ultra- and peri-articular hemorrhagic effusion. The cheeks and eyelids were swollen, but the gums were normal. The urine did not contain blood. Four days later a new eruption occurred simultaneously with an attack of pleuro-pneumonia. For the latter an ice-bag was applied to the chest, resulting in the development of a large patch of effused blood, which slowly subsided, the skin being œdematous and sensitive. A second application of the ice-bag produced a similar result. Under the use of iodide of potash the patient was cured in four weeks. Bälz thinks that syphilis induced in this case a hemorrhagic diathesis. He also speaks of another case of a healthy man, who, a short time after syphilitic infection, was attacked by a general hemorrhagic eruption, with epistaxis, bloody urine, bloody stools, and febrile reaction. Several days later a papular syphilide appeared among the patches of effusion, and on the tenth day the man died. Whether this hemorrhagic condition was a mere coincidence or was etiologically related to syphilis it is impossible to say.

We have also seen a case of hemorrhagic effusion occurring late in syphilis. The patient, a man forty-six years of age, had suffered severely from various lesions, and of late with extensive ulcerating gummata. Twelve years after infection, being in a cachectic state, he was attacked

[1] Ueber hæmorrhagische Syphilis. Arch. d. Heilk., Feb. 1875.

by a general but not copious eruption of bullæ. These when first seen contained sero-pus, but soon became of a deep red color, and around them a wide areola of effused blood appeared, with large, slightly raised hemorrhagic patches between them. The bullæ became large, foul ulcers; the effused patches grew larger, and some coalesced. The patient finally passed into a typhoid condition and died. In this instance the hemorrhagic condition or diathesis was probably caused by syphilis.

CHAPTER XIII.

CERTAIN SIMPLE CUTANEOUS AFFECTIONS OF THE GENITALS.

Under this head are included some of the more common diseases of the skin, and especially those affecting the genital organs, which are sometimes regarded by inexperienced persons as of venereal origin.

Eczema of the Scrotum and Penis.

The male genitals, especially the scrotum, are frequently the seat of eczema, either limited to these regions, or constituting a part of a general eruption.

This begins as a slight redness of the surface, attended by pruritus. The scrotal surface becomes thickened and œdematous, the normal furrows being much deepened. In most cases the lesion is a dry, scaling eczema, but it is sometimes of the moist variety. The affection is very persistent, and is accompanied by itching and a burning heat, often almost intolerable. The suffering may be increased by the formation of deep fissures. In many cases the lesion spreads to the thighs and perinæum.

When the penis is attacked, its integument becomes much thickened and phimosis may be produced.

This affection is rarely seen before puberty, occurring usually in young and middle-aged men. Relapses are often observed.

The etiology of this, like other varieties of eczema, is not clear. Probably in many cases local irritation is the starting point of the affection, while in some the rheumatic and gouty diatheses may act as predisposing causes.

Treatment.—The treatment of eczema of the scrotum is often very unsatisfactory. In its early stages, when there is much hyperæmia, the best application is diachylon ointment, to which a little powdered camphor may be added. The inflamed surface should be covered with pieces of lint smeared with the ointment, and the parts be then placed in a suspensory. The acute œdema of the early stage is often benefited by immersion of the parts once or twice daily in very warm bran-water, followed by the application of the ointment. As the case becomes chronic and the infiltration more dense, some stimulating agent, such as the oil of cade, or the oil of white birch, should be added to the ointment. Half a drachm of the oil may be combined with an ounce of diachylon ointment, and the mixture should be used when fresh, since it readily decomposes. The proportion

of the oil may be increased according to the toleration of the parts. It is rarely necessary to add more than two drachms to each ounce. While treatment is thus followed, the patient should, if possible, avoid active exercise.

In some chronic cases the thickening is so dense and the pruritus so severe, that more active stimulation is required. We then resort to a strong solution of caustic potassa or soda, in the proportion of from half a drachm to two drachms to the ounce of water. This should be carefully applied with a sponge or pad of flannel for five or ten minutes. Its immediate effect is to produce much redness and swelling, with more or less superficial excoriation. From the excoriated surface small drops of viscid secretion slowly exude for an hour or two. Water-dressing may be needed to control the reaction. Finally the parts may be enveloped in strips of lint smeared with the ointment, which should be renewed twice daily. The reapplication of the caustic solutions may be indicated. In occasional instances we have used vesicating collodion, instead of the caustics, with similar results and with decided relief of the intense pruritus.

Tinea Circinata Inguinalis.

Under the titles, *herpes inguinalis* (Baerensprung) and *eczema marginatum* (Hebra) has been described a form of ring-worm occurring about the genitals, particularly of males, which sometimes resembles eczema.

The eruption begins as a small round spot on the inside of the thigh, where it is in contact with the scrotum, or upon the pubic region. It is rarely seen by the surgeon in its early stage. If uncomplicated, we find a narrow ring, not very much elevated, often scaly, and composed in part of vesicles. Its color is darker than that of ringworm, as seen on the neck and on other exposed regions. The inclosed area of skin is sometimes almost normal; it may be red and scaly, and the hairs growing from the part are broken and lack their normal lustre, as though their nutrition were impaired. In some cases the hairs seem to be unaffected. The rings formed by the eruption tend to spread down the thighs, over the perinæum to the buttocks, and up the hypogastric region to the umbilicus. Not infrequently the affection appears at about the same time in the axillæ and from there extends in the form of rings.

In the chronic cases, in which a large extent of surface is involved by the eruption, the skin inclosed by the rings undergoes various changes. Sometimes new rings appear within the larger ones, so that we may find the thighs, buttocks, and abdomen covered with large and small circles and segments of circles, or simply by wavy and irregular lines. This condition may continue for months or even years, or the lesion may assume an eczematous character as it extends at the periphery. The affected skin becomes thickened and inflamed, and papules, pustules, and perhaps numerous scales may form upon it. Owing to greater cleanliness and early treatment we do not frequently see this aggravated form of ringworm, but in Austria, according to Hebra, it is quite common among shoemakers

and cavalry men. English authors state that it is often seen in patients returning from China, India, and other Eastern countries. The course of this affection is quite chronic; while it yields readily in its early stages, it is very rebellious to treatment at a later period, and is prone to recur.

The most reliable remedy is sulphurous acid, which should be thoroughly applied once or twice a day after cleansing the parts with soap and water. In many cases simply painting the affected region with tincture of iodine is sufficient. German authorities speak in high terms of Wilkinson's ointment, which is modified by Hebra as follows:—

℞.	Flor. Sulph.,	
	Ol. Fagi., āā ʒiij	90
	Cretæ Albæ ʒij	60
	Saponis Viridis	
	Axungiæ Porci, āā ʒviij	240

This ointment should be well rubbed in, and, instead of washing it off, the anointed surface may be dusted with powdered starch. Another ointment we have used with benefit in these cases is made as follows:—

℞.	Hydrarg. Precip. Alb. gr. xlv	3
	Potass. Sub-carb. ʒiss	6
	Ol. Cadini ʒiij	12
	Ung. Simplicis,	
	Ung. Petrolei āā ʒj	30
M.		

The subcarbonate of potash should be dissolved in a few drops of water and then the other ingredients may be added. When there is much hyperæmia and eczema it is necessary to use soothing and astringent applications to reduce the inflammation, before attacking the parasite which is the cause of the affection. It is important to guard against reinfection, which is liable to occur from spores lodging in the meshes of the underclothing.

This affection occurs much more frequently in males than in females and is usually observed in young and middle-aged persons. It is caused by the parasite known as the *tricophyton tonsurans*.

Scabies of the Genital Organs.

Scabies, or itch, may be limited to the genitals, or it may involve these organs at the same time with other regions of the body. It occurs rather more frequently upon the penis than upon the female genitals, and is sometimes very persistent. Upon the mucous more commonly than upon the tegumentary covering of the penis we find slightly elevated papules and moderately distended pustules. Sometimes we also find the marks of scratching and patches of hyperæmia. In some cases very careful examination will reveal the furrow of the acarus, as a small whitish linear elevation, varying in length from one-eighth to one-half an inch. These furrows or cuniculi definitely prove the presence of the itchmite. They are sometimes, however, not found here as in other localities. In bad

cases an eczematous condition of the penis is produced by the excessive irritation.

This affection tends to remain in a chronic condition; papules and pustules succeeding each other and uniting to form patches. In some cases the lesion is conveyed from the hands or other parts by the act of scratching the genitals. The occurrence of a localized eczema of the penis or of the extra-genital region of the female should always excite suspicion. The points of diagnostic significance, therefore, are the irregular mingling upon the penis or mons Veneris, of a number of small papules and pustules, the excessive itching, and perhaps the presence elsewhere of a similar eruption. The discovery of the acarian furrow establishes the diagnosis beyond doubt.

The treatment is very simple. The best application is a salve composed principally of balsam of Peru, as follows:—

℞. Bals. Peruv. ʒij . . . . . 8|
Gelati Petrolei ℥j . . . . . 30|
M.

After immersion of the affected parts in quite hot water containing a little borax, the above ointment should be thoroughly rubbed in and afterwards spread upon lint and applied to the region.

The cause of this affection, as of the itch in other localities, is the insect, the *acarus scabei*.

Phtheiriasis Pubis.

Phtheiriasis, commonly called lousiness, is an affection caused by animal parasites or pediculi, of which there are three varieties: the pediculus capitis, the pediculus corporis, or vestimentorum, and the pediculus pubis. The first two attack the head and body, the third is usually limited to the extra-genitals, and we shall confine our description to the changes produced by it in these parts.

The pediculus pubis, also called the crab-louse, phthirius inguinalis, phthirius pubis and morpio, is the smallest variety. Its body resembles in shape a shield, being broad, flat, and rounded. Its head is proportionately large, and is somewhat the shape of a fiddle. From each side of the head project stout, five-jointed antennæ, anterior to which are two small eyes. There is no indentation between the thorax and the abdomen. To the former are attached six-jointed, hairy legs with strong claws, and along the margin of the abdomen are eight conical feet, from each of which project from four to ten bristles. The insect has a very light-brown color, and is somewhat translucent. The female is larger than the male, and has a triangular indentation at its posterior part.

Although the insect is usually found only in the pubic and femoral regions, it is sometimes transferred by the fingers to the axilla and to the eyebrows and lashes.

The presence of the parasite upon the genitals is made known by an intense pruritus, which is paroxysmal. In many cases the itching is trifling during the day and severe at night. Very often the insects are so few that

The formula on p. 573 should read—

℞. Hydrarg. Bichlor. gr. viij 50
Aquæ Cologn.,
Aquæ, āā ℥ij 60
M.

they may be overlooked, except upon the most careful search. In some cases no visible lesions of the skin are produced. In other cases we may find crusts of dried blood, as small as the head of a pin. These result, not from the bite of the insect, but from the puncture of a sucking apparatus, or haustellum. In addition to these lesions, we sometimes find secondary changes, such as hyperæmia, congestion of the hair follicles and even pustulation. Examination of the hairs shows dirty white particles attached to their shafts, which are the nits or ova of the parasite. Upon separating the hairs small, light-brown spots, sometimes mistaken for particles of dirt, may be discovered. On each side of this body, which is the pediculus, may be seen its minute hair-like legs. This feature is diagnostic, and should be looked for in every case of pruritus of the genitals.

Treatment.—The treatment of phtheiriasis pubis is strictly local and is very efficacious, if carefully applied. Although mercurial ointment is considered a specific by the laity, its use is objectionable on account of the acute and severe dermatitis which it often produces. The most eligible preparation is the following solution, which may be sopped on the parts freely once or twice a day and allowed to dry :—

R. Hydrarg. Bichlor. gr. viij 50
Aquæ Colognæ,
Aquæ, āā ʒij 60
M.

After its use a warm sitz bath is very beneficial. Care should be taken that the underclothing and bed-linen are thoroughly cleansed and pressed with a hot iron. In cases of extreme persistence of the parasites it may be necessary to cut the hair from the pubes. Besides the solution already recommended the tincture of delphinium, or larkspur, is equally efficacious and pleasant to apply.

Tinea or Pityriasis Versicolor.

This parasitic skin-affection is so often mistaken for syphilis, and those affected with it are so frequently subjected to unnecessary mercurial treatment that a description of the lesion seems desirable.

It begins on the chest as small, round, light yellow spots, which may be slightly or not at all elevated above the surface. These spots may be scaly, or smooth and shining; they seem to be seated around the sebaceous and sweat follicles, and they gradually extend until quite large patches are formed. When the eruption is chronic and very extensive, numerous small patches surround those of larger size, an appearance which has been compared to a map representing continents and islands. The color varies from a light yellow to a dark brown or even coppery hue. When the circulation is active, or the lesion is irritated by scratching, the patches may become red.

In some cases this affection is limited to the breast, while in others it extends over the entire anterior surface of the trunk, stopping at the neck,

perhaps invading the axillæ to some extent and encroaching slightly upon the thighs. It sometimes begins upon the mons Veneris and about the inguinal region, but very rarely extends around to the back. It occurs in both sexes, perhaps with greater frequency in females than in males. It is of common occurrence among those who perspire freely, in weak and debilitated subjects, and especially those suffering from pulmonary troubles. On the other hand, those in robust health are by no means exempt.

The affection is sometimes attended by mild pruritus, or tingling and slight itching may be complained of only when the patient is warm or excited. In very rare cases the pruritus is severe and troublesome.

The disease runs a slow, chronic course, sometimes persisting for years; again it sometimes disappears in winter to return in summer. It is only mildly contagious, cases of undoubted infection from the parasitic fungi being not often seen. Instances have been known in which husbands have had the disease for years without infecting their wives. The affection is perpetuated by the wearing of flannel, which seems to be a nidus for the parasite, and it is particularly persistent in uncleanly persons. Yet in some cases the utmost cleanliness does not prevent a recurrence.

The affection is not seen in very young persons, but in those of adult and middle age. Some authors have claimed that a peculiar state of the system, generally one of debility, is essential to its development. In our opinion free perspiration seems to favor its appearance, which is quite independent of a morbid condition of the system.

Tinea versicolor is a distinctly parasitic affection, being caused by a vegetable parasite, the *microsporon furfur*.

Diagnosis.—This affection is sometimes regarded as an evidence of syphilis or of a disordered condition of the liver. It certainly has no relation whatever to hepatic derangement, and resembles syphilis only in the brown or sometimes coppery color of the patches. The distinction is very readily made. Syphilitic coppery stains are always discrete and not confluent; they are scattered all over the trunk as well as elsewhere on the body; they are sharply circumscribed, and rarely if ever scaly, are not itchy, and are not effaced by scratching, as is the case with patches of tinea. Finally, the scales of syphilis are simply epithelial, while those of tinea contain the spores of the parasite.

Treatment.—The patches should be well scoured with a pad of flannel smeared with soap. Strong solutions of sal soda or borax employed with active friction are of benefit. After a thorough washing, either of the following parasiticide lotions may be applied:—

℞. Sodæ Hyposulphitis ʒiij 12
Aquæ ʒiv 120
S. To be freely sopped on the parts.

℞. Hydrarg. Bichlor. gr. v 30
Aquæ Cologn. ʒss 15
Aquæ ʒiijss 105
M.

After each application clean underclothing should be put on, and that previously worn must be boiled for a long time, in order to prevent reinfection.

Lupus Erythematosus of the Penis.

Lupus erythematosus, although occurring most commonly upon the face, occasionally attacks the penis, sometimes being limited to the latter region and again appearing at the same time on other parts of the body.

The lesion begins as a small, circular, red spot, slightly elevated and covered with a few small adherent scabs. The margin is sometimes raised, while the surface may present numerous little elevations caused by plugging and swelling of the sebaceous follicles. The patch increases in size, healing taking place at its centre while its border extends. The eruption has a dull red, but not coppery, color, and is seldom attended by any abnormal sensations. Its course is very chronic. In two cases seen by us the lesion began on the outside of the prepuce.

Diagnosis.—This affection may be mistaken for the papular syphilide, in its ringed form, or for psoriasis. The rings of syphilitic papules generally have a coppery red color, are very slightly scaly, and the inclosed area of skin is normal. The patches of psoriasis are usually multiple, are very scaly, and coexist with similar ones elsewhere.

Treatment.—The treatment of this affection is not always satisfactory in its results. As an application mercurial plaster or a dilute mercurial ointment may be tried. Electrolysis may be employed at the advancing border of the patch. In case these methods fail it may be well to resort to excision of the entire patch unless too large.

CHAPTER XIV.

AFFECTIONS OF THE APPENDAGES OF THE SKIN.

AFFECTIONS OF THE HAIR.

Alopecia is one of the most common symptoms of syphilis. It varies from slight to almost complete loss of hair, which is rarely permanent, and its course may be rapid or chronic. It is attended by no subjective symptoms, such as heat or itching, and in most cases there are no marked lesions of the scalp, while in other cases the hair follicles may be involved by macules, papules, pustules, or ulcers. The eyebrows, the beard and moustache, the hair of the pubes and axillæ may also be involved. The eyelashes are seldom attacked, except by ulcerative lesions, and alopecia never exist elsewhere without affecting the scalp.

There are two varieties of syphilitic alopecia, one consisting of a simple thinning of the hair, and the other of loss of the hair in patches.

On the scalp the result of alopecia is generally striking, but it may be so slight as to pass unnoticed, the hair merely being thinned. The hair may be lost in one or more patches, which vary in size and occur without symmetry or order; they may be as large as the palm of one's hand, and several may fuse together. Their outline is irregular, and they show no tendency to assume a circular form. The surface of the patches is rather dry and somewhat scaly; the follicles are quite prominent, and scattered irregularly may be a few long hairs, sometimes one or more tufts, and minute hairs. The surface of the scalp is dry, and presents a few furfuraceous scales. In patients who have been subject to seborrhœa capitis, or, as it is generally known, pityriasis capitis, this condition is often much more marked.

The hair follicles may be involved by erythematous spots, papules, or pustules, coincidently with a general eruption. In such cases the loss of hair is generally slight and scattered. The arch of the eyebrows may be interrupted by the fall of a few hairs, or may be totally destroyed, giving the patient a very peculiar appearance. In the beard, in the axillæ, and upon the pubes, the loss of hair may also be partial, complete, or in patches.

Syphilitic alopecia is peculiar to the secondary period, and generally begins about the third month, at the decline of the earlier secondary symptoms. It may occur at any time before the end of the second year, and is very frequently associated with cachexia.

Alopecia is undoubtedly a result of impaired nutrition of the hair follicles, due to the adynamic influence of syphilis. Under the microscope the hair bulb, instead of appearing expanded and rounded, is seen to be

wedge-shaped or otherwise imperfectly formed. It is probable that the papilla no longer nourishes the bulb, which therefore withers and contracts, the hair becoming detached. For a short time the hair may remain in the follicle held by the root-sheath. In this case a new hair will probably grow; but should inflammatory or ulcerative changes occur in the follicles, or when pustules attack the scalp, and sometimes even when erythematous spots and papules occur, the papilla may be destroyed and the follicle become obliterated, permanent baldness resulting. This happens in a marked degree in connection with late tubercles and gummatous ulcers.

Diagnosis.—The diagnosis of syphilitic alopecia is to be made from pityriasis capitis (seborrhœa), senile baldness, and alopecia areata. The suddenness of invasion and the generally marked character of the baldness in syphilitic alopecia and its non-inflammatory course are in marked contrast with the chronic course, and the scaly and somewhat pruritic condition of pityriasis capitis. Moreover, the suspicion of syphilis is confirmed by the history of the case and the discovery of other specific lesions.

Senile alopecia, incorrectly so called since it usually begins in middle life, extends backwards from the forehead or begins at the vertex, and is wholly unlike the syphilitic affection. Moreover, the scalp is smooth and shiny, and the follicular openings are no longer visible.

Alopecia areata is much more common in children than in adults, and occurs in round, oval, or serpiginous patches, the hair on other parts of the scalp being preserved. The surfaces of the patches are very smooth and polished, and of a yellowish-white color; they are not scaly, and they are completely destitute of hair.

The prognosis of syphilitic alopecia is in general good. In some cases the loss of hair is so extensive and its renewal so slow that permanent baldness seems to be inevitable. The main points upon which to base the prognosis are the extent of the baldness, its duration, and the patient's general health. If the affection has been severe, and has existed for some time, if treatment has been neglected and incomplete, and if cachexia has taken place, the prognosis must be very guarded.

The treatment of syphilitic alopecia is that of the secondary period. Although we cannot agree with Fournier that mercurial treatment is the only requisite, we are confident that it should never be neglected; and we believe that local treatment also should be employed. The indications are to apply stimulation with the hope of restoring the healthy condition of the scalp. Frequent shampooing of the head with brisk friction is of much benefit. For this purpose we prefer a simple tincture of German green soap, made as follows:—

R. Saponis Viridis, ℥ij 64
Aquæ Cologn., ℥iv 124
M. Filter.

The scalp having been moistened with warm water, it should be rubbed with a sponge containing ℥ij (8) of this preparation. Care must be taken

to completely expose the scalp. After washing and thoroughly drying the hair, the surface should be rubbed with the following:—

℞. Tinct. Cantharid., ℥jss 45
Tinct. Capsici, ℥iv 16
Ol. Ricini, ℥jss 45
Alcohol (95) ad ℥viij 250
Perfume, q. s.
M.

This makes an excellent tonic. Some authors recommend a similar compound with spirits of hartshorn added; we never use this ingredient, since it dries the hair and is inferior to green soap tincture as a detergent. We have also used a solution of quinine as follows, but have never been struck by its efficacy:—

℞. Quin. Sulph., ℥j 4
Spir. Myrciæ, ℥iijss 112
Ol. Amygdal. Dulc., ℥iv 16
M. To be shaken before it is rubbed in.

Various essential oils, such as sabine, thyme, cedar, etc., have also been recommended, but the odor is objectionable, and their stimulating properties are not remarkable. The best local treatment is the daily use of the cantharidal tonic, preceding its application every second or third day by friction with the green soap tincture. In very rebellious cases, in which the patches are large, even greater stimulation may be required, and is best accomplished by blistering with cantharidal collodion, repeated, if necessary, in a week or two, and followed by the milder treatment directed above.

Affections of the Nails.

Syphilitic affections of the nails are of two varieties: in one, called *onychia*, the disease begins in the nails themselves; and in the other, called *perionychia*, it begins in their vicinity and involves them secondarily. Their course is chronic, and may be mild or severe and destructive. They generally appear within the first two years of syphilitic infection, but may be much later.

In syphilitic *onychia* the changes may be dry and confined to the nail-substance, or the nail may be separated from its bed.

In the dry form, *onychia sicca*, called by Fournier "friable onychia" (*onyxis craqueté*), the nail gradually loses its lustre and transparency at its free edge and assumes a dull yellow color; sometimes the disease is limited by a distinct line of demarcation, or the whole nail may be involved. The edge of the nail becomes thickened and brittle, readily cracks, and may be deeply serrated. Its surface is rough and presents shallow, longitudinal fissures and minute depressions, which collect the dirt. The epidermis under and beyond the free margin is usually thickened and scaly. Very often there is but slight inconvenience from the disease and the deformity may be remedied by careful paring of the nail. Treatment results in the gradual pushing forward of the diseased portion, leaving a healthy nail. In neglected cases, especially if the parts are irri-

tated, the whole of the affected nail may be lifted off or pushed forwards by a new nail, which may at first be imperfect.

Separation of the nail takes place not infrequently in the early part of the secondary stage of syphilis, and may be partial or complete. The process may be so insidious and it may cause so little inconvenience, especially with careless persons, and when the toe-nails are affected, that several nails may fall without attracting the notice of the patient. It begins at the free border of the nail, being limited at first to a portion of its breadth. It gradually extends towards the base of the nail, involving one-third to one-half its length, and possibly its entire breadth. In neglected cases the whole nail may be affected and thrown off. The diseased portion of the nail assumes a greenish-brown color, and the matrix beneath presents more or less healthy granulations. When the destruction of the nail has been partial, the healthy portion pushes forward and covers the denuded parts; when it has been complete, an entirely new nail is formed. Only one nail may be affected, or several may be involved simultaneously or in succession, those of the hands more frequently than those of the feet.

Fournier describes a *hypertrophic onychia*, in which the thickening of the nail is excessive. It involves the nails of the fingers more frequently than those of the toes, and usually attacks more than one nail. He thinks women are more subject to it than men.

There is also an affection of the nails, of which we have seen but two well-marked instances in men suffering with syphilitic cachexia, which seems to be a *local necrosis*. The nail becomes opaque and whitish, in spots the size of a pin-head. These spots, of which there may be from two or three to ten, are formed by depressions of the surface of the nail which finally reach the matrix, leaving minute and sharply-cut holes.

There are two forms of *perionychia:* an ulcerative and an indolent form, which is usually non-ulcerative.

The *non-ulcerative* form may attack the entire attached margin of the nail, or its lunula, or one of its lateral margins. The border of the nail to the width of about one line is thickened in consequence of specific infiltration, and there is a more or less complete papular rim around it. The color is dull red, which pales on pressure, and the surface is slightly scaly. This condition may persist for a long time, until the nail becomes of a dull color and is traversed by shallow transverse furrows, showing impaired nutrition. As a result of pressure or irritation ulceration may occur at the angle of reflection of the skin, and may extend beneath the nail, which is finally loosened and thrown off. Sometimes when only a lateral margin is affected, the ulceration reaches but a short distance, and the nail remains and excites a chronic suppurative inflammation, which is cured only after its partial or complete ablation.

The *ulcerative* form of perionychia may occur at any time during the secondary period, and varies greatly in severity. It may begin as a papule or a pustule at some part of the nail margin, or a small ulceration or fissure at the lunula is the change first noticed. In either case the inflammation gradually increases, and ulceration extends along the sulcus at

the attached margin of the nail. The process may be limited to the lunula or to a portion of the nail border, or it may involve the entire length of the sulcus. When the lunula is invaded the affection is very obstinate; the base of the nail soon loses its transparency and becomes detached to the extent of about a line. The ulceration which extends under the nail itself, and may be for a time inaccessible, constantly secretes an offensive pus. The whole nail may be gradually undermined, or the parts may be denuded to a limited extent by destruction of the attached margin. Much depends on the early treatment of the ulceration; if it be speedily checked, a new nail forms and covers the diseased parts, pushing the old nail before it.

When the ulceration, which is likely to be particularly intense at the lunula, is severe, the whole matrix becomes involved, and, after the nail has been thrown off, it presents a yellowish, somewhat pultaceous surface, surrounded by the swollen and ulcerated nail margin. Soon the ulceration shows a tendency to localize itself at the basal margin, while the surface of the matrix becomes covered with a dirty yellow, firm, and uneven epithelial tissue. Unless ulceration involves the lateral margins, which it seldom does, a thin spicula of nail forms along the whole length of the sulcus. In such a typical case the whole phalanx is swollen and bulbous, and the matrix is hypertrophied, pulpy, and of a reddish-yellow color. Attempts at formation of a new nail are seen upon the matrix and at its margins. Owing to its dense structure the matrix itself is very resistant, and if left without treatment merely becomes thickened as the ulceration increases.

If the base of the nail has not been too extensively destroyed it retains a surprising degree of reparative power. A new nail appears and covers the matrix, unless it be excessively hypertrophied, and may be quite as good as the original nail. In some cases a perfect nail results only after several renewals. It sometimes happens that the nail-producing power of the distal portion of the matrix is impaired, so that the new nail fails to cover as much of the finger as did its predecessor. When this condition coexists with total destruction of the base, the whole matrix is converted into a cicatrix.

When the inflammation attacks the base and one side of the nail it involves the subjacent matrix, and if its intensity in the latter region equals that at the base, separation of the nail at the side soon takes place, and permits the free application of remedies. Such cases are of much less gravity.

In persons whose hands are exposed to irritants, perionychia may begin under the free edge of the nail, generally of the index or middle finger. Slight pain attracts the attention of the patient, and he finds a brownish-red crust beneath the nail, removal of which exposes an ulcer extending along more or less of the nail's breadth. On removal of the irritation and the use of proper remedies the ulcer soon heals; in case of neglect it extends and rapidly involves the whole of the matrix, or it creeps slowly along, the nail assuming a dull, yellowish-brown color, the

matrix exhibiting a yellow, ulcerated appearance, and the whole phalanx becoming enlarged, until the base of the nail is reached, when a condition similar to that of inflammation of the lunular region is induced.

All forms of syphilitic perionychia are very chronic, rarely lasting less than one or two months, and sometimes continuing a year. At first they may cause scarcely any inconvenience, and for this reason they are often neglected. Pain begins when the inflammation is fully developed, especially if the base of the nail is involved. In severe cases the whole finger and even the hand may be affected by the inflammation; the lymphatics of the arm are very painful, and there is pronounced systemic reaction.

The nails of the fingers and of the toes are attacked with equal frequency, those most used and most exposed being the most liable. In general only one finger is affected, sometimes a finger of each hand, or two fingers of the same hand, either simultaneously or, more commonly, in succession.

Diagnosis.—Chronic eczema and psoriasis of the hand are sometimes followed by changes in the nail similar to those of syphilitic friable onychia. The question may be settled by the previous history of the case.

Ulcerative perionychia has been mistaken for the initial lesion of syphilis.

A chancre of the finger is seldom met with except in the case of midwives and surgeons, and is always accompanied by characteristic enlargement of the epitrochlear or axillary ganglia.

Severe perionychia resembling the syphilitic form is sometimes seen in broken-down and cachectic subjects. Its occurrence should always excite the suspicion of syphilis.

The prognosis of friable and of hypertrophic onychia is good, since they are generally mild and transient. The same is true when separation of the nail occurs, the morbid condition being soon relieved by proper treatment.

The non-ulcerative form of perionychia usually distresses the patient on account of its attacking several nails, but it occasions slight inconvenience and is readily cured.

The ulcerative forms are always troublesome and often very painful affections, and the prognosis should always be guarded. The earlier separation of the nail occurs and the focus of disease at the base of the nail is reached by local applications, the sooner may relief be expected. New and comely nails sometimes develop even after prolonged and intense basal ulceration. In nearly all cases where the perionychia is lateral or at the free border of the nail, a perfect nail may be predicted.

The growth of the new nail is very slow, and the spiculæ at the edges and the uneven plates which often form on the surface of the matrix, are important indications of retention of the nail-producing power. The new nail is often imperfect at first, being ridged and irregular, and it is sometimes permanently shorter than the old one.

Treatment.—Internal treatment is required in all forms of syphilitic affections of the nails.

Friable onychia calls for no other local treatment than careful trimming of the nails and prevention of irritation.

In case of separation of the nail, exposure of the matrix and the application every day or two of liquor potassæ, followed by the use of an ointment composed of one part of mercurial and two parts of diachylon ointment, will arrest the disease. The simple form of perionychia may be cured by the use of this ointment.

In ulcerative perionychia the diseased surface should be exposed as soon as possible and cauterized with nitric acid or a strong solution of nitrate of silver, allaying inflammatory reaction with water dressings. Subsequently iodoform or powdered nitrate of lead may be applied, and the phalanx be enveloped in diachylon ointment. The profuse granulations of the matrix may require the use of a strong solution of caustic potassa (ʒi–ʒij or iv). Prolonged immersion of the hand in very warm water containing powdered borax (ʒij–Oj) diminishes the swelling, and removes the secretions. The application of a bandage over the ointment, India-rubber finger stalls, or gutta-percha tissue, may be used to reduce the swelling. Care must be taken to apply the pressure gradually.

In addition zinc and belladonna ointments or Goulard's extract may be used to meet special indications. The mixture of diachylon with mercurial ointment is smoother and more efficient than the ordinary mercurial plaster or the *emplastrum de Vigo*.

CHAPTER XV.

GENERAL REMARKS UPON AFFECTIONS OF MUCOUS MEMBRANES.

Attempts have been made by several authors, and especially by Babington, Ricord,[1] and Baumès,[2] to establish a classification of syphilitic eruptions upon mucous membranes founded upon their initial lesion, as is the case with the syphilodermata. There is no doubt that the manifestations of syphilis upon these two regions exhibit a general correspondence, which in some cases is almost perfect. At the same time, it must in general be confessed that although points of resemblance are often apparent between syphilitic eruptions upon cutaneous and mucous surfaces (which are indeed but one continuous membrane), yet that the physical conditions in which the latter are placed—their constant moisture, exposure to friction, etc.—prevent as accurate a classification as we are able to establish in the former.

One form of eruption at least, the pustular, is never met with upon mucous membranes.

Erythema.

Erythema of the mucous membranes is usually identical, in the time of its appearance and in its general character, with the same eruption upon the skin. Like the latter, it ordinarily appears six or eight weeks after contagion, and may affect any of the outlets of mucous canals, although it is most frequently seen upon the fauces, pituitary membrane, and genital organs, and in many instances, doubtless, fails to attract attention. It is most frequently seen upon the fauces in persons exposed to sudden changes of temperature, in smokers, and in those who are subject to frequent attacks of catarrh; upon the vulva in women who have frequent sexual intercourse, and upon the glans penis in men with a long prepuce. It may be the only general lesion present, or more frequently it is accompanied by other early manifestations. It may occur in patches like the erythematous syphilide upon the skin, as in a case described and figured by Ricord,[3] of erythema of the glans penis coexisting with roseola upon the trunk, in which the former eruption was arranged in circles of a bright-red color, inclosing sound portions of the mucous membrane, and closely resembling the roseola upon the body. As a general rule, however, especially upon the fauces and vulva, the eruption is diffused and its outline well defined.

[1] Notes to Hunter on Venereal, p. 429 and 447.
[2] Traité des maladies vénériennes, ii., p. 443.
[3] Iconographie, pl. xv.

Syphilitic erythema of the mucous membranes may exhibit mere redness of the surface without structural changes in the tissues. In some cases, however, the epithelium has a milky hue, and becomes detached in spots, giving rise to erosions. The surface is sometimes dry, and at other times smeared with an abundant secretion. There is usually but little swelling, except when the vulva, the tonsils, and the pituitary membrane, or the labia minora are affected. In the case of the nose, the swollen folds of mucous membrane may interfere with breathing or the passage of the tears through the lachrymal ducts, and also obstruct the Eustachian tubes. Aside from these mechanical annoyances, it is attended with but little pain or inconvenience.

This eruption often disappears quite suddenly, but is very prone to return. Its treatment consists in the internal administration of mercury; in the use of demulcent gargles, as of chlorate of potash or of marshmallow, when the fauces are affected; and in strict attention to cleanliness, and in the separation of opposed surfaces, when the genital organs are involved.

Mucous Patches.

"The name 'mucous patch' is applied to a lesion peculiar to syphilis, consisting of elevations of a more or less decided rose-color, frequently rounded in form, the surface resembling a mucous membrane, and situated in the neighborhood of the outlet of mucous canals, especially around the genital organs and anus, upon the mucous membrane of the mouth, and sometimes upon other parts of the body, more particularly at the base of the nails and wherever the reflection of the integument upon itself forms natural folds in the skin."[1]

This affection is one of the earliest and most frequent secondary manifestations of syphilis, and is therefore one with which the student of venereal should be perfectly familiar; unfortunately obstacles have been placed in the way of acquiring a knowledge of it by the confusion which has been introduced in its classification, and in the terms which have been applied to it. Different authors, according to the views they have entertained of its nature, have described it among tubercles, pustules, and papules, and have called it by the corresponding names of "mucous tubercle," "pustule" or "papule." But the first two of these terms are entirely inappropriate, since it does not resemble syphilitic pustules or tubercles in its time of development, its symptoms, course, or termination. The name mucous papule is less objectionable, since it consists in most instances of a development of the papillæ forming broad elevations above the surrounding surface; but it is not always elevated, and may even be excavated, and it is moreover so distinct in its characters from ordinary papules, and of such importance as an indication of constitutional infection, as to entitle it to the separate name adopted by MM. Deville and Davasse, which I shall here retain.

As regards its histology, this lesion is found to consist mainly in a

[1] Davasse and Deville, Des plaques muqueuses, Arch. gén. de méd., 1845, t. ix.

marked hyperplasia of the papillæ, and an abundant proliferation of cells in the mucous layer which present a muddy appearance due to granular changes in their protoplasm and segmentation of their nuclei. The sheaths of the hair bulbs and the walls of the vessels are likewise infiltrated and thickened. The surface of the patch may retain its epithelium, or the latter may become detached and removed; it may either become depressed below the surrounding surface by the process of ulceration, or rise above the same in consequence of further development of the papillæ, whence arise the various appearances which this lesion may present.

As already stated, this lesion is found at the outlet of mucous canals, and upon those portions of the external integument which are maintained by contact in a constant state of warmth and moisture, and are thus very nearly in the condition of mucous surfaces. Some idea of its comparative frequency in these various regions may be obtained from the following tables:—

In 130 men observed by Bassereau, mucous patches were found—

Around the anus	110 times.
Upon the tonsils	100 "
" " scrotum	66 "
" " lips	55 "
" " glans and prepuce	28 "
" " velum palati	27 "
" " tongue	18 "
" " pillars of the soft palate	17 "
" " internal surface of the cheeks	11 "
Between the toes	11 "
In the fold between the scrotum and thigh	5 "
At the nasal orifice	2 "
On the posterior wall of the pharynx	2 "
At the base of the toe-nails	2 "
" " meatus urinarius	once.
In the axilla	"
Upon the gums	"
Covering the thighs in an infant three months old	"

In 186 women observed by Davasse and Deville, mucous patches were found—

Upon the vulva	174 times.
" " anus	59 "
" " perinæum	40 "
" " nates and upper and inner parts of the thighs	38 "
" " tonsils	19 "
" " nostrils	8 "
" " tongue	6 "
" " toes	5 "
" " face	5 "
" " umbilicus	3 "
Around the nails	2 "
Upon the ears	2 "
" " soft palate	2 "
" " inguinal fold	2 "
" " neck	once.
" " nipple	"
" " cervix uteri	"

It thus appears that the most frequent seat of mucous patches in men is around the anus and within the mouth, and in women upon the vulva. It has been asserted that they are much more frequent in the latter than in the former sex, but the difference is probably not so great as has been supposed. There is certainly no more common symptom in male patients affected with syphilis. They are also present in most cases of hereditary syphilis in infants, and, in consequence of the moist condition of the integument at this early age, are not confined to the regions above mentioned, but may be scattered over the whole surface of the body, and especially the nates and thighs.

The development of mucous patches is everywhere favored by inattention to cleanliness, and in the mouth by the use of tobacco, either by smoking or chewing; in men who are habituated to this practice, they constitute one of the most persistent and troublesome symptoms we have to deal with, and in dirty prostitutes of the lower class they are equally abundant and obstinate about the genital organs.

Mucous patches vary in appearance according to their situation. The chief points of difference are found between those seated upon the external integument and those upon membranes which are strictly mucous.

The former, which are met with for the most part around the anus and genital organs in the two sexes, consist of rounded disks, either single or aggregated, of a reddish or grayish color, granulated and elevated to the height of about a line above the integument upon which they appear to be superimposed, like a number of cones laid upon the part. They then receive the name of *condylomata*. Their appearance is so peculiar, that when once seen it cannot be forgotten.

Their mode of development is as follows: A red spot first appears upon the skin, and a slight effusion takes place beneath the epidermis—sufficient to loosen it from the derma but not to raise it in the form of a vesicle or bulla; the epidermis is removed by friction, or falls off, and exposes a raw surface upon which a moist, grayish pellicle is formed; the surface is elevated by hypertrophy of the superficial layers of the skin and gives rise to the broad, flat, wart-like disks above referred to.

In Fig. 119 we have a representation of exuberant condylomata situated around the vulva.

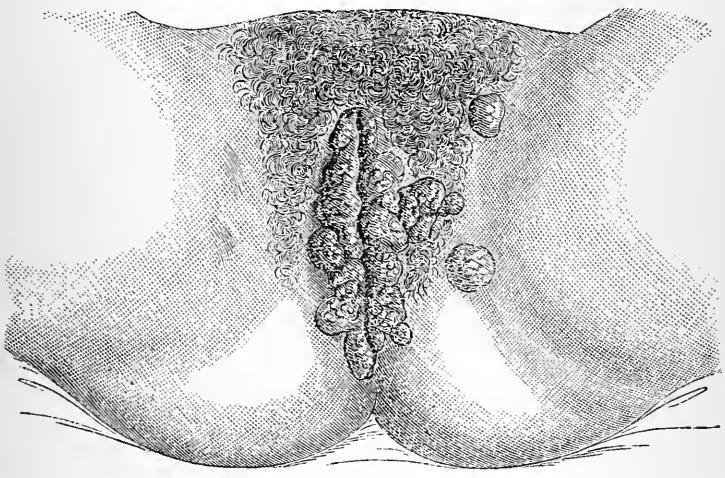
Another and a very singular mode of origin of mucous patches is from the surface of a chancre, which, during the reparative process, may granulate above the surrounding integument, and become covered with a thin, translucent, and grayish pellicle. This transformation of a primary into a secondary symptom has already been described in the chapter upon chancre. It occurs most frequently upon the genital organs, but Bassereau relates an interesting case in which it took place upon the lower lip,[1] and I have met with an instance upon the upper eyelid.

When originating from a chancre, mucous patches are seated upon an indurated base, but otherwise the tissues beneath them are found on pres-

[1] Op. cit., p. 326.

sure to retain their normal suppleness. Contrary to the statements of some authors, they never present the copper color of other syphilitic eruptions, but are either of a reddish or grayish-white color. If the patient happen to be jaundiced, the pellicle covering them may be tinged with yellow. They are usually smeared with a very offensive muciform

Fig. 119.



Vegetating condylomata about the vulva. (Jullien, after a cast in the museum of the Hôpital Saint-Louis.)

secretion, which is peculiarly unpleasant when the patches are seated in the neighborhood of the genitals, and I have repeatedly known the odor to be so strong as to pervade the room. In a few exceptional instances the patches are dry.

Mucous patches readily become ulcerated. When exposed to friction against the clothes or the opposed integument, the pellicle covering the patch is removed, and a red, superficial, but depressed ulceration takes the place of the elevated disk. Such is the origin of the raw surfaces frequently seen upon the sides and front of the scrotum in syphilitic patients.

Ulcerated mucous patches upon the margin of the anus closely resemble ordinary anal fissures, from which they may be distinguished by their more prominent and rounded edges, and by the grayish pellicle which is generally visible upon the sides of the cleft. When situated between the toes, they yield a thin, brownish, and very offensive discharge, and they often project upon the dorsum or palmar surface of the foot in the form of a crescent at the base of the interdigital sulci. Ulcerated and fissured mucous patches upon the margin of the anus, between the toes, or elsewhere, are called *rhagades*.

Condylomata upon the vulva are generally elevated and of a reddish color, as is well represented in Ricord's *Iconographie*, Pl. XX. Those that I have seen within the vagina and upon the cervix uteri, have more

closely resembled mucous patches upon the external integument than those situated upon other mucous membranes, as, for instance, within the buccal cavity. Mucous patches upon the genital organs in both sexes sometimes give rise to a discharge resembling gonorrhœa from the neighboring mucous membrane, which is not unfrequently observed about the time that early secondary symptoms appear, or when a relapse of general symptoms takes place.

Unlike most syphilitic eruptions mucous patches are frequently attended by pruritus, especially when seated upon the scrotum or perinæum, and when proper attention is not paid to cleanliness or the parts have become warm and moist from exercise or prolonged contact in bed. The unquestionably contagious character of these lesions has previously been mentioned.

Mucous patches within the buccal cavity present a somewhat different appearance from those now described. Their most characteristic feature is the grayish-white color, appearing as if they had been pencilled over with a crayon of nitrate of silver, which has given them the name of "opaline patches." They are more irregular in their outline than condylomata, and unlike the latter are not, as a general rule, perceptibly elevated above the surface. In some cases, the adventitious deposit which gives them their grayish color and which is with difficulty removed, is confined to the irregular margin of the patch, while the centre remains sound; and when presenting this appearance they have been compared to the track of a snail.[1]

The most frequent seat of this form of mucous patches is upon the internal surface of the lips and cheeks, upon the sides and dorsum of the tongue, upon the gums, tonsils, and soft palate. They sometimes extend beyond the pillars of the fauces, and are seen upon the walls of the pharynx and the posterior nares. Since the invention of the laryngoscope they have also been seen upon the epiglottis and mucous membrane of the larynx.

A frequent situation is at the angle of the mouth, where they are often intersected by cracks and fissures, the sides of which present the characteristic grayish color of this lesion, and where they are continuous with small patches of impetigo upon the external integument. Upon the dorsum of the tongue, their base is sometimes hard, indurated, and fissured; or the pellicle which at first covers them may be rubbed off by the food, leaving a slightly depressed surface resembling an aphthous ulceration; or, again, they may granulate above the surface and form vegetations. When seated upon the tonsils, mucous patches are peculiarly exposed to irritation and ulceration from friction of the food in deglutition, and ulcers are formed, attended by considerable inflammation and swelling of the surrounding parts, and in which the characters of the original lesion are entirely lost. Deglutition is very much impeded, and the surrounding inflammation may extend to the Eustachian tube and produce partial deafness.

[1] Iconographie, pl. XX, bis.

Bassereau states that mucous patches may react upon the neighboring lymphatic ganglia, in the same manner as syphilitic eruptions situated upon the scalp, but only in case their development is attended by acute inflammation. Thus the submaxillary glands are frequently swollen from sympathy with mucous patches upon the fauces; and the inguinal glands may be enlarged in consequence of the presence of condylomata upon the scrotum, but the effect upon the latter is less readily perceived because they are generally indurated from their anatomical connection with the primary sore. In two cases observed by Bassereau, in which the chancre was situated at a distance from the genital organs, the inguinal glands were enlarged in consequence of mucous patches in the last mentioned situation. This effect upon the ganglia is, however, exceptional, and always consists of mere engorgement and never of induration.

The following tables from the same author exhibit the period of development of this lesion after contagion when no treatment had been instituted, and also when mercury had been given for the primary sore:—

In the former case, mucous patches appeared—

On the 20th day after contagion in										1	instance.
" 29th " " "										1	"
From 1 to 2 months after contagion in										25	instances.
" 2 " 3 " " "										5	"
" 3 " 4 " " "										7	"
" 4 " 5 " " "										5	"
" 5 " 6 " " "										3	"

In the latter case—

From 2 to 3 months after contagion in										2	instances.
" 3 " 4 " " "										6	"
" 4 " 5 " " "										5	"
" 5 " 6 " " "										5	"
" 6 " 7 " " "										6	"
" 7 " 8 " " "										2	"
" 8 " 12 " " "										5	"
" 12 " 18 " " "										3	"

I will again remind the reader that these dates have reference to the first development of the eruption only. The difference in the two tables shows the power possessed by mercury to delay the appearance of secondary symptoms.

Mucous patches are exceedingly chronic and persistent, and are very prone to reappear; they are, indeed, the most frequent evidence of the renewed activity of the syphilitic poison.

Treatment.—In addition to the general treatment by mercury which mucous patches require in consequence of the indication they afford of the existence of syphilitic intoxication, certain local applications are advisable. In the case of condylomata, Ricord's favorite treatment, which consists in washing them twice a day with Labarraque's solution of chlorinated soda, then sprinkling them with calomel and separating the opposed surfaces by the interposition of lint, is generally very successful, but it is sometimes

necessary to destroy them with nitrate of silver, nitric acid, or the acid nitrate of mercury.

Mr. Victor de Méric speaks highly of an ointment employed by several physicians of the German Hospital, London, consisting of two drachms (8.00) of calomel, the same quantity of sulphate or oxide of zinc (it matters not which), and one ounce (30.00) of lard. After a few applications, the excrescences become dry and horny, fall off and leave a raw surface which soon heals. When there is much inflammation present, the application of poultices should precede this treatment.[1]

Mucous patches in the mouth should be touched with nitrate of silver or one of the stronger caustics, and other applications may be employed which will be mentioned in a subsequent chapter. This local treatment should by no means be neglected, since without it these lesions will often persist in spite of the use of remedies directed to the cause of the disease.

Aubert and Chéron claim that the treatment of obstinate cases of condylomata may be greatly shortened by first pencilling them with the stick nitrate of silver and then applying to the surface a piece of zinc. This method is based upon the decomposition of the nitrate of silver, and the formation of a nitrate of zinc, which is a very powerful caustic, especially in the nascent state. This mode of treatment usually excites very considerable pain.

[1] Lettsomian Lectures, p. 42.

CHAPTER XVI.

AFFECTIONS OF THE ORGANS OF DIGESTION.

The Mouth.

Erythema.—Erythema of the buccal cavity is usually confined to the neighborhood of the fauces. It may readily be confounded with the effects of an ordinary cold, from which it often can be distinguished only by the history of the case. The presence of narrow, dusky-red bands of inflammation along the border of the velum ending abruptly at the base of the uvula is considered by some observers to be characteristic of syphilitic erythema. Associated with this condition, as well as with other lesions, there is often a general œdema, especially of the velum and uvula. The latter organ may become much swollen, but no portion of it should be removed, since under treatment it soon resumes its normal proportions. The uvula also may be completely or partially eroded by ulceration. In the latter case, even when its attachment to the soft palate is very slender, the uvula need not be excised, since during the process of repair adhesions form between the eroded surfaces. In this way the natural conformation of the parts may be restored to a remarkable degree.

Mucous Patches.—The most common syphilitic lesions of the mouth are mucous patches. They are most frequently found upon the tonsils, the uvula, the velum palati and its pillars, the sides of the tongue and the mucous surfaces of the lips, especially the lower. At the angles of the mouth they are often continuous with a pustular eruption upon the integument. The inner surface of the cheek near the last molar tooth is another favorite seat. The dorsum of the tongue and the gums are less frequently affected.

Papules and Vesicles.—Papules are often seen in the mouth coincidently with a general papular eruption. Owing to the constant maceration of the mucous membrane of the mouth, the formation of vesicles is rare if not impossible.

The name "*plaques des fumeurs*" has been given to certain patches most frequently seen on the mucous lining of the cheeks near the angles of the mouth. Fournier[1] considers their location absolutely diagnostic, and, in view of their situation and color, he has called them "*plaques nacrées commissuraires.*" They occur most frequently in the mouths of

[1] Des glossites tertiaires, Paris, 1877, p. 54.

inveterate smokers, and are due to accumulation of the epithelium, which becomes opaline, as though the spots had been touched with collodion, or with nitrate of silver; the patches are sometimes fissured and may become eroded, although the epithelium is usually very adherent. They are generally quite obstinate and persist long after the apparent extinction of the specific virus.

The Tongue.

The tongue is the seat of many interesting and important lesions of syphilis, whose resemblance to each other and to certain non-specific affections may be somewhat confusing. The rarity of other secondary affections of the tongue has led to the inclusion of many of them under the term "mucous patch." A single case of *roseola* is referred to by Jullien[1] as having been seen by Hardy in a patient who had at the same time a general erythematous eruption. Zeissl describes *mucous papules* of the tongue, and says of mucous membranes in general that syphilis does not develop *pustules* in their structure.

Secondary lesions of the tongue are, as a rule, the source of but slight pain at their inception, and even in process of ulceration they may give rise to remarkably little inconvenience, unless subjected to irritation. In extreme cases there may be some difficulty in mastication and moderate increase in the secretion of saliva. The tendency to assume the circular form has been observed in some of these lesions of the tongue. They generally yield readily to treatment and leave no trace of their existence, but frequent recurrences, especially in smokers, are seen. The comparatively greater frequency of these lesions in men may be referred to the use of tobacco and alcohol, irritating causes to which women are thought to be less exposed.

A condition of so-called "*psoriasis of the tongue*" has been described by several writers, particularly Bazin,[2] Debove,[3] and Mauriac,[4] the syphilitic origin of which is doubtful. It occurs on the dorsum of the tongue in patches, which may be recognized by their silvery white color, their leathery consistence, and the epithelial exfoliation attending them. Fournier, Trélat, Fairlie Clarke, and others regard them as frequent antecedents of epithelioma. Clarke thinks that they assume a malignant character when they invade the papillæ and the submucous tissues. A similar affection, originally described by Samuel Plumbe,[5] under the name "*ichthyosis*," occurs very rarely in the course of syphilis. In 1875, Weir[6] reported ten cases of ichthyosis in addition to fifty-eight previously recorded by other authorities. The proportion of syphilitic subjects in whom this

[1] Mal. vénériennes, Paris, 1879, p. 737.
[2] Leçons sur les affections arthritiques et dartreuses, 1868.
[3] Le psoriasis buccal, 1873.
[4] Du psoriasis de la langue, etc., 1875.
[5] Diseases of the Skin, London, 1837, p. 514.
[6] Ichthyosis of the Tongue and Vulva, N. York M. J., Mar. 1875.

lesion has been observed is extremely small. The idea that ichthyosis, psoriasis and the condition called *plaques des fumeurs* are identical lesions, has been advocated by Hugonneau,[1] who believes that they are due to different causes, not necessarily specific, and that they may develop into cancer. Their resistance in many cases to anti-syphilitic treatment, and their frequent occurrence in those who never present any evidence of syphilitic infection, create a doubt whether these lesions should be considered truly specific, although syphilis may furnish a predisposition to their development.

The term "gummata" was applied to all tertiary syphilides of the tongue until Fournier[2] classified them as "scleroses" and "gummata." In either case hyperplasia is the morbid process, but in scleroses the newly-formed cells persist and become organized in a definite manner, while in gummata they are eliminated by a degenerative process.

Sclerosis.—Sclerosis of the tongue is most frequent about the fifth year of syphilis. It is usually developed near the median line and always on the upper surface of the tongue, and may be *superficial* or *deep*.

Superficial sclerosis involves the mucous membrane only, and produces a lamellated induration analogous to the "parchment" induration of the chancre. It may be circumscribed or diffuse, and ulcerates only as a result of injury by the teeth, tobacco, or similar irritants.

Parenchymatous or *deep* sclerosis may be considered an aggravated form of the superficial lesion, and invades the muscular as well as the mucous tissue. The tongue may be greatly increased in size, but after long persistence of the lesion the newly-formed fibrous tissue retracts, and, as in cirrhosis of other organs, atrophy results. At first the hypertrophied tongue receives the imprint of the teeth at its margin, the body of the organ being lobulated in a manner almost pathognomonic. The lobules are separated by furrows which cannot be effaced by stretching, in this respect offering a contrast with the rugæ which occur on the tongue in dyspepsia and other depraved conditions of the system. The induration is deep and cartilaginous, and the mucous membrane becomes changed in color and perfectly smooth. Ulceration may result from causes similar to those which produce it in the milder form of sclerosis. When parenchymatous sclerosis involves the whole tongue, which fortunately it seldom does, the tumefaction may be enormous.

Gummata.—Like scleroses, gummata, which are later lesions, may be designated as *superficial* or *parenchymatous*, since they may be found in the mucous or the muscular tissue of the tongue. The *superficial* or *mucous* gumma begins as a small nodule, which soon softens and ulcerates, leaving an excavation with perpendicular margins and an infiltrated base, which is often covered by tenacious false membrane of a yellowish-white color.

[1] Sur la glossite interstitielle syphilitique, Paris, 1876.

[2] Des glossites tertiaires, Paris, 1877.

Parenchymatous gummata are developed in the muscular tissue of the tongue.[1] They begin as small tumors, which are sometimes difficult of detection on account of their depth and of the surrounding induration. The process of degeneration extends from the middle of the tumors until the thinned mucous membrane over them on the upper surface of the tongue becomes ruptured, exposing a deep cavity with over-hanging and sloughy walls, surrounded by an areola of induration. In view of the great size of the cavity, one would expect excessive deformity, but cicatrization often takes place with relatively slight permanent damage. In rare cases two or more gummatous tumors coalesce, and lead to enormous enlargement of the tongue and proportionate destruction of its tissue. The ulcers may be attacked by phagedæna, when the condition becomes still more aggravated. Without treatment these ulcers are remarkably chronic. One has been reported which persisted, with comparatively little change, for twenty years. According to Clarke[2] gummatous tumors occasionally undergo calcific degeneration.

The importance and oftentimes the difficulty of differentiating syphilitic tumors of the tongue from others of non-specific origin, especially cancerous, are very great. Boyer, Clarke, Lagneau, and many other authorities have given great diagnostic value to their situation at the base and near the median line of the tongue. The experience of Fournier, however, has led him to conclusions quite the reverse. Their insidious formation, their chronic course, and their freedom generally from spontaneous pain are characteristic features of gummatous tumors. The observation of Anger[3] that lancinating pain shooting towards the ear is diagnostic of cancer of the tongue has been repeatedly confirmed. Gummatous tumors may appear at a period much earlier than is usual with cancerous. In addition to these facts, and to the individual and family antecedents of a patient, the ulcerating surfaces of the tumors present somewhat constant features, which may assist in the diagnosis.

Gummatous ulcers are usually multiple, bilateral, and are always upon the upper surface of the tongue; cancerous ulcers are usually single, and may occupy its under surface. The ulcerative process of gummata destroys the tumor; carcinomata present an ulcerating tumor, the induration of which extends with the eroding process. The floor of a gummatous ulcer is sometimes sloughy and is slightly vascular; that of a cancerous ulcer bleeds readily, and, at an advanced stage, secretes an ichorous pus. Zeissl[4] gives diagnostic importance to the fact that "sebum-like plugs" may be pressed from the mucous membrane in epithelioma of the tongue.

Interference with the functions of the tongue is much less in gummata than in cancer. Ganglionic enlargement is rare in syphilitic lesions of

[1] Boursson. Gaz. méd. de Par., 1846, p. 563.

[2] Diseases of the Tongue, London, 1873, p. 147.

[3] Du cancer de la langue, Paris, 1872, p. 78. See Hugonneau, op. cit., p. 42, and Fournier, op. cit., p. 66.

[4] Lehrbuch der Syphilis, 1875, p. 210.

the tongue, with the exception of the chancre, while in cancer it always occurs.

Confirmatory evidence may be furnished by microscopic examination of the tumor, and by the effect of anti-syphilitic treatment, which, in cancer, is sometimes evidently harmful.

The diagnosis between syphilis and tuberculosis of the tongue is sometimes difficult, especially in those cases where the two diseases coexist, and in rare instances where tubercular deposit takes place in the tongue prior to the development of pulmonary symptoms.

So many instances of the development of cancer on the site of a gummatous ulcer have been recorded that a relation between the two affections cannot be doubted, although the accident is not peculiar to syphilitic lesions, a similar transformation being observed in a simple ulcer as a result of neglect or exposure to continual irritation.

Sub-lingual Gland.

In 1874 Fournier[1] reported a case of "tertiary degeneration" of the sublingual gland, in a man aged 30, which was developed eleven years after primary infection. The right sublingual fossa was occupied by an oval tumor, quite hard and painless, which merely gave slight trouble in swallowing and in articulation of certain words, the patient speaking "as though he had a foreign body in his mouth."

Fournier was uncertain whether the tumor was a gummous infiltration of the gland, or a form of hyperplasia analogous to that of syphilitic sarcocele. His belief in its syphilitic origin seems to have been confirmed by its rapid disappearance under treatment with the iodide of potash, and by the subsequent appearance of other lesions unquestionably syphilitic.

Necrosis of the Maxillary Bones.

This affection is most frequently met with in the hard palate and in the alveolar processes of the superior maxillary bone. In the former case, a swelling first appears upon the roof of the mouth, usually near the median line; softening takes place; the abscess opens, and the necrosed bone is exposed. After evolution of the sequestrum, an opening is left communicating between the buccal and nasal cavities, which imparts to the voice a nasal sound and interferes seriously with the distinctness of speech and with deglutition. When the progress of the disease has been arrested by internal treatment, and the ulceration has healed, the question not unfrequently arises whether an attempt should be made to close these openings by a plastic operation. I have never felt disposed to make the trial, believing as I do, that the wearing of a plate will better and more surely accomplish the desired end.

Necrosis of the alveolar processes almost invariably takes place in the

[1] Ann. de derm. et syph., Par. t. vii. p. 81.

neighborhood of the upper central incisors; indeed, I cannot recollect a case in which the lower jaw was affected. The bony support of a number of the teeth is often involved, and the teeth themselves, of course, become loosened and detached. An opening not infrequently is formed into the nasal cavities, affecting speech in the manner above mentioned.

In the treatment of these cases the mixed method affords the best results, but, after the arrest of the disease, time is required for the sequestra to become sufficiently detached for removal. Fortunately the present advanced state of dental surgery can, in most cases, remedy the damage done.

Gummy Tumor of the Soft Palate.

In its insidiousness of approach, and in the irreparable injury it is likely to inflict, but few syphilitic lesions equal this.

Early symptoms are insignificant or entirely wanting. Possibly the patient notices a slight uneasy or tickling sensation in the fauces, and experiences some difficulty in deglutition, which he naturally attributes to an ordinary cold; he may even find when attempting to swallow liquids that they regurgitate through the nostrils, but this he regards as accidental. Suddenly, however, and without further warning, he is nearly deprived of the power of speech and deglutition. His voice is transformed to an almost unintelligible nasal whisper, and, upon attempting to eat, solids, and especially liquids, are returned through the nose.

If we are so fortunate as to observe this affection in its earliest stage, we find that it has two modes of commencing.

1st. A deposit of gummy material may take place in a circumscribed mass, within the substance of the soft palate, and between its buccal and nasal surfaces. This mode of origin is the one usually described by authors. The deposit then appears as a flattened tumor, of the size of a bean or almond, encroaching upon the cavity of the mouth. It is at first hard to the touch, but subsequently, when secondary degeneration has taken place, soft and fluctuating.

2d. In other cases the infiltration is diffuse. No tumor exists, but the velum is generally thickened, its mucous membrane reddened, and its mobility impaired, as is evident when the patient attempts to articulate or to swallow.

Rupture of the abscess or ulceration of the infiltrated tissues may involve both mucous surfaces or only one: in the latter case it is usually the buccal; a cavity with sharply cut and ulcerated edges is then visible in the soft palate, while possibly the voice and the power of swallowing remain unimpaired. The destructive process, however, proceeds with great rapidity, and complete perforation soon follows, even when not at first produced.

The perforation may be limited in extent, but frequently a large portion or the whole of the velum is destroyed, together with the uvula and the pillars of the fauces, and thus an immense door of communication is

opened between the mouth and nose. It is thus easy to account for the indistinct and nasal voice, or "duck's voice," as the French call it, of such patients, and also for the reflux of liquids and even solids, and yet the absence of pain which characterized the onset of the disease is still a remarkable feature, since deglutition, although so difficult, is attended with a merely trifling sensation of discomfort. In addition, there is often some dulness of hearing, due, doubtless, to the œdema of the tissues composing the walls of the pharynx and surrounding the orifices of the Eustachian tubes.

In time, the subsidence of the infiltration is followed by amelioration of these symptoms. What remains of the velum recovers in a measure its pliability and renews its function. Practice also assists in teaching the patient how to avoid regurgitation of solids and even fluids. Some improvement also takes place in the voice, and this may be greatly increased by wearing a proper plate, or by the ingenious artificial palate of India-rubber, the invention of Dr. Stearns, but complete restoration of the normal voice cannot be expected. The impairment of hearing is only temporary.

It remains to speak of a remarkable sequel of this affection, viz., the change which usually takes place in the fauces, as a consequence of the process of repair. Directly after the mischief has occurred, the remains of the soft palate are dependent, and the opening communicating between the mouth and nares is very large. One would naturally suppose that this condition would continue or would even be aggravated at a subsequent period, after cicatrization had taken place. Strange to say, such is not the course of events. The dependent remains of the palate become elevated, the ulcerated edges contract adhesion with the ulcerated walls of the pharynx, and the opening, which at first was simply immense, gradually contracts, until finally complete atresia is the result, or, more frequently, a diminutive channel of communication remains between the buccal and nasal cavities, less in diameter than the normal opening.[1] Witness many old syphilitic cases in our hospitals. Attempts to remedy this condition by operation have been made by Hoppe, Pitha, Coulson, Dumreicher, and Paul, but with very indifferent success.

Cases not unfrequently occur in which the surgeon may hesitate to express an opinion as to the cause of ulceration and perforation of the soft palate. Two causes only are likely to produce this result: syphilis and scrofula, and the former by far more frequently than the latter.

If the patient be an adult who has enjoyed at least tolerable health until the present attack, there can be little doubt but that the cause is syphilis. No matter if a syphilitic history is obscure or even denied. Admitting the honesty of the patient, the primary and secondary symptoms may have been overlooked or forgotten, and have left no traces.

[1] See an article by Dr. H. J. Paul (of Breslau) on "Adhesions of the Velum Palati to the Posterior Wall of the Pharynx, following Ulcerations." Translated by Verneuil.—*Arch. gén. de méd.*, 1865.

Tertiary lesions often appear years after the preceding, and when least expected. Then, too, they come isolated, without concomitant symptoms to assist the diagnosis.

If the patient be young, say of 10 to 15 years of age, the chances of syphilis are less, of scrofula greater. Inquire as to the evidences of hereditary taint. When an infant, was the child affected with an eruption, coryza, etc.? Look at the upper incisor teeth; are they well formed or do they show traces of hereditary disease? Are the corneæ clear and intact? Are there cicatrices of strumous ulcers upon the neck or elsewhere? In all cases the effect of treatment is a valuable aid to diagnosis. Syphilitic ulceration yields to full doses of the iodide of potassium as if by magic. Strumous ulceration may be benefited by the same remedy, especially if combined with tonics, but it exhibits no such marked improvement within a few days.

The Pharynx.

Lesions similar to those occurring in the mouth are met with in the pharynx. Erythema, superficial ulcers, and deep ulcerations resulting from degeneration of gummatous deposit may be observed. The occurrence of mucous patches of the pharynx has been noted by several authorities, but we have never seen them in this region. Their rarity may be ascribed to the fact that the papillæ of the pharyngeal mucous membrane are of extremely small size. Frequently ulcers extend into the pharynx from the posterior nares. The symptoms of pharyngeal syphilis are usually insignificant, except in the case of ulcers, when there may be pain, aggravated in the act of swallowing and especially on the ingestion of acrid or irritating substances. The posterior portion of the lateral walls of the pharynx is more often attacked than the posterior wall. Gummy tumors have been observed on the vault of the pharynx and on the upper part of its posterior wall. After destroying the mucous membrane the disease may even invade the vertebræ and produce necrosis, or even inflammation of the contents of the vertebral canal.

Syphilitic ulcerations of the pharynx are of special interest on account of the traces which they leave in the form of cicatrices, or of adhesions, which diminish the capacity of the cavity and interfere with its functions. The cicatrices seen upon the pharyngeal wall are quite characteristic. They may present a stellate appearance, or may assume the form of prominent bands. The cicatricial tissue is white and glistening, and may persist indefinitely, or gradually contract.

In rare cases the entire soft palate is destroyed by ulceration, necrosis of the hard palate occurs, and the mouth, the nose, and the pharynx are converted into one enormous cavity. In milder cases, when the ulcerative process is limited to the border of the velum and the pharyngeal wall, adhesions may form, which divide the cavity of the pharynx into two distinct chambers, one communicating with the posterior nares and the other with the mouth. There may be a very narrow passage between these two cavi-

ties, or they may be completely shut off from each other, respiration being carried on exclusively through the mouth.

It is often very difficult to distinguish between the deep ulcerations of syphilis and those of struma. There are at least four points to be considered in making a diagnosis. In syphilis other lesions are usually found. Syphilitic ulcerations follow the formation of a gummatous tumor; in but few cases, however, on account of the very slight inconvenience occasioned by even extensive lesions, is the patient observed before complete destruction of the original gummy tumor. Specific ulcers usually progress more rapidly than scrofulous u cers; and, finally, they yield to specific treatment. Some observers claim that the ulcers themselves present distinctive characteristics, but this can be very rarely the case. The diagnosis must be based chiefly on the antecedents of the patient and the history of the lesion.

Treatment of Lesions of the Mouth and Pharynx.

The treatment of syphilitic affections of the mouth and pharynx resolves itself into constitutional and local. For an account of the former I must refer the reader to the chapter upon the treatment of general syphilis. Suffice it at present to say that mucous patches, erythema, and the superficial forms of ulcers belong to the secondary stage of syphilis and require the use of mercurials in accordance with the directions given in the chapter referred to, while the deep ulcerations belong to the tertiary stage, in the treatment of which the iodide of potassium plays so important a part.

Local treatment is of great importance. It is often surprising to see how mucous patches of the mouth and fauces will persist under the best directed internal treatment used alone, and yet how readily they will disappear when appropriate local treatment is added.

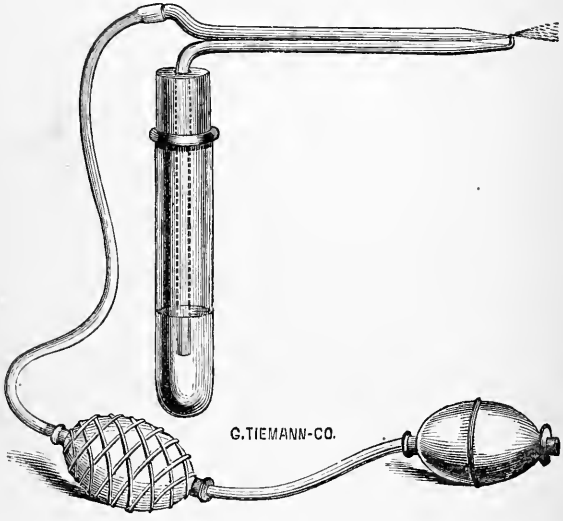
Those situated upon the lips, internal surface of the cheeks, and sides of the tongue, should be touched every second or third day with a crayon of nitrate of silver or the sulphate of copper, or the acid nitrate of mercury. Another excellent application is the chloride of gold, adding just enough water to make it liquid, and applying it with a camel's-hair brush. With those upon the fauces, the walls of the pharynx, larynx, etc., I much prefer the spray of a saturated solution of nitrate of silver, applied by means of the atomizer represented in Fig. 120.

Other forms of the same instrument may be obtained, in which the spray is directed upwards or downwards for the cauterization of the posterior nares and the larynx. These atomizers have been much improved and perfected by Dr. Louis F. Sass, of New York, to whom I am indebted for those in my possession.

In nearly all cases of the ash-colored, excavated ulcers upon the tonsils or uvula, the stronger caustics, as nitric acid or the acid nitrate of mercury, must be employed. In making these latter applications, great caution is required lest the acid come in contact with the sound tissues, or its fumes be inhaled; and these evils may be avoided by taking care that the

probang or glass rod which is employed be not so wet as to permit the fluid to drop from it, and by allowing the fumes to pass off before the remedy is applied.

Fig. 120.



The application of caustics should, however, be deferred in cases attended by severe inflammation and swelling of the fauces, which must first be subdued by saline cathartics, rest, mustard pediluvia, and sometimes by leeches at the angle of the jaw. I have found the most grateful topical application under these circumstances to be a solution of tannin in glycerine (ʒj to the ℥j), with the addition of extract of opium if the pain be severe, which may be applied with a camel's-hair brush two or three times a day. Rest should be promoted by means of sedatives, of which Dover's powder is the best.

So soon as the acute inflammation has subsided, various astringent and tonic gargles may be employed with benefit. A good one is the undiluted tincture of Cimicifuga. It should be prepared from the fresh root, as otherwise the effect is much diminished. Washes and gargles containing Labarraque's solution, chlorate of potash, the bichloride of mercury, or the oxymel of the subacetate of copper also serve an excellent purpose.

℞. Liquor. Sodæ Chlorinatæ ʒij–ʒiv . . 8|—16|
Mellis ℥j . . . . . 38|
Aquæ ℥v . . . . . 150|
M.

℞. Hydrarg. Bichloridi gr. vj . . . . . |40
Acidi Hydrochlorici gtt. xij . . . . |80
Syrupi ℥j . . . . . 38|
Aquæ ℥viij . . . . . 250|
M.

℞. Potassæ Chlorat. ʒj 4
Infusi Lini Oj 500
M.

℞. Oxymellis Cupri Subacetatis ʒij . . 60
Aquæ ℥vj 180
M. (Langston Parker.)

℞. Acidi Sulphurosi ℥ss 15
Glycerinæ ʒiss 55
Aquæ ℥vj 180
M. (Mr. Shillitoe.)

Either of the above washes may be used three or four times in the twenty-four hours. In fetid and phagedenic ulcerations of the throat, the following is a valuable formula:—

℞. Creasoti ♏x 65
Mellis ℥j 38
Aquæ ℥vij 210
M.

In all syphilitic affections of the mouth and pharynx, the surgeon must insist upon the patient's abstaining from the use of tobacco, which is found in practice to be the most common cause of the persistency of these lesions and of their frequent return after removal. Unless this restriction be faithfully complied with, the patient should understand that little permanent benefit can be expected. The question is often asked whether smoking or chewing is the more injurious? Tobacco in any form acts as an irritant, but in the act of smoking a partial vacuum is produced in the mouth, whereby the vessels of the mucous membrane are congested, and I am therefore inclined to think smoking the more injurious of the two habits.

The Œsophagus.

In an able paper by Mr. James F. West, Surgeon to the Queen's Hospital, Birmingham, which was published in the *Dublin Quarterly Journal of Medical Science* for Feb. 1860, the probability, if not the absolute certainty, that stricture of the œsophagus may be due to syphilis was first established.

The case upon which Mr. West's observations were chiefly founded was one of a girl aged 21, who had suffered for several years from well-marked syphilitic manifestations, such as eruptions upon the skin, ash-colored ulcerations of the fauces, rheumatic pains, and syphilitic cachexia, and who was admitted into Queen's Hospital, May 18, 1858, for stricture of the œsophagus. Treatment by means of tonics, iodide of potassium, and mercurials afforded only temporary relief, and she succumbed on Sept. 2, of the same year. The following appearances were found at the post-mortem examination: "The upper portion of the œsophagus for about four inches was much dilated; its mucous membrane thickened, and marked by spots having the appearance of recent cicatrices. At this distance from the upper end it was suddenly constricted, and terminated in

a narrow canal which would barely admit a No. 4 catheter. This constricted portion, which was about two inches and a half in length, was formed by the thickening of the mucous membrane, and by fibrous deposit in the form of bands and bridles, having very much the appearance of an old stricture of the urethra. Below this track the œsophagus continued perfectly healthy to its termination in the stomach. Both lungs contained tubercular deposit in different degrees of softening, with several small cavities in the upper lobe of each, one in the left apex being as large as a pigeon's egg."

In reviewing this case Mr. West remarks: "We have no account of the swallowing of any caustic or irritating fluid, so that we cannot attribute the stricture to that cause. The presence of numerous recent cicatrices clearly indicated that ulcerations had existed in the walls of the œsophagus. The deposit in the submucous tissue was fibrous; it was exactly similar in nature to that which is so well described by Dr. Wilks as characteristic of syphilitic eruption, and could not under any supposition be referred either to cancerous or tubercular degeneration."

Mr. West[1] has since reported another case in which the pathological appearances were very similar, and states that Mr. Langston Parker has recently met with a case of general syphilis in private practice in which unmistakable stricture of the œsophagus existed.

In reviewing this subject it appears extremely probable that Mr. West is right in his conjecture as to the cause of the stricture in the cases which have come under his observation, since we may readily admit that syphilitic ulceration of the fauces may extend to the œsophagus or attack the latter as a primary affection; and yet it is singular that this effect of syphilis has attracted so little attention from previous observers, and to the names of those authors who are quoted by Mr. West as silent upon the subject, I will add that of Yvaren, whose work on the *Métamorphoses de la syphilis* includes nearly all the obscure forms of syphilitic disease, so far as they are known. Follin,[2] however, was of the opinion that some of the reported cases of stricture of the œsophagus might be attributed to syphilis, and Virchow has met with contraction of the upper portion of this tube in the post-mortem examination of a syphilitic subject.[3]

Some of the cases of syphilitic stricture of the œsophagus, whose advent and whose disappearance under treatment are somewhat sudden, are probably spasmodic, the contraction being excited by ulceration of the mucous membrane of the canal. Organic strictures, which undoubtedly may result from syphilis, are caused by fibrous deposits in the submucous tissue, thickening of the mucous membrane, and by contraction of cicatrices following ulceration.

Obviously, anti-syphilitic treatment can avail in cases of only the former class. The iodide of potassium seems to have given relief in one of Mr.

[1] Dublin Q. J. M. Sc.

[2] Des rétrécissements de l'œsophage, Paris, 1853, p. 30.

[3] Syphilis constitutionelle, p. 88.

West's cases, while only temporary benefit was derived from the use of mercury.

In cases of organic stricture, dilatation with œsophageal bougies, combined with general tonic treatment, is a palliative resource. When death from inanition seems probable, in spite of rectal alimentation and of medication, the question of producing a gastric fistula arises.

A most interesting case of syphilitic stricture of the œsophagus occurred several years ago in the practice of Prof. F. F. Maury, of Philadelphia, in which this accomplished surgeon resorted to gastrotomy, after it had become impossible for the smallest quantity of food or the finest bougie to enter the stomach, and the patient had been kept alive for several weeks by way of the rectum. Unfortunately the operation was performed too late, and the patient died of exhaustion in fourteen hours after. The post-mortem showed a very tight stricture, entirely free from any evidences of cancer, just above the cardiac orifice. The patient's syphilitic antecedents had been unequivocal.[1]

Mr. Bryant was somewhat more fortunate in the case of a patient at Guy's Hospital upon whom he did this operation,[2] life being prolonged until the fifth day. The fatal result was due to pulmonary complication, which Jullien[3] believes is the most frequent cause of death in these cases.

Syphilitic gummata have been found in the wall of the œsophagus, and doubtless obstruction may be caused by the growth of vertebral nodes. Habershon[4] refers to a specimen, in the Hunterian Museum, of a gummatous tumor of the liver which had produced a similar result.

Stomach and Intestines.

Functional disturbance of the digestive organs is not an uncommon effect of the contamination of the blood by the syphilitic virus, as shown by the loss of appetite or the occasional inordinate desire for food, and the nausea and vomiting which sometimes accompany the appearance of early secondary manifestations. The general cachexia belonging to the later stage of syphilis may also be attended by intestinal derangement. But the question is an interesting one, and one not yet, perhaps, fully solved, how far syphilis may produce, in those portions of the intestinal canal which are beyond the reach of sight, the same organic changes and their consequences which are known to exist at the outlets and more accessible portions of the same canal. Are syphilitic erythema, mucous patches, ulcerations, and deposits of gummy material to be found in the stomach and intestines, as in the buccal cavity?

Cullerier[5] believes in a form of enteritis developed in syphilitic subjects,

[1] Am. J. M. Sc., Phila., April, 1870.

[2] Habershon on Diseases of the Abdomen, etc., 3d ed., 1878, p. 73. Quoted from the post-mortem records of Guy's Hospital.

[3] Mal. vénériennes 1879, p. 848.

[4] Op. cit. p. 76.

[5] Cullerier and Bumstead's Atlas, p. 260.

which is probably not ulcerous, and "the specific nature of which cannot be doubted," and he is thus led to admit syphilitic exanthema of the intestines. Post-mortem examinations, however, of persons dying in the early secondary stage of syphilis are rare, so that the above statement can with difficulty be verified. Moreover, enteritis supervening during this stage may be due to the improper use of mercury, or to many simple causes. Hence we must, I think, regard the existence of syphilitic erythema of the intestines as probable but not demonstrated.

With regard to late syphilitic affections of the stomach and intestines our knowledge is more definite. Several cases have been reported of persons in the tertiary stage of syphilis, who have suffered from chronic diarrhœa that did not yield to simple treatment, and in whom post-mortem examination has revealed ulcerations of the stomach or intestines, identical in their appearance with the ulcerations of gummy deposits on other mucous surfaces. Cullerier gives such a case (*op. cit.*, p. 317). In another instance, reported by Lancereaux (*op. cit.*, p. 311), "The stomach was about of the normal size, but, near the pylorus and on the smaller curvature there was an ulceration which had nearly eaten through the wall of this organ; its edges were bevelled at the expense of the mucous membrane, and were fibrous and indurated; at certain points they were of a clear grayish color, while at others they had a cicatricial appearance. No indurated ganglia in the neighborhood."

Cornil gives a case of gummata of the stomach associated with similar lesions of the liver, the patient having died with pulmonary complication. The only symptoms were indigestion and pain in the epigastrium. An extraordinary case of multiple gummata of the parietal and visceral peritoneum has been reported by Laurenzi.[1]

Lancereaux concludes that the intestinal canal may in rare cases be attacked by syphilis, and that "the multiple and rounded ulcerations, penetrating to a greater or less depth and circumscribed by fibrous tissue, of which it is sometimes the seat, are probably only the sequence of gummy deposits, or, in other words, the result of the degeneration which these deposits have undergone. The simple thickening of the submucous tissue met with in some instances, and the case reported by Wagner,[2] of deposits not yet ulcerated, are favorable to this view."

This view is still further supported by the beneficial effect of the iodide of potassium in several of Cullerier's cases, given either in large doses internally, or, when the stomach was irritable, in the form of enemata (gr. xv–lxxv ad aquæ ℥iv–vj).

The symptoms of this affection present nothing peculiar to mark their origin aside from the history of the case and the coexistence of well-marked syphilitic lesions elsewhere. They consist only of an almost constant and obstinate diarrhœa, sometimes with bloody stools, attended with a feeling of oppression and malaise in the abdomen, and occasionally with severe

[1] Gior. ital. d. mal. ven., Milano, 1871, vol. ii, p. 298.
[2] Arch. d. Heilk., 1863, obs. xxix, p. 369.

colic. There may also be frequent eructations and vomiting of food a few hours after its ingestion; the appetite diminishes; the patient loses in strength and in weight, and assumes a condition of general cachexia, which is observed in syphilis of other internal organs.

The Rectum.

Chancroids situated near the margin of the anus may give rise to a form of stricture of the rectum, which has improperly been called "syphilitic." Its true pathology was first pointed out by M. Gosselin,[1] who reports twelve cases under his own observation, including three in which he was able to make a post-mortem examination. M. Gosselin's views have been confirmed by other eminent authorities, as Mr. Holmes Coote[2] and Lancereaux.[3] I have myself had several cases under my charge, in which the antecedents pointed in the same direction, and in which a thorough trial of mercury and iodide of potassium failed to afford the slightest relief, as they would have done if the trouble had been of syphilitic origin.[4]

This lesion depends upon a thickening or hypertrophy of the submucous cellular tissue of the rectum, the same as is produced by chancroids of the prepuce and labia minora in the neighborhood of their site, and which has already been described. All the cases thus far reported have occurred in women, as may readily be explained by the greater frequency of chancroids about the anus in this sex.

The patients often complain merely of a frequent desire to go to stool, which is followed by a discharge of pus and sanguinolent mucus. Constipation, and difficult and painful defecation are present in only a few instances; the majority, especially when the disease has been of long standing, suffer from constant diarrhœa. The amount of purulent discharge is excessive, either with or without fecal matter at stool, or involuntarily during the day. Most of the patients lose flesh and strength, and suffer from various dyspeptic symptoms. In nearly all, hypertrophied and prominent folds of integument are found upon the margin of the anus. The stricture is invariably found at the depth of about an inch and a half or two inches from the margin of the anus, and does not appear to vary from this position like strictures dependent upon other causes.

The stricture is composed of an indurated and inextensible adventitious deposit in the substance of the mucous membrane and the submucous cellular tissue. It is never impermeable nor so contracted as entirely to prevent the exit of fecal matter. The muscular tissue surrounding the contracted portion is somewhat hypertrophied. There is not the slightest evidence of any deposit similar to that found in gummy tumors.

[1] Des rétrécissements syphilitiques du rectum, Arch. gén. de méd., t. iv, 5e série, p. 667.

[2] Med. Times and Gaz., Lond., Jan. 27, 1855. [3] Op. cit., p. 315.

[4] See also Bull. Soc. anat. de Paris, 2e série, t. iv, 1859, p. 100; also a paper read by the author of this work before the N. Y. Acad. of Med., April, 1864, Bull. of the Acad., vol. ii, p. 280.

The lining membrane of the dilated portion of the rectum above the stricture is denuded of its epithelium and glandular layer, giving rise to an extensive and continuous erosion for about four or five inches above the contraction, and the muscular tissue surrounding this portion is hypertrophied. This ulcerated surface is the chief source from which is derived the pus that is mingled with the stools and flows away involuntarily. Gosselin believes that so extensive an erosion is peculiar to this class of strictures.

Since the last edition of this work much has been written upon syphilitic affections of the rectum, but little has been added to our knowledge of the subject. The chief contribution has been by Fournier,[1] who has published an elaborate brochure, of which the thesis of his student, Godebert, is a recapitulation. Fournier thinks that tertiary lesions of the anus and rectum are rare, and classifies them as *ulcerating syphilides*, *gummous syphilides*, and a third variety, which he calls *syphilôme ano-rectal*. He subdivides ulcerating syphilides of the rectum into two kinds; those which are continuous with ulcers outside the anus, and extend one or two centimetres, more rarely three or four centimetres, within the sphincter. In one case they reached further than he could see even with the aid of the speculum; secondly, those which are developed *originally within the rectum*, as multiple ulcerations, either in the sigmoid flexure and rectum, or confined to the latter portion of the intestine. He says that these lesions are very rare, although they are probably more common than is supposed, since they are seldom looked for. He has never seen gummous infiltration, but it has been observed by Prof. Verneuil, and he, therefore, considers it another but rare cause of rectal stricture. The third lesion of syphilis, which may cause stricture of the rectum, is the one upon which Fournier lays most stress. He thinks that most of the strictures in syphilitic persons are caused "*by an infiltration of the ano-rectal walls with a neoplasm of unknown structure, but capable of degenerating into a fibrous tissue, the contraction of which results in coarctation of the intestine.*" In proof of this theory he has no facts derived from post-mortem examinations, but, reasoning from analogy, he concludes that since syphilis produces connective tissue hyperplasia in other organs, as the testes, lungs, liver, etc., it may have a similar effect in the rectum. This theory, certainly more than any other, seems to be in accord with the facts. Fournier calls attention to the fact, that at the autopsies of subjects with old syphilitic strictures of the rectum, no ulcerations nor cicatrices can be found; hence, he infers that the morbid changes are submucous rather than in the mucous membrane itself. He admits, however, that contractions from ulceration do occur, but claims that they are very rare. He thinks also that chronic inflammation may have a modifying influence in the production of stricture.

In this lesion the entire circumference of the rectal wall for a distance of from three to eight centimetres above the sphincter, becomes trans-

[1] Fournier, Lésions tertiaires de l'anus et du rectum, Paris, 1875.

formed into a thickened, hard, and unequally rigid cylinder, with no trace of ulceration. When the infiltration is limited to the vicinity of the anus, it is not uniformly diffused around the circumference of the canal, but is circumscribed, forming tumor-like masses, irregularly round or flattened, which are at first covered by healthy tissue. These masses are firm and elastic, and are painless unless they become inflamed; they are liable to erosion and ulceration. These anal lesions are curable if treated early, but if neglected they inevitably result in stricture. It is the opinion of Fournier that these lesions are more common in females than males, in the proportion of eight to one.

We have given an analysis of this valuable paper in order to present clearly the views of its accomplished author. While we agree with him in the main, we are somewhat surprised that he is silent regarding the influence of chancroids in producing rectal strictures.

The views of Fournier concerning *syphilôme ano-rectal* are adopted by Duplay,[1] who thinks, however, that primary lesions and gummata are never the cause of rectal stricture. He says, "the cylindrical and extended stricture of the rectum accompanied by thickening and induration of the walls is a constitutional affection, having, in a measure, its own proper individuality." He thinks that the irritation to which the rectum is subjected is the exciting cause.

One of the most important contributions to the subject of gummy infiltration of the rectum is contained in the report of a case by Zeissl.[2] The patient was a man who contracted syphilis in 1860, and suffered severely from it. Fourteen years later he came under Zeissl's observation, being much emaciated, and having a large fungous mass growing from the scrotum. The slow, painless course of this lesion suggested its syphilitic nature. While under treatment for this affection the patient complained of pain in the rectum, attended by bloody and diarrhœal discharges; very soon a brownish-black ill-smelling mass was found protruding from the anus, which, after removal, proved to be composed of connective and elastic tissue. On digital examination a swelling the size of a walnut was discovered on the right wall of the rectum, from which a sanious pus could be expressed. Periosteal nodes were also present at this time. Zeissl quotes Virchow as saying that there is nothing absolutely specific in the formation of the infiltrations of syphilis, but that their nature is determined by their development, history, course, degeneration, etc. He concludes that the anal tumor was a syphilitic new growth, and that it was of exceptional importance on account of its occurrence in a male patient. Barduzzi,[3] an Italian, has also published a brochure on the subject of syphilitic stricture of the rectum, which he thinks may be caused first by simple ulcers or the chancroid, second by the lesions of secondary syphilis, third by those of tertiary syphilis, and fourth by cancer. His

[1] Duplay, Progrès méd., Paris, nov. 30, 1876.
[2] Zeissl, Vrtljschr. Dermat. u. Syph., Wien, H. II, 1876.
[3] Barduzzi, Gior. ital. d. mal. ven., Milano, No. I, 1875.

paper also contains a good description of the symptomatology and some suggestive points in the diagnosis of cancerous strictures.

The literature of this subject has been further increased by the publication by Zappula[1] of a case of rectal stricture, in which cure was effected by the internal use of iodide of potassium. The patient, a man 36 years of age, had gonorrhœa and an ulcer on the glans fifteen years before. Mercurial treatment was at once begun, and no lesions of syphilis subsequently appeared. Fifteen years later he began to suffer from pains to the right of the anus and in the right tuberosity of the ischium. Very soon the symptoms of rectal stricture became well marked, and so extreme was the intestinal obstruction that large fecal tumors formed, and could be felt through the abdominal walls. Upon examining the rectum with the finger, smooth, elastic elevations of the mucous membrane were felt, rather in the form of folds than of condylomata or other adventitious deposits. Examination with the speculum showed the mucous membrane hypertrophied, uniformly swollen, and slightly mammillated. A sound could be readily introduced to a depth of eleven centimetres (four and a half inches), but there met an impassable obstruction. On a second examination there was found at a depth of four centimetres (one and six-tenths inch) a painless swelling the size of a hazelnut, globular, smooth and elastic, which was situated beneath the mucous membrane, and appeared not to adhere to the latter. The diagnosis lay between syphilis and cancer. Giving the patient the benefit of the doubt, he was placed upon anti-syphilitic treatment, consisting of large doses of the iodide of potassium. In the course of twelve days the pain disappeared, the tumor diminished in size, natural stools took place, and the patient was at last completely restored to health.

According to Fournier, Guérin also obtained good results from the iodide of potassium in rectal stricture.

Treatment.—It has only been exceptionally, as in Zappula's case above given, that the potassium iodide and mercurials have had any effect in relieving stricture of the rectum. Their success, however, in these few instances should lead us to give them a trial in all. At the outset of the disease, dilatation, either alone or combined with incisions, may effect a cure; at a later stage, they are in most cases at best palliative, and a fatal termination can only be delayed for a time by the use of sounds, the administration of tonics, and general hygienic means.

An important modification, however, of the treatment of these strictures by dilatation has been successfully employed by Dr. McMasters[2] of St. Francis Hospital, New York. The patient was a man, twenty-three years of age, who had been infected two years previous. Fifteen months

[1] Zappula, Ann. univ. di med., Milano, CCXIII, 1870; also Arch. f. Dermat. u. Syph. Prag., 1871, pp. 62 and 90.

[2] McMasters, Treatment of syphilitic stricture of the rectum by means of pressure, and the local application of mercurial ointment. N. York M. J., Oct. 1876.

after the primary lesion he complained of symptoms of rectal stricture, which were not treated, and which gradually increased for ten months. When he came under treatment his stricture, which was just within the sphincter, scarcely admitted a No. 12 bougie. After unsuccessful treatment by incisions and dilatation, Dr. McMasters introduced a piece of wood covered with flannel, saturated with mercurial ointment, and so shaped as to exactly fit the stricture. Having been retained for twenty-four hours by means of a perineal band, it was withdrawn, and, after the application of another thickness of flannel, anointed as before, it was reinserted. After daily repetition of this procedure for two weeks, the stricture was large enough to admit the index-finger, and, at the end of five weeks, its diameter was nearly one inch, which was subsequently increased to one inch and three-eighths. The treatment, being continuous, required confinement of the patient. For the first twenty-four hours the wooden plug caused slight discomfort, but afterwards no inconvenience was experienced. Cure was hastened by the internal use of the iodide of potassium.

The Liver.

The liver is attacked by syphilis more frequently than any other of the abdominal viscera. In the *secondary* stage congestion of the liver sometimes occurs, usually associated with a cutaneous eruption. The most marked symptom is *icterus*, which is of short duration and may be accompanied by gastric disturbance and febrile reaction. There is a sense of weight or oppression in the hepatic region, but seldom any pain, except perhaps on pressure. Percussion may show slight increase in the volume of the organ. This condition, which was first described by Gubler in 1853, is probably due to the extension of a catarrh from the intestine to the bile-duct. The fact that it usually accompanies a specific exanthem, simultaneously with which it often disappears, suggests the possibility of an analogous condition of the intestine. It rarely persists more than a week or two. The icterus occurring at a later period of syphilis may, of course, be due to interference with the transmission of the bile by mere congestion of the liver; more frequently it is caused by compression from a gumma or a cicatricial band.

The affections of the liver observed in the later stages of syphilis are much more serious and present more decided symptoms. Three forms of *tertiary* syphilis of the liver are usually recognized:—

1. Chronic Interstitial Hepatitis.
2. Gummata.
3. Amyloid Degeneration.

Chronic Interstitial Hepatitis.—Chronic interstitial hepatitis may be *general* or *partial;* the former condition is rare, and cannot be distinguished from ordinary cirrhosis. In the localized form the increase of fibrous tissue is especially marked in the capsule of Glisson at the

attachment of ligaments. The subsequent contraction of the newly-formed tissue causes very striking lobulation of the organ.

Upon post-mortem examination the liver is found to be united to the neighboring organs and to the diaphragm by means of ligamentous bands, which are so firm that it is often difficult to remove it from its position. The external appearance is highly characteristic. Its natural contour is often lost, so that its different portions are with difficulty recognized. Its edges are uneven and fissured. Its surfaces present irregular prominences or lobes, separated by furrows radiating for the most part from the suspensory ligament, and dense, grayish, and fibrous at the bottom.

On making a section, thickened striæ or septa are found to emanate from the fibrous bands upon the surface, and permeate the substance of the organ, enclosing interspaces in which the hepatic tissue is of a deeper and more yellow color than normal. Under the microscope the hepatic cells are enlarged and fatty, or they have undergone amyloid degeneration, while in the neighborhood of the septa they are commonly atrophied.

The size of the liver may be moderately increased during the early vascular stage, but it is commonly diminished at a later period, and in one case reported by Frerichs, it did not exceed that of a man's fist.

The symptoms of this affection are those of ordinary cirrhosis, consisting of loss of appetite, emaciation, ascites, etc.

Gummata.—Gummata are commonly found imbedded in fibrous tissue, and are usually small and multiple. They are seldom larger than a walnut, and are frequently arranged in groups. Their outline is irregular and their consistency firm. Cornil[1] describes the structure of a gummy tumor of the liver as follows: it consists of three portions; a central mass, homogeneous or composed of granular matter, imbedded in which are small round cells. These cells are arranged in groups which are separated by delicate filaments of connective tissue. Around this central portion is an intermediate zone composed of fibrous tissue, which, when recent, incloses numerous round cells; when older, the cells are scanty and fusiform. The third or external zone consists of condensed hepatic tissue, which is filled with cells and is penetrated by fibres of connective tissue from the middle zone. In the central portion of the gumma the vessels are very small or are completely obliterated. The vessels of the periphery are large and their walls are thickened. Scattered among the new cells are small, round, highly refractive bodies, not acted upon by carmine, but deeply colored by purpurine, which Malassez[2] considers peculiar to syphilis. In rare cases the gummatous deposit softens and is absorbed; still more rarely it undergoes calcific degeneration; commonly the tumor contracts, and is transformed into fibrous tissue, in which no traces of its original layers can be found.

These gummatous tumors may be distinguished from tubercular nodules

[1] Leçons sur la syphilis, Paris, 1879.
[2] Jullien, Mal. vénériennes, Paris, 1879.

by the fact that the latter are much smaller and more numerous. The centre of a tubercle, moreover, is soft, and perhaps puriform; its fibrous periphery is narrower and less dense than that of a gumma. Gummy tumors can hardly be confounded with cancerous or sarcomatous tumors.

The symptoms of gummata of the liver are often obscure, and the diagnosis must be confirmed by coincident lesions. The organ may be increased in volume, and nodules may be detected upon its surface. Pain may be entirely absent, except on pressure, or it may be very acute: it does not radiate towards the shoulder as in other hepatic affections. Respiration may be painful in consequence of adhesions. Unless the tumors are extremely numerous, there is no interference with the functions of the organ. In severe cases there may be icterus and gastro-intestinal disturbances. The stools may be clay-colored or bloody. Blood may also be expectorated, and epistaxis may occur. The spleen and the abdominal ganglia are often decidedly hypertrophied. The urine may contain albumen. There is sometimes a tendency to anasarca, in consequence of some unknown changes in the blood. The skin is dry and bronzed. The temperature of the body is somewhat diminished.

Gummy tumors of the liver may be mistaken for cancer or for hydatid cysts. Cancer occurs at an advanced age and invades both lobes; it is usually attended by marked pain and by cachexia; icterus is generally present; the duration of cancer is greater than that of gummata. In hydatid cysts fluctuation and frequently the pathognomonic vibratory thrill may be detected. The tumors often extend towards the epigastrium and simulate gastric disease, although digestive troubles are rare. Disturbance of respiration and ascites are also infrequent.

The prognosis of gummata of the liver is less serious than that of interstitial hepatitis; when death occurs it is usually due to some intercurrent affection.

Amyloid Degeneration.—Amyloid degeneration of the liver is not peculiar to syphilis. It is often accompanied by fatty degeneration or interstitial hepatitis. The morbid changes involve the hepatic cells, beginning, according to Green, in the small nutrient bloodvessels. The hepatic cells are found to be enlarged, with irregular outlines, many of them having coalesced; the nuclei of some have disappeared. This amyloid change differs in its seat from the fatty and the pigmentary degenerations; in the fatty the deposit takes place in the external portions of the lobule; pigmentation occurs chiefly at the centre; while amyloid degeneration is most marked in the intermediate portion. Sometimes these three processes occur simultaneously.

The amyloid liver is heavier and much enlarged, sometimes almost filling the abdominal cavity. There is no lobulation of the organ, which may retain its form although greatly enlarged. If fatty deposit also occurs, however, the margins are rounded and the natural furrows are obliterated. The consistence of the liver is firm, and its cut surface is dry, bloodless,

and has a translucent, waxy appearance. The change of color to violet or blue, on the application of iodine and sulphuric acid, is characteristic.

The symptoms resemble those of cirrhosis. The portal circulation is seldom obstructed, hence ascites is rare. The hepatic cells being destroyed the functions of the liver are abolished. Gastro-intestinal disturbance and albuminuria are often observed. The spleen may be enlarged at the same time. Recovery is very rare.

The treatment of these lesions of the liver is that appropriate to the late stages of syphilis.

According to Lacombe,[1] Hayem has found in livers affected by syphilis a perilymphangitis comparable to the nodular form of lymphangitis sometimes seen in the skin. In such a case, we find in the fibrous bands of newly formed tissue, numerous lymphatic vessels which are much dilated and surrounded as if by a muff of connective tissue. When the lymphatic is cut perpendicularly to its axis, it appears like a small, round, fibrous nodule, in the centre of which is an opening. When, however, it is cut more or less parallel to its axis, we find in a thickened fibrous tract a simple slit, often enlarged at one of its extremities, and of which the lumen is sometimes empty and sometimes filled with a granular and cellular exudation. This perilymphatic inflammation is found in the thickness of the capsule of Glisson, and is observed in many cases. The bloodvessels are also sometimes compressed and obliterated by the tissue which surrounds them.

The Spleen.

In some rather rare instances enlargement of the spleen occurs early in the course of syphilis. The swelling is quite rapid, and in some cases is evident on palpation; in others it can be determined only by percussion. The patient usually feels no pain nor discomfort, but when the organ is enlarged to four or five times its normal size a sensation of dragging weight is complained of. The average degree of enlargement is twice the normal size.

The course of this affection depends largely on treatment, under which the swelling usually subsides in from three to four weeks; in exceptional cases it persists for several months. A relapse may occur within a few weeks or months, and sometimes the swelling increases after having been stationary for a time.

We have met with six marked cases of this affection, four in males and two in females; in each case there was mild cachexia, and in two disturbance of the appetite. We have never been able to discover this enlargement until the secondary period of syphilis; yet Weil[2] and Wever[3]

[1] Etude sur les accidents hépatiques de la syph. chez l'adulte. Paris, 1874.

[2] Weil: Ueber das Vorkommen des Milztumors bei frischer Syphilis. Centralbl. f. d. med. Wissensch., Berl. No. 12, 1874. Also, Ueber das Vorkommen des Milztumors, etc. Deutsches Arch. f. klin. Med., Leipz. Bd. 13, H. 3, 1874.

[3] Wever: Ueber das Vorkommen des Milztumors, etc. Deutsches Arch. f. klin. Med., Leipz. H. 4 u. 5, 1876.

state, in their monographs, that they have found it during the secondary period of incubation. Of three cases observed by the latter, in one it was found between the eighth and twelfth weeks of infection; in another between the fifth and tenth weeks after the initial lesion; and in the third during the first two weeks of the secondary stage. In three of our cases it was found within a month after general invasion, and in the remainder between three and eight months. Probably it may occur at any time during the secondary period. Jullien attributes to this condition of the spleen many of the symptoms of gastric derangement as well as certain blood changes occurring in syphilitic patients.

We are ignorant of the minute changes in the splenic enlargement of syphilis, but probably they consist of increase of the cell elements of the pulp with hyperæmia, as suggested by Weil.

In all cases of enlarged spleen thought to have a syphilitic origin, other causes must be eliminated.

Gummata of the Spleen.—Gummata vary in size from that of a millet-seed to that of a walnut, and may be few in number or very numerous. Their number is usually greater when their size is small. In some cases the spleen itself is enlarged. The tumors are usually found near the trabeculæ and deeply seated, or at the periphery of the organ; in the latter case the capsule is thickened. Recent tumors have a reddish-gray color, and are more dense and tough than the normal spleen tissue; when old they are dry and of a yellowish-gray color. When young they are less clearly defined than at a later period, when they may become distinctly encapsulated. The vessels and the structure of the organ in the neighborhood of the tumors are more or less destroyed. Cicatricial contraction, especially in the capsule, subsequently occurs. The spleen has several times been found adherent to the diaphragm in consequence of peritonitis from irritation by gummy tumors.

We know little of the symptomatology of this affection. Enlargement of the spleen is sometimes demonstrable, and in some cases, when the tumors are superficial, inflammation of the capsule and localized peritonitis occur.

In the cases hitherto observed the lesion has generally been accompanied by similar affections of other viscera, and the patients have suffered from cachexia or marasmus.

According to Bäumler, Beer thinks that, besides gummata, syphilis causes in the spleen a diffuse cellular infiltration of the arterial sheaths, and certain characteristic deposits, which are as follows: "They are paler than the normal tissue, from which they do not project at all, but merge diffusely into the surrounding spleen tissue; contain but little blood and few cells, and in the centre consist of a finely granular material in which a few cells and nuclei are embedded."

Pancreas.

Upon this subject Lancereaux remarks: "Cases showing syphilitic changes in the pancreas are extremely rare. In a patient who died under the care of Prof. Rostan fourteen years after having contracted a chancre, there was found, besides multiple gummata of the muscles, a gummy tumor of the mammary region, and two others in the pancreas.[1] All these tumors, subjected to microscopic examination by Verneuil and Robin, appeared to be composed of similar elements. I, myself, in several cases of visceral syphilis, have found this organ firm, indurated, and sclerosed, so that we cannot deny that the pancreas, like most of the viscera, is subject to the diffuse and circumscribed lesions of syphilis."

[1] Bull. Soc. anat. de Paris, 1855, p. 26.

CHAPTER XVII.

AFFECTIONS OF THE ORGANS OF RESPIRATION.

The Nose.

The pituitary membrane may be the seat of erythema, superficial ulcerations, and mucous patches, which give rise to symptoms resembling those of an ordinary catarrh. Sometimes an ulcer may be seen just within the nasal orifice, surrounded by swollen mucous membrane, and rendering the alæ nasi tender upon pressure. Plugs of inspissated mucus, mixed with blood and pus, which obstruct the passages, are from time to time discharged. The nasal secretion is more abundant and more purulent when ulcerations or mucous patches exist. In the absence of other lesions of syphilis, upon the skin or elsewhere, the character of the nasal affections may be suspected only because of their persistence and of their rapid disappearance under specific treatment.

In the more advanced stages of syphilis, deeper ulcers appear, which originate in gummatous infiltration of the submucous tissue and gradually involve the cartilaginous and osseous textures; or the latter structures may be the first attacked, and the mucous membrane become implicated secondarily. On account of the serious deformity resulting from destruction of the framework of the nose, the importance of recognizing these lesions at an early period is very great. Their progress is usually very slow and insidious, so much so that necrosis may occur before the patient is conscious of any serious trouble. The ulcerative process may perforate the septum or the floor of the nasal cavity, or it may extend into the pharynx. Again, it may find its way along the Eustachian tube and even penetrate the cranial cavity, involving the meninges; more commonly, however, the membrana tympani becomes ruptured and a purulent discharge takes place through the external auditory canal. Deafness may ensue from obliteration of the Eustachian tube by a cicatrix. The disease has been known to pass up the lachrymal canal, involving the lachrymal bone and even the eye.

Respiration through the nose may be interfered with by hypertrophy of the mucous membrane, by the formation of adhesions between ulcerating surfaces in process of repair, or by the contraction of cicatrices. The voice becomes nasal; the sense of smell may be impaired or lost, even when the terminal filaments of the olfactory nerve are not involved; the discharge, in cases of necrosis, is extremely fetid and may contain fragments of bone. When necrosis of the nasal bones occurs, the bridge of

the nose becomes depressed and its tip elevated; when the cartilages are destroyed, the tip of the nose is depressed and flattened. The portions of bone spared by the destructive process become thickened and eburnated, and are often separated superiorly so as to form a longitudinal furrow running along the dorsum of the nose. According to Virchow,[1] this tendency to eburnation and thickening of the osseous tissue is not confined to the part first affected, but may extend to the bones composing the base of the skull.

Treatment of Lesions of the Nose.

The earlier syphilitic affections of the nasal passages readily yield to the internal administration of mercurials, and rarely require topical applications. In tertiary affections, iodide of potassium, preparations of iron, the mineral acids, cod-liver oil, and other tonics must frequently be employed either alternately or in combination, and for a long period, in order to afford permanent relief to the disgusting and distressing symptoms. As a general rule, however, the iodide of potassium in large doses, together with the cautious use of mercurial inunction, will suffice to effect a cure. The most efficacious local treatment consists in mercurial fumigations, which may be administered by means of the ordinary mercurial vapor bath, provided the general health of the patient be not too much reduced; but a more convenient method is to evaporate a sufficient quantity of calomel, the bisulphuret or binoxide of mercury from a metallic plate heated over a spirit lamp, directing the fumes into the nostrils by means of a tunnel of paper or other convenient material. Blood-warm injections of salt and water (℥j ad Oj), diluted chlorinated soda (one part to twelve or twenty of water), and weak solutions of nitrate of silver or chloride of zinc, by means of a syringe, or with Thudichum's apparatus, will also be of much service. I most frequently employ a strong solution of chlorate of potash. It must be recollected that the discharge will still continue as long as there are any necrosed portions of bone or cartilage to come away. Patients and even physicians are too apt to despair of the success of treatment in consequence of forgetting this fact.

Before making any of the above applications, the nasal passages should be thoroughly cleaned by the use of Thudichum's apparatus, or, better still, by a douche directed from behind forwards.

The Larynx.

Before the invention of the laryngoscope, knowledge of the syphilitic affections of the larynx was derived chiefly from the study of post-mortem appearances. Reasoning by analogy, it was the custom to infer the existence of laryngeal lesions corresponding with those manifested on parts

[1] Ueber der Natur der constitutionellen Syphilis.

within the reach of visual examination.[1] Thus all syphilitic diseases of the larynx were believed to be propagated from those occurring primarily in the pharynx, and they were thought to follow the same laws, regarding their time and mode of development, as the dermal lesions of syphilis. Modern research has shown these theories to be erroneous. We know that the larynx may be the seat of syphilitic lesions independently of manifestations in the pharynx, although these regions are usually involved at the same time. Moreover, the laryngeal lesions are so erratic as regards the time of their appearance, and so modified by their situation that their arbitrary division into secondary and tertiary is impracticable. It is desirable, however, in order to obtain a clear idea of these affections, to adopt some system of classification. Provided it be borne in mind that they refer to the depth and extent of the lesions rather than to the time of their occurrence, it may be as well to retain the terms *secondary* and *tertiary*.

Among *secondary* or *superficial* lesions, therefore, may be included:

1. *Erythema.*
2. *Superficial ulcerations.*
3. *Mucous patches.*
4. *Chronic inflammation with hypertrophy of the mucous membrane. Vegetations.*

Tertiary or *deep* lesions comprise:

1. *Deep ulcerations.*
2. *Gummy tumors.*
3. *Perichondritis and Chondritis.*
4. *Caries and Necrosis.*

With regard to laryngeal syphilis in general it seems to be true that the more remote a lesion is from the entrance to the larynx the more serious will be its consequences, and that the subjective symptoms of a lesion are by no means commensurate with its gravity. For instance, a superficial ulcer may be complicated by an acute œdema so general and so excessive as to threaten life; on the other hand, a destructive process may have gone on to a considerable degree while the patient is in ignorance of his condition. The invasion of the larynx by syphilis is usually very insidious, and the subsequent course of the lesions is chronic and devoid of pain. Gerhardt and Roth[2] express the opinion that the parts of the vocal organism most often in contact during the performance of its function are more frequently attacked by syphilis. Hence the vocal cords and the arytenoids are the most susceptible regions.

There are certain symptoms, some of them common to many of the lesions of laryngeal syphilis, which deserve special attention. *Spontaneous pain* is very rare. It is considered an indication of the invasion of fibrous or cartilaginous tissues. Pain in the ear and, when the lesion is unilateral,

[1] Dance; Eruptions syph. du larynx. Thèse de Paris, 1864.

[2] Ueber syph. Krankheiten des Kehlkopfes, Arch. f. path. Anat., etc., Berl. H. xxi, 1861.

in the ear corresponding to the affected side, is spoken of by Jullien[1] as a symptom in many cases, although not peculiar to syphilitic disease of the larynx.

Cough is also an extremely rare symptom, and *expectoration*, if present, is scanty, mucous or muco-purulent. The sputa may be tinged with blood from an ulcerative lesion or from ruptured capillaries. In cases of caries or necrosis they may contain fragments of cartilage or bone. In the latter condition also the breath is likely to have a fetid odor.

Alteration in the volume and quality of the voice may be very slight even in severe lesions. Frequently the voice becomes hoarse or assumes a character called by the French "*crapuleuse.*" Sometimes it is reduced to an almost inaudible whisper.

Dysphagia is quite infrequent except in very advanced stages of disease, or when the epiglottis is attacked.

Dyspnœa may supervene in consequence of stenosis due to various causes, chief of which are œdema, growths which invade the air-passages, or occlude them by pressure from without, and cicatricial contractions. Probably spasm may be an occasional and temporary cause of dyspnœa. Œdema may occur with any lesion of syphilis. The sub-mucous effusion may take place rapidly, in which case the danger to life is imminent, or it may be gradual. In the latter case the patient may accommodate himself to a very considerable diminution in the calibre of the larynx. The disappearance of an acute œdema is usually proportionately rapid, while a slowly-formed effusion may persist for a long time. Among new growths which may cause stenosis of the larynx, are to be included vegetations, hypertrophy of the mucous membrane following chronic inflammation, gummy tumors and exostoses. The most intractable cases of stenosis are those due to gradual contraction of cicatrices. This unfortunate result usually follows only the deep ulcerations of the later stages of syphilis. Superficial ulceration may involve quite extensive surfaces, producing complete aphonia and other pronounced subjective symptoms, yet a cure may be obtained with entire restoration of the functions of the larynx. It is in these cases of stenosis from cicatricial contraction that the operation of tracheotomy is sometimes necessitated. The experience of Krishaber,[2] however, authorizes confident delay of surgical means of relief, even in the presence of alarming dyspnœa from *other* causes, the energetic use of specific remedies, especially by the hypodermic method, having been promptly efficacious in many instances.

The larynx may also be occluded by the formation of false membrane between the vocal cords. This is rather a rare cause of stenosis. Elsberg,[3] in an article published in 1874, stated that in about 270 cases of laryngeal syphilis he had met with this condition six times. It may result from

[1] Mal. vénériennes, p. 835.

[2] Contribution a l'étude des troubles resp. dans les laryngopathies syph. Gaz. hebd. 1878, Nos. 45–47.

[3] Syphilitic membranoid occlusion of the rima glottidis. Am. J. Syph. and Derm., N. Y., Jan. 1874.

superficial ulceration and, on the contrary, has been observed in conjunction with destruction of the cartilages and other late lesions. The process appears to begin usually at the anterior commissure, leaving a passage for the air posteriorly. It may take place in a reverse direction, or an aperture may be left in the middle of the rima glottidis, or along the edge of the vocal cord. This condition is also described by Sommerbrodt,[1] who, with Elsberg, recommends the use of the galvano-cautery in relieving the dyspnœa, and adds that complete restoration of the voice must not be expected. The fact that in many cases of stenosis the obstacle to inspiration is greater than to expiration has been noticed by several observers.

Let us now consider the special lesions which may occur in the larynx in the course of syphilis.

Erythema.—Erythema of the larynx, unless it be very acute and attended by œdema, may be so slight as to attract no attention, the only symptoms being slight huskiness of the voice and moderate catarrh. No doubt it occurs during early skin eruptions, and it is frequently developed at more advanced stages, either independently or in connection with deep laryngeal lesions. There may be nothing in the appearance of the affection to distinguish it from a simple catarrh. It occurs either in patches, which give the mucous membrane a mottled appearance, or it may be limited to certain regions, or it may be diffuse, the lining of the larynx having a uniform dusky-red hue. There may be superficial erosions of the mucous membrane. The vascularity of the affected parts is much increased, the bloodvessels often presenting the appearance referred to by Krishaber and Mauriac[2] as "*arborisation.*" When the epiglottis participates in the affection and in the concomitant œdema, it may be much tumefied and assumes a bilobed shape.

Superficial Ulcerations.—The superficial ulcerations observed in laryngeal syphilis involve only the mucous membrane and, according to Bäumler,[3] usually begin in mucous follicles at the posterior commissure. They may affect phonation to some extent, but are generally very sluggish, persisting with slight change for an indefinite period. Their margins are well-defined, quite regular, and very slightly elevated above the surrounding level. The surface of the ulcers is usually concealed by a layer of tenacious secretion. Frequently general erythema of the mucous membrane coexists. These early ulcerations, whose appearance is quite different from that of ulcers occurring at a later period, may be confounded with incipient tubercular ulcers. They are not so likely as are the late ulcerations to be mistaken for cancerous disease. The following points of distinction may be found of service. The ulcers of phthisis begin in the ventricular bands and are usually paler than those of syphilis. They are

[1] Berl. klin. Wchnschr. Apr. 1, 1878.

[2] Des laryngopathies syph. pendant les premières phases de la syphilis. Paris, 1876.

[3] Ziemssen's Encycl. vol. iii, p. 206.

bathed in a copious, muco-purulent secretion. There is decided swelling and œdema of the arytenoids, while the mucous membrane elsewhere is anæmic. The course of phthisical ulcers is more rapid and painful, and pulmonary symptoms coexist or are soon manifested. Whistler[1] observes that in syphilis the voice is rough and rasping, while in phthisis it is whispering and moist, suggesting the presence of excessive secretion. The absence of ulceration in the mouth, the blanched appearance of the palate and fauces, while the pharynx may be congested, are indicative of the tubercular character of laryngeal ulceration. Symmetry in the position and outline of syphilitic ulcers is considered characteristic by some authorities.

Mucous Patches.—Great diversity of opinion has prevailed, even since a method of inspecting the larynx during life has been provided, regarding the frequency of mucous patches. Pierre Ferras[2] considers them very rare, having found them in only one instance among nearly one hundred cases of syphilis. Krishaber and Mauriac, on the contrary, found ten cases of "*plaques muqueuses*" in fourteen of laryngeal syphilis, the former observer discovering them only on the vocal cords. Whistler states that he has met with twenty-four cases of this lesion among eighty-eight of syphilis in its secondary stage. In his experience the time of its occurrence varied from one and a half to twelve months after primary infection. In all cases mucous patches of the mouth or genitals coexisted; in seven cases papular or papulo-squamous eruptions were found, in one case associated with a roseola. In one case, six weeks after infection, the indurated cicatrix of a chancre was still present. Enlarged glands and alopecia occurred in many instances. In ten cases the epiglottis was the seat of the lesion and in ten the vocal cords; in four cases the arytenoids, in two the inter-arytenoid fold, in two the ventricular band, and in one the glosso-epiglottic fold. When seated on parts exposed to irritation, either in respiration or in phonation, mucous patches of the larynx are prominent with ragged margins, forming what are known as *condylomata;* in other regions they are flatter and the ulceration is more sharply cut. Their surface is covered by a scanty, viscid secretion. The removal of this film exposes a red, excoriated surface in striking contrast with the paler hue of the surrounding mucous membrane. Sometimes the centre of a patch is slightly depressed, its borders remaining prominent. Besides the ulcerated form of mucous patch we also meet with the *opaline patch*, according to Whistler, more often on the epiglottis and on the arytenoids. In these lesions the epithelium is thickened and still adherent, the deeper tissues being infiltrated with new cells. The opalescent appearance is attributed by Cornil[3] to minute collections of pus amidst the epithelial cells.

[1] The early manifestations of syphilis in the larynx. Med. Times and Gaz., Lond., 1878, Nos. 1473–74–75–80–84.

[2] De la laryngite syph. Paris, 1872.

[3] Progrès méd., Par., Aug. 10, 1878.

Chronic Inflammation.—Chronic inflammation of the larynx is an intermediate lesion; it may follow an early catarrh, or may not appear until three or four years after infection. The color of the mucous membrane is decidedly darker than in the early erythemas, although Whistler affirms that it never deserves the name "coppery," which has been applied to it by some authors. The affection is very persistent and commonly leads to thickening or *hypertrophy* of the mucous membrane, which, according to Krishaber is the only one of the early lesions which does not disappear spontaneously. This thickening is quite different from the œdema occurring with an erythema, in which the mucous membrane has a puffy appearance. The thickening of the cords may be so great as to require operative interference for the relief of the dyspnœa. A remarkable instance of this condition has been reported, in which tracheotomy was done four times during a period of five years.[1] Associated with this condition chronic ulcers are almost always found. These ulcers have ragged and thickened edges; frequently vegetations spring from them, which may reach a considerable size, even to the degree of producing aphonia and of impeding respiration. The vocal cords, which are thickened and rough, are very often the seat of these ulcers. The ventricular bands may be so swollen as to overlap the cords. The *vegetations*, which may grow from the margins of an ulcer or from other portions of the mucous membrane, are often difficult to distinguish from simple polypoid growths. Their favorite seat is at the insertion of the inferior vocal cords. Ferras states that they may appear in the ventricles of the larynx, where natural papillæ are scanty. The history of the case, or even the empirical use of specific treatment, may sometimes be required to determine their character.

Deep Ulcerations.—Deep ulcerations, occurring in the later stages of syphilis, may form by extension from the pharynx or by degeneration of gummatous deposit. The epiglottis may be entirely destroyed by the ulcerative process. Next in order of frequency the aryteno-epiglottic ligaments are attacked, then the superior vocal cords, and more rarely the true cords. The ulcerations, especially those of gummy tumors, are very irregular and indurated. Frequently, vegetations, like those occurring in connection with the ulcers described in the preceding section, accompany these deep ulcerations. Extensive regions may be destroyed in a chronic and insidious manner, irreparable injury being done. These ulcerations can hardly be confounded with those of tubercular origin, which are smaller, more numerous, and more superficial. The lardaceous base and the general appearance of the lesions, in connection with cicatrices of previous ulceration, suggest their specific character. They are much more likely to be mistaken for malignant disease. In cancer the tonsils and the submaxillary glands are, at an early period, the seat of infiltration. Pain, often extreme, is distinctive of cancer, while the syphilitic lesion makes much slower progress and is generally painless, until the tissues have

[1] Tr. Clin. Soc. Lond., vol. x, 1877.

been extensively destroyed. In most cases of syphilis, moreover, there is a clear history of infection, and traces of former lesions may be discovered in the mouth or pharynx, or in other regions of the body.

Gummy Tumors.—Gummy tumors of the larynx are much more common than has been supposed. Two forms of gummatous deposit are described by Simyan:[1] a circumscribed variety of a grayish-red color, and a diffuse infiltration which has a yellowish color. Virchow describes gummy tumors of the larynx as extremely vascular nodules, of softer consistence than those developed in other regions, which gradually ulcerate and penetrate the deeper tissues. The lesion is often single, and may attain a very large size; frequently the tumors are small and multiple, and may be limited to the mucous and sub-mucous tissues. The deposit sometimes undergoes absorption, but more frequently it degenerates, forming the deep, ragged ulcers already described, which may involve the framework of the larynx and produce permanent deformity. The epiglottis and the arytenoids are most often involved, but any of the laryngeal cartilages may suffer. A fatal termination may ensue in the course of these lesions from impediment to respiration, due to the size of the tumor or to an acute œdema of the larynx. A single case of death from hemorrhage has been recorded by Türck.

Perichondritis.—Perichondritis is generally the result of the extension of an inflammatory or ulcerative process from the mucous and submucous tissues. The cartilage itself may be involved. Pain, of a marked character, is a common symptom of this lesion, and the parts are sensitive to external pressure. Crepitation on palpation of the cartilage is referred to by Jullien[2] and others as a sign of its invasion. Œdema of the soft parts, and deformity from the structural changes in the affected cartilage are frequently observed. The epiglottis and the arytenoid cartilages are most often involved, more rarely the cricoid. They may be entirely destroyed.

Caries.—Caries, or true *necrosis*, in cases where ossification of the cartilage has taken place, is a common sequel of the invasion of the perichondrium by inflammation or gummatous ulceration. It is always a very late accident, and frequently induces structural changes in the larynx which cannot be remedied. An instance of its occurrence six years after infection has been reported by Lamallerée.[3] Two small abscesses formed on the anterior aspect of the neck at the level of the cricoid cartilage. They soon opened, and, several years later, pieces of necrosed bone were discharged through the fistulous tracks. Fragments of sequestrum may be expectorated, or may lodge in the air-passages and cause alarming or

[1] Syphilis laryngée tertiaire. Thèse de Paris, 1877.
[2] Mal. vénériennes, Paris, 1879.
[3] Ann. d. mal. de l'oreille et du larynx, Par. 1878, Vol. IV., No. 5.

even fatal dyspnœa. The occurrence of phlegmonous inflammation in the parts surrounding the larynx, secondary to the invasion and death of the cartilage, has been made the subject of a special paper by Mauriac.[1]

Syphilitic aphonia, occurring at an early period, without appreciable lesions, was originally described by Diday before the use of the laryngoscope became general. There can be little doubt that the condition was really due to lesions which could not be discovered with the imperfect methods of exploration at his command.

Simyan and Paget[2] describe a *paralysis* of the vocal cords, which has been observed in the later stages of syphilis. It is always unilateral, and affects the left cord more often than the right. Simyan gives the details of a case, communicated by Libermann, of complete aphonia due to this condition, which appeared eight years after infection. It resisted every kind of treatment, until its specific character was suspected, when the use of hypodermic injections of mercury was begun. The affection then yielded, and the voice was gradually restored.

The Trachea.

The trachea may be the seat of lesions similar to those occurring in the larynx. Vierling[3] concludes from the observation of forty-six cases that early syphilitic lesions are rare; the most common are ulcerative processes, which lead to stenosis by contraction of the resulting cicatrices.

The wall of the trachea may be perforated and an abscess be formed externally. Usually the larynx, trachea, and bronchi are involved at the same time. In sixteen out of the forty-six cases the larynx was spared. Cough, purulent expectoration, and dyspnœa, which may be intermittent, are the prominent symptoms of tracheal syphilis. Stenosis is most likely to occur just above the bifurcation of the trachea, and is always a serious if not a fatal sequel of deep ulceration. According to Gerhardt, stenosis of the trachea may be distinguished from that of the larynx by the absence of depression of the larynx during convulsive inspiration. The trachea above the ulceration is often dilated, and the structure of the cartilages may be changed or destroyed. Thus in addition to the stenosis caused by cicatricial contraction, the ingress of air may be impeded by collapse of the trachea at each act of inspiration.

It is an interesting fact that stricture of the air-passages consequent upon the *cicatrization* of a syphilitic ulcer may cause death from dyspnœa, so that specific remedies may in reality hasten a fatal termination just so far as they exert a beneficial influence upon the local disease. Two interesting cases of this description are given in the *Annuaire de la syphilis* (année 1858, p. 324).

[1] Sur les laryngopathies syph. graves compliquées de phlegmon péri-laryngien, Paris, 1876.

[2] Des paralysies du larynx. Thèse de Paris, 1877.

[3] Deutsches Arch. f. klin. Med., Leipz., April 16, 1878.

In the first, reported by Moissenet, the stricture was situated just above the bifurcation of the trachea. The lining membrane at this point presented a honeycomb appearance, and the cartilages were more or less changed in their structure and destroyed; indeed, four of the rings had entirely disappeared and were replaced by flexible tissue; hence, in addition to the diminution in the calibre of the tube, its walls collapsed at each act of inspiration and added to the difficulty in the ingress of the air. The patient had been taking mercurials and iodide of potassium which only aggravated her symptoms. Tracheotomy was performed without benefit, since the larynx was unaffected and the obstruction was below the artificial opening. Death was caused by asphyxia.

The following is a summary of the second case, reported by M. Demarquay:—

The patient, aged 36, entered a *maison de santé*, Oct. 25, 1858, with all the symptoms of œdema of the glottis. He seemed to be threatened with suffocation; his respiration was noisy and painful; he had had a cough for two months with slight expectoration; his sputa resembled those of laryngeal phthisis; and he had lost much flesh. For a fortnight his symptoms had been very intense. The lungs were found to be sound; and as the patient had had ulcers upon the penis twelve years before, followed six years afterwards by ulceration and perforation of the soft palate, iodide of potassium was ordered. Under this treatment he continued to improve for a month; but on Nov. 25th he was suddenly seized with such extreme dyspnœa that M. Demarquay thought it best to perform tracheotomy. The operation was of no benefit and death soon ensued.

At the autopsy, the larynx was found to be perfectly healthy, with the exception of a small cicatrix between the two arytenoid cartilages; but the trachea was found to be abruptly contracted opposite its eleventh ring, at which point its circumference measured only 28 millimètres. This stricture involved the left side of the trachea and was formed of cicatricial tissue in which six rings of the tube were twisted on themselves and fractured. Below the stricture the bronchi were dilated, and their longitudinal muscular fibres hypertrophied. The lungs were healthy, and free from tubercles.

Treatment of Lesions of the Larynx and Trachea.

Treatment, except in the advanced stages of laryngeal syphilis, gives prompt and permanent results. The use of the "mixed" treatment is in all cases indispensable, and, when cachexia exists, it should be combined with various tonics. Local treatment may be of service in hastening reparation, although Krishaber believes that it is not essential, except in the case of vegetations or of hypertrophy of the mucous membrane. For these conditions he uses chromic acid and the galvano-cautery. Acid nitrate of mercury, chloride of zinc, or nitrate of silver in solutions of appropriate strength may be applied to ulcerations. Astringent sprays, preferably a solution of sulphate of zinc, sedative insufflations, such as

iodoform, and inhalations, as of the compound tincture of benzoin, are useful palliatives. When œdema threatens, counter-irritation externally is indicated, and for its relief scarification of the mucous membrane may be required. Cohen[1] speaks of the œdema which sometimes results from the use of large doses of iodide of potash, and the consequent necessity of closely watching the effect of the drug. Spasm may be quieted with bromide of potassium, and opiates may be required in the rare cases of extreme pain. Fetor of the breath may be relieved by the use of detergents and disinfectants in the form of sprays or gargles. For the stenosis following ulceration dilatation with bougies has been resorted to with results not fully satisfactory; when the contraction becomes extreme tracheotomy is the only resource. The operation is rarely required for other conditions which cause laryngeal obstruction. The tracheal lesions of syphilis, especially those which may result in stenosis, are much more serious than similar lesions of the larynx. Although they are equally amenable to constitutional treatment, the tracheal lesions are usually beyond the reach of surgical intervention. In all cases of syphilis of the air-passages, and especially of the larynx, particular attention should be given to abstinence from tobacco and alcohol, and the avoidance of excessive use of the vocal organs.

The Bronchi.

The *bronchi* may be the seat of syphilitic ulceration and consequent stricture.

In the case of Marguerite Rudloff, reported by Virchow, "the right bronchus was contracted at its bifurcation and above that point; a section of it presented the form of a triangle; its diameter measured a quarter of an inch, while that of the left bronchus measured half an inch. The left bronchus was contracted to a still greater extent near its bifurcation, but only for the distance of a quarter of an inch, and was adherent at this point to the normal œsophagus through the intervention of a thick and tendinous mass of tissue. The right bronchus was the seat of thickening and contraction which extended for a short distance into its branches, which further on were reddened upon their internal surface and dilated. Several larger dilatations of the bronchi were found in the inferior lobe of the lung which was otherwise healthy; and at these points the pulmonary tubes were filled with mucus and surrounded by condensed tissue which extended as far as the pleura."

Virchow concludes from this and another case of which he gives an analysis, that "we must admit the existence of syphilitic ulceration and stricture of the bronchi similar to the same lesions of the larynx, and must also concede that syphilitic bronchitis may give rise to chronic pneumonia, in the same manner as laryngeal ulcerations cause extensive induration of the cellular tissue of the neck. I have often seen in constitutional syphilis,

[1] Diseases of the Throat and Nasal Passages. Phila., 1879.

limited star-shaped cicatrices of the pleura and the sequelæ of pleurisy, in consequence of the above-mentioned changes."[1]

The prognosis in syphilitic ulceration of the air-passages is exceedingly unfavorable. The iodide of potassium, mercurials, nourishing diet, and tonics may, in some cases, afford relief, while in others they prove inefficacious, or, in a few instances, as already remarked, may hasten a fatal termination by inducing cicatrization of the ulcer and consequent contraction and stricture. Carmichael believed that the ulcerative process was maintained by the transit of the air, and that the best method of cure was the early performance of tracheotomy. These views have not, however, been confirmed by recent surgeons, who resort to this operation only in cases of impending suffocation, and even then, since the stricture may be seated below the artificial opening, if for no other reason, the prospect of affording relief is very dubious.

The Lungs.

Lancereaux describes an interstitial pneumonia due to syphilis, and also gummy tumors of the lungs.

Interstitial Pneumonia.—"The seat of this change is variable; sometimes it occupies the superior or middle lobe; at other times it is limited to the inferior lobe; whence we may conclude that it may invade almost indiscriminately the different portions of the lungs, without, however, acquiring a very considerable extent. The affected portion of the parenchyma is firm, hard, elastic, resistant to pressure, friable, impermeable to air, and, therefore, non-crepitant." Numerous yellowish points have been observed in the condensed mass, which under the microscope were found to be composed of granular nuclei and numerous molecular granules, contained in a fibrous network. This form of pneumonia may generally be distinguished by the small extent of the tissues affected, since it rarely involves an entire lobe, or at times it is disseminated at various points.

Gummy Tumors.—"Their number is variable, sometimes single, but generally multiple, rarely exceeding six or eight. They appear as tumors of a grayish or yellowish-white color, somewhat rounded, of the size of a pea, almond, or large nut, at first of a firm, slightly elastic consistency, and afterwards rather soft and cheesy at the centre. Deposited in the midst of the parenchymatous network, these tumors are generally surrounded by an indurated, fibrous, and grayish tissue, which forms a kind of cyst, and is of importance in the diagnosis. Upon the surface of a section of one of these tumors, this cyst or zone is perfectly distinct from the central nodule; the former is resistant under the finger, evidently traversed by vessels, and is made up of perfectly developed fibrous tissue; the latter is friable, little or not at all vascular, formed of nuclear elements or imperfect cells, which are more or less granular, and which belong to the group of elements of connective tissue." Secondary degeneration of

[1] Op. cit., p. 154.

the deposit subsequently commences at the centre and extends to the periphery, and the granulo-fatty débris may be absorbed or are evacuated through the bronchi, leaving a cavity which is lined by the fibrous zone. Such cavities are capable of cicatrization, resulting in depressions and scars upon the surface of the lungs, which have often been mistaken for those of tubercle.

Both this form and the one before described are often attended with dry pleurisy, followed by membranous adhesions to the costal walls.

The most important recent investigations of the pulmonary lesions of syphilis are those of Drs. Greenfield, Goodhart, Green, Gowers, Pye-Smith, and Mahomed, published in the *Transactions of the London Pathological Society* for the year 1877. The main conclusion of these observers is that syphilis produces fibroid changes in the lung, especially at the base and in the middle and lower lobes, with the formation of nodules of a new small cell-growth; in other words, granulation tissue. These fibroid deposits may consist of large firm bands or of masses of greater or less size. The gummy nodules are prone to gangrene, and their vascularity in their early stage explains the hæmoptysis observed in syphilitic subjects. All observers admit that the minute appearances are not always clearly defined, since both tubercular and syphilitic phthisis are accompanied by chronic inflammatory changes essentially similar. There is, however, a radical difference between the two diseases, which is rendered more prominent by their clinical features; in the former we find, coexisting with the fibroid masses, tubercles, which have a tendency to cheesy degeneration, while in syphilitic phthisis there coexist small cell-infiltrations, which have a tendency to necrosis. The microscopic appearances of the syphilitic lesion are given by Dr. Goodhart as follows: There is thickening of the bronchial septa and of the coats of the vessels, and dilatation of the bronchi. The fibrous septa are in places crowded with small cells and nuclei, which project into the lung tissue between the alveolar walls which they distend. The alveoli, in consequence, become contracted and are ultimately obliterated, leaving a fibro-nucleated tissue containing vessels of moderate size. Degenerative changes appear to be going on in the central parts. "In one patch of more rapid cell growth the central cells were softening down into cavities without any previous formation of fibrous tissue." The thickening observed in the outer coats of the arteries, and perhaps also in their inner coats, was not out of proportion to the general thickening which had taken place in the bronchial septa and around all of the tissues contained in them. Dr. Goodhart states that in some cases of old lung disease, tubercular grains were found in various parts. He says: "But while I do not wish to detract from such an occurrence any of the weight which it may be thought to have against the disease which was found along with it being essentially syphilitic, yet, on the other hand, it must in justice be remarked that the presence of such grains in the lungs is no positive evidence of their tubercular (as we understand that term) nature. And even if they were tubercles, they may quite possibly have arisen in the chronic inflammatory changes which resulted from the syphilis; and

though tubercles were found in the lungs in six cases, yet none of these were prominently tubercular, but, on the other hand, fibrous." He therefore concludes that, "with the large proportion of cases of fibroid disease of all the cases of chronic lung disease which occurred in syphilis, there can, I think, be very little doubt that syphilis and fibrous change go together in the lung as elsewhere." As to the nature of the fibroid lung disease, whether it is at all specific or only a form of inflammation, tubercular or otherwise, modified by the syphilitic virus, he says: "On this point I think there can be very little hesitation in arriving at a decision. I can see no difference in any of the specimens that I exhibit between those I suppose due to syphilis and the more chronic forms of tubercular phthisis, chronic pneumonia, and miners' phthisis; all of these are histologically concerned with a nuclear growth in the interstices of the lungs. They are indeed but varying forms of inflammation, but, unless we think to find a specific corpuscle in syphilis, the close similarity of the growths which occur in it to those of other diseases was but to be expected, since the range of variation in the arrangement of cells and tissue and in the form of cells is, so far as we know, most limited." Although he believes that the changes are characteristic of syphilis, he can determine no histological distinction. "Fibroid degeneration of the lungs due to syphilis differs from chronic pneumonia and that state of solidity which arises after contraction of the lung from old pleurisy, in that it is generally less evenly spread over the lobe than they; it is nodular rather than diffuse, and is symmetrical and not unilateral; it differs from miners' phthisis in wanting the extreme amount of dilatation of the tubes and possessing more solidity from greater cell growth. Many of the patches of disease look, it is true, not unlike red or gray hepatization, but they are more tough, generally less granular, and often somewhat translucent."

The clinical features of syphilitic affections of the lungs have been carefully studied by Fournier, Rollett, and Frey. Fournier[1] thinks that syphilis affects the lungs in two ways: first, by the development of its specific lesions —gummata, etc.; second, by producing changes such as occur in any cachexia. The lesions, which seldom occur before the tertiary period, are divided by Fournier into two classes: 1, simple hyperplasia; 2, gummous infiltration. Syphilitic hyperplasia of the lung is similar to that of the liver. The septa of the lung are thickened and the alveoli consequently narrowed. The epithelial lining is secondarily involved. Fournier regards the process as really an interstitial pneumonia, which results in the formation of nodular masses. In recent cases the pleura over the nodules is white and glistening; in old cases stellar depressions of the membrane are found.

Gummata of the lungs resemble those of other organs. There may be a single tumor, and the lesions rarely exceed six or eight in number, in this respect differing from tubercles, which are very numerous. They are usually superficial and occupy the lower lobes. They degenerate from the centre, leaving a cavity with white, hard, and fibrous walls. Fournier

[1] Fournier, Gaz. hebd. de méd., Paris, Nos. 48, 49, 51, 1875.

enumerates five anatomical points of distinction between gumma and tubercle of the lungs: 1. Situation—tubercle involves the upper lobe of each lung; gumma, one lung to a limited degree. 2. Number—gummata are few and solitary; tubercles become confluent. 3. Gummata are larger, and are never miliary. 4. Color—gummata are white or yellow, never transparent like miliary tubercle. 5. Consistency—the structure of the gumma is more uniform, and if it breaks down its capsule prevents the degeneration from being complete.

Syphilitic lesions of the lungs may attain quite a large size, with very obscure symptoms. There may be some disturbance of respiration and slight cough with scanty expectoration. Physical signs are absent, unless the lesion be very superficial and circumscribed. The dyspnœa gradually increases, but is never very intense, the cough becomes more severe and spasmodic, the expectoration is free and muco-purulent, and hæmoptysis may occur. The symptoms are in fact similar to those of ordinary phthisis.

Fournier recognizes three varieties of syphilitic affections of the lungs: the latent, in which the lesions are circumscribed, cause no symptoms, and are not detected until after death; in the second variety there is merely slight disturbance of respiration without any disorder of the general condition, the symptoms being those of limited induration or of a cavity; the third is a severe form, presenting all the features of phthisis. The prognosis depends upon the extent of the lesions and their amenability to treatment. That cure may be effected has been proved by the post-mortem discovery of the traces of gummous deposits which have been reabsorbed. The gradual disappearance of the physical signs of induration, with improvement in the general condition, as a result of treatment, is often observed. The remarkable degree to which subjects of these lesions sometimes retain their flesh and strength should always excite suspicion of syphilis. It is the opinion of Fournier that, however grave and extensive the lesions may be, the disease will yield to specific treatment.

The views of Rollet[1] are of interest chiefly by reason of their contrast with those of Fournier. Rollet thinks that syphilis of the lungs is indicated by pronounced dyspnœa or even orthopnœa, besides a sense of oppression or pain on deep inspiration. The cough is at first dry or accompanied by bloody sputa. Percussion shows a sharply defined region of dulness over the middle lobes, particularly on the anterior and lateral portions. Auscultation gives at first diminished respiratory sounds, and finally the usual signs of phthisis. He alludes to the statement of Grandidier, that in twenty-seven cases the affection involved the middle lobe of the right lung, and adds that conclusions should not be drawn without confirmation of the fact. He admits the diagnostic value of the fact that the upper lobes generally escape. The history of the case is of the greatest importance, and the coexistence of syphilitic lesions, the absence of a phthisical tendency, and improvement under specific treatment are points in the diagnosis.

[1] Rollet, Ueber Lungensyphilis, Wien. med. presse, No. 47, 1875.

CHAPTER XVIII.

AFFECTIONS OF THE ORGANS OF CIRCULATION.

The Heart.

The heart may be attacked by syphilis in two forms, either as a diffuse myocarditis, or as a gummatous deposit. Changes in the muscular fibre of the heart analogous to amyloid degeneration of the liver, but not necessarily characteristic of syphilis, may also occur.

Diffuse Myocarditis.—Diffuse or interstitial myocarditis is described by Lancereaux as follows: "At first, the appearance of rounded nuclei in the thickness of the sarcolemma or in the connective tissue; the formation of cells and fibres of connective tissue; vascularity; then at some points fatty metamorphosis of the nuclear and cellular elements, whence arises the yellowish coloration; at the same time and secondarily to the formation of connective material, granulo-fatty degeneration of the muscular fibres, the contents of which may be completely absorbed." This form generally coexists with gummy tumors in the heart.

Gummata.—Gummy tumors of the heart vary greatly in size and number. One has been observed as large as an egg, but they seldom exceed the size of a cherry. They may appear in any portion of the muscular tissue of the heart, but are most commonly found in the wall of the left ventricle. Jullien has collected nineteen cases of gummatous myocarditis, four of which occurred in women. The time after infection at which the disease appeared varied from the first to the eighteenth year. In the majority of cases the affection is coincident with the late lesions of syphilis. An interesting case of the precocious development of cardiac syphilis, in which the autopsy was made by Prof. Loomis, was reported to the N. Y. Pathological Society in February, 1876. The patient died with double pleurisy and pericarditis. The muscular tissue of the heart, which was enlarged and dilated, was almost entirely replaced by interstitial cellular deposit. The external evidences of syphilitic infection did not appear until several weeks after the manifestation of cardiac and pulmonary symptoms. Renal and hepatic lesions were also present.

In structure gummata of the heart resemble similar lesions elsewhere. They differ from sarcomata, with whose cellular structure they are almost identical, in their tendency to cheesy degeneration. Tubercular deposit is always associated with similar lesions of the lungs. These tumors are almost always attended by more or less inflammation of the surrounding tissues. Under the microscope small cells are seen scattered among the

muscular fibres, which may themselves be granular; frequently the striæ are destroyed. The heart is enlarged and dilated, and pulmonary congestion frequently results from its impaired action.

Gummatous tumors of the heart seldom, if ever, soften and evacuate their contents. On the contrary, they remain dry or undergo caseous degeneration, while their peripheral tissues become dense and indurated, and slowly contract.

The *endocardium* overlying these tumors is almost invariably inflamed and thickened. Sometimes it becomes much roughened and so dense as to be almost cartilaginous. Vegetations, like small condylomata, often spring from its affected surface, especially near and upon the valves. These conditions must obviously interfere with the current of blood, and may lead to the formation of emboli.

The *pericardium* may also become inflamed, and covered with false membrane. Its cavity may be completely obliterated. Its surface has been found studded with miliary granules, and Lancereaux has reported a case in which a gummy tumor as large as a cherry was embedded in the thickened pericardium.

The *symptoms* of cardiac syphilis may be obscure or absent. In many cases the heart's action is feeble and irregular; palpitation, dyspnœa, cyanosis, and œdema are sometimes observed. Pain or a sense of oppression in the præcordium may be complained of. Examination may show hypertrophy of the heart, and a murmur may possibly be detected on auscultation. In many cases, however, the diagnosis must be furnished by the general history.

The *prognosis* is always unfavorable, although a cure has been reported in three cases, and doubtless the condition has been entirely overlooked in many others. Death is usually sudden, and may be due to embolus, to cardiac spasm, or to syncope. A fatal result may also ensue from secondary complication of the lungs, by which perfect aeration of the blood is interfered with. In two of the cases collected by Jullien, death was preceded by hemiplegia.

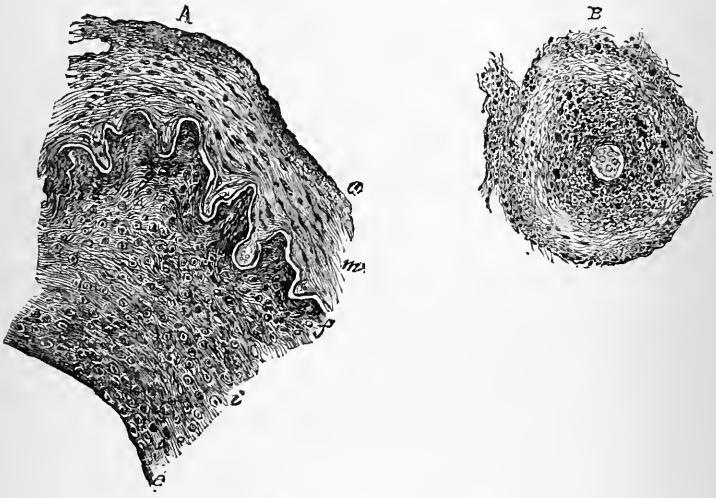
The *treatment* comprises the use of iodide of potash, tonics, and stimulants.

The Bloodvessels.

The veins and capillaries are very rarely invaded by syphilis. Two cases of gummy tumor seated in the connective tissue external to the saphena vein have been reported by Gosselin. The syphilitic lesions of the arteries may be consecutive to disease of the surrounding tissue or they may be primary. Lesions of the latter class are found almost exclusively in the small arteries of the brain. In a few cases the carotid has been attacked. The morbid change consists of a circumscribed thickening of the wall of the vessel by an infiltration of small cells, especially into the tunica intima. The lesion is limited internally by the endothelium, and externally by the membrana fenestrata. The cells are round

and spindle-shaped, and seem to become developed into an imperfectly fibrillated tissue. The tunica adventitia is abnormally vascular and infiltrated with cells, the infiltration usually invading the muscular coat also. The changes in the arterial wall are well shown in the accompanying figure, taken from Green's pathology.

Fig. 121.



Syphilitic disease of cerebral arteries.

This arterial lesion has been studied especially by Lancereaux, who regards it as quite distinct from atheroma, and in the cerebral arteries by Heubner, Greenfield, and Barlow. The affection differs from simple arteritis in three particulars; it is limited to the small vessels, it is developed rapidly, and it involves all the coats of the vessel. The disease may terminate by the formation of a thrombus, in consequence of the obstruction to the vascular current, or the new cells may be absorbed, leaving the wall of the vessel so thin and weak that it becomes dilated or even ruptured.

The symptoms of the lesion of course depend upon its seat. When the carotid is involved there is impairment of the cerebral functions, pain in the head, epileptiform attacks and perhaps coma and death. When the disease attacks the cerebral arteries the nervous phenomena are usually more marked. The headache is severe; paralysis, with or without coma, supervenes; aphasia and muscular spasms are observed. Amendment may take place, or delirium with fever and epileptiform convulsions may be developed, and a fatal result rapidly follows.

The relation of syphilis to aneurism of the large arteries is a question of great interest. Although the influence of the specific virus in its production may have been overestimated, there seems to be good reason to believe that aneurism does occur in syphilitic subjects as a direct result of specific changes in the arterial wall.

CHAPTER XIX.

SECONDARY AND TERTIARY AFFECTIONS OF THE GENITO-URINARY ORGANS.

Syphilitic Epididymitis.

Under the name of syphilitic epididymitis, Dron,[1] in 1863, described an affection limited to the globus major of the testis.

In some cases this affection begins insidiously and is not recognized until "a lump" is felt by the patient; in others, a slight uneasiness attends its formation. Upon examination, we find a small, round, or oval tumor just above the testis, the scrotum itself being unaffected. It usually has a smooth surface and is of a decidedly firm consistency. Its size varies from that of a pea to a lima bean. It may exist in one epididymis only, but frequently both are affected. Such tumors remain in an indolent condition without showing any tendency to degeneration, and they always promptly disappear under mercurial treatment. Other portions of the epididymis or the testicle itself are commonly not attacked simultaneously. We have, however, seen two instances, and Fournier has met with such, in which the globus minor was involved shortly after the globus major. We have also found similar tumors developed in the cord subsequent to the appearance in the epididymis; and others again in which sarcocele coexisted.

This affection is usually a somewhat precocious manifestation of syphilis, occurring in most cases within the first six months and sometimes as early as the second month, or again as late as the fifth year after infection. It is more commonly unilateral when it occurs at a late period. In opposition to the view that it is the result of acute or chronic urethral inflammation, it is only necessary to say that it occurs in syphilitic subjects, some of whom have never had any urethral trouble and that it is quickly cured by anti-syphilitic treatment. Fournier aptly remarks that probably many cases of syphilitic epididymitis have been wrongly diagnosticated as tubercular. An important point in the diagnosis of this affection is that as a rule it attacks the globus major, whereas in gonorrhœal epididymitis the globus minor is most commonly involved alone.

Syphilitic Orchitis.

A disease of the testicle, dependent upon syphilis, was recognized by Astruc,[2] who speaks of its indolent character, and contrasts it with the

[1] De l'épididymite syphilitique; Arch. gén. de med., Paris, 1863.

[2] Book III. chap. iv.

acute inflammation of gonorrhœal testicle; it was unknown to Hunter, but was noticed by Bell,[1] and, more recently, has been described by Sir Astley Cooper,[2] Bérard,[3] Velpeau,[4] and others, but our present knowledge of this affection is chiefly due to Ricord, who has given a most faithful description of its symptoms, pathology, and treatment, under the name of syphilitic albuginitis.

Syphilitic sarcocele, orchitis, or albuginitis, as it is variously termed, is one of the so-called transition symptoms of syphilis, on the confines between secondary and tertiary lesions, but more closely allied to the latter than the former. When the constitutional disease runs a rapid course, it may sometimes occur as early as the fourth or fifth month after contagion, while secondary symptoms are still present; but, in the majority of cases, it does not appear until several years after the primary sore, and is accompanied by well-marked tertiary manifestations in the fauces, periosteum, or bones; or, in some instances, it stands alone as the only evidence that the patient is still affected with the syphilitic poison.

Symptoms.—In most cases, syphilitic orchitis attacks both testicles either at the same time or consecutively. Its symptoms are deserving of special attention, since it may readily be confounded with other affections of the testis which require extirpation. The records of surgery show that many testicles have been removed for what is now known to be an essentially curable disease.

One of the most characteristic features of this affection is the almost entire absence of pain attending it, and the great insensibility to pressure; whenever, therefore, a testicle becomes enlarged without any of the ordinary signs of inflammation, in a person who has once had syphilis, there is strong reason to suspect that the disease is due to syphilitic taint. In exceptional instances, a dull pain is felt about the loins, but generally the only uncomfortable sensation is a feeling of weight in the affected organ, which is worse towards evening after the patient has been upon his feet during the day, but which does not undergo the nocturnal exacerbation so common to syphilitic pains situated in the periosteum and bones. Moreover, as the disease progresses, the testicle appears to lose even its normal sensibility, and may be roughly handled without causing the slightest uneasiness.

The body of the testicle, which is commonly alone affected, is somewhat increased in size, but never to the same extent as in encephaloid disease of the same organ; and it rarely exceeds twice its normal diameter. Ricord was in the habit of saying at his lectures, "Whenever you meet with a tumor of the testis as large as your fist, and find that the swelling is not in a great measure due to effusion, you need not suspect syphilis."

[1] Treatise on Gonorrhœa Virulenta and Lues Venerea, vol. ii. p. 128.
[2] Structure and Diseases of the Testis.
[3] Des divers engorgements du testicule, Paris, 1834.
[4] Dictionnaire de méd.

In most cases, a small portion of the apparent swelling is dependent upon hydrocele; since in nearly every instance of syphilitic orchitis, there is a slight effusion into the tunica vaginalis. When the amount of fluid is considerable, it may be necessary to evacuate it by puncture with a broad needle, before a satisfactory examination can be made; but in most cases, we may by firm pressure sufficiently displace the fluid to reach the body of the testicle and determine its condition by palpation. At an early stage of the disease, the testicle may be found to contain one or more distinct masses of induration, which form slight projections upon the surface, of the size of the head of a pin, pea, or even an almond, but which are never so prominent as to change the general contour of the organ. These projections are due to an effusion of plastic material, of the same nature as gummy tumors, upon the surface of the tunica albuginea. As the disease progresses, the distinct masses of induration coalesce and form a hard resistant tumor, which still preserves to a great extent the normal shape of the testicle.

In rarer instances, the tumor is smooth throughout its whole course, while the other symptoms remain the same.

The course of this affection is exceedingly slow and chronic, frequently lasting for several years. The sexual desires are not changed, unless the disease has made great progress in both testicles.

When recognized at a sufficiently early period, syphilitic orchitis may almost invariably be arrested, and the organ restored to its original integrity. If left to itself it most frequently terminates in obliteration of the seminiferous tubes, and complete or partial atrophy, corresponding to the extent of the adventitious deposit; or, again, the parenchyma of the gland may degenerate into fibrous, cartilaginous, or even osseous tissue. Ricord has laid down the law that suppuration never takes place in uncomplicated syphilitic orchitis, and has shown that many supposed cases to the contrary were really instances of tubercular disease of the testis, or gummy tumors of the cellular tissue of the scrotum. This law was generally admitted as correct, and was not for a time called in question; but Rollet[1] reported an unquestionable instance of this disease in which the substance of the testicle protruded through an ulceration of the scrotum and the tunica vaginalis and albuginea, giving rise to the condition known as fungus of the testicle; and also quoted a similar case, witnessed by himself, from Jarjavay and referred to another described by Curling.[2] Victor de Meric[3] reported still another instance of fungus of the testicle dependent upon syphilis. It would appear, therefore, that Ricord's law is not without exception.

Pathological Anatomy.—This affection is found to exist in two forms, the diffused and the circumscribed.

[1] Annuaire de la syph., année 1848, p. 90.
[2] On the Testis, 2d ed. p. 277.
[3] Lancet, Lond., Am. ed., May, 1859.

Diffused Form.—In the earliest stage nothing is discovered but an increase in the vascularity of the organ. Soon adventitious nuclei and cells appear in the connective tissue, and are followed by fibrous bands which, starting from the internal surface of the tunica albuginea, permeate the body of the testicle, and cause compression and atrophy of the tubuli seminiferi, the epithelial cells of which undergo fatty degeneration, and are stained of a brownish color by the deposit of pigment. The organ is, at the outset, somewhat larger than normal, and hard and resistant to the touch; but, in the absence of treatment, atrophy is the usual termination, either general if the inflammation is diffuse, or presenting a cicatricial depression when only a portion of the gland has been affected.

The tunica albuginea is often thickened; the tunica vaginalis contains a certain amount of serous fluid, its walls become covered with false membranes, and often contract adhesions with each other.

Circumscribed Form.—In this form, gummy material is deposited in masses from the size of a pea to that of an English walnut, sometimes scattered through the testicle, at others aggregated, and often surrounded, especially at a late stage, by a fibrous capsule. This deposit originates from the external (muscular) coat of an artery, or from the membrane of a seminal tubule. Its color is grayish or yellowish-white; its consistency somewhat firm towards the circumference, but soft towards the centre; its histological elements vary in different cases, being sometimes entirely fibrous, at other times consisting of cells and nuclei, or amorphous matter mixed with fatty crystals.

The tendency of these masses is to undergo secondary degeneration and softening, which commences at the centre, so that a section frequently exhibits several layers varying in consistency. As a consequence of this degeneration, inflammation of the surrounding tissues may take place, ulcerations of the adherent layers of the tunica vaginalis ensue, and a portion of the deposit projecting through the opening gives rise to the syphilitic fungus of the testicle described by Rollet and others.

Lancereaux figures a case in which both testicles were almost entirely composed of a homogeneous yellowish substance resembling the yolk of a well-boiled egg; the tunica albuginea had undergone the same transformation, and was distinguishable only in spots from the general mass.

The circumscribed form of syphilitic testicle often coexists with the diffuse.

Diagnosis.—Syphilitic orchitis may be confounded with gonorrhœal epididymitis, with cancer, tubercular disease of the testis, or chronic orchitis.

Gonorrhœal inflammation of the testis is an acute disease, attended with severe pain, difficulty of motion, redness, heat, and tension of the scrotum; chiefly attacking the epididymis; often complicated with inflammation of the vas deferens; preceded or accompanied by a discharge from the urethra; and yielding to simple treatment. The induration left by an acute

attack of swelled testicle may be recognized by the previous history of the case, and by being limited to the globus minor of the epididymis.

In cancer of the testicle, which is generally of the encephaloid variety, the pain is slight at the commencement, but increases with the progress of the disease and becomes very severe and lancinating; the tumor is very irregular, grows with great rapidity, and often attains an immense size; and the cord and neighboring ganglia are frequently involved. "If you remove a cancerous testicle, the disease almost always returns in the cord; in a second attack of syphilitic orchitis, the opposite testicle is affected."[1]

Tubercular disease of the testis occurs about the age of puberty rather than in adult life, and in subjects presenting evidences of a strumous diathesis. The adventitious deposit first takes place in the epididymis, or in the centre and not in the external portions of the testis as in syphilitic orchitis; as the disease progresses, slight protuberances may be formed upon the surface as in the last-mentioned disease, but they soon contract adhesions with the tunica vaginalis and scrotum, suppurate and ulcerate. Moreover, evidences of tubercular deposit may often be detected in the vesiculæ seminales by examination with the finger *per anum*, or in the cord and inguinal ganglia.

Great diversity of opinion exists, especially between English and French surgeons, relative to the frequency, nature, and symptoms of chronic orchitis. Mr. Curling, who may be taken as the representative of English views, regarded this affection as quite common, and dependent upon a deposit, generally in circumscribed masses, of a peculiar yellow homogeneous substance in the body of the testicle, which frequently terminates in suppuration and benign fungus of the testis. Among the French, Nélaton maintains, justly, I think, that this description applies to true tubercular testis, and that Curling has also included under the head of chronic orchitis many cases of syphilitic albuginitis. He believes, with the generality of French surgeons, that chronic orchitis is an exceedingly rare affection; that it is due to plastic inflammatory infiltration, bearing no resemblance to tubercle, in the substance of the epididymis and body of the testicle, not circumscribed in well-defined masses, often very persistent, but capable of absorption without suppuration; that it often originates in irritation about the deeper portions of the urethra, and sometimes gives rise to a very peculiar condition of the sperm, which is of a reddish color, resembling thin currant jelly.[2]

It is unnecessary to enter more minutely into the details of the differential diagnosis between syphilitic orchitis and the above mentioned diseases. If attention be paid to their prominent features as now described, especially when assisted by a knowledge of the history of the case and a careful search for coexisting syphilitic symptoms or traces of their previous existence, the surgeon will not often be left in doubt. If any un-

[1] Dupuytren, Leçons orales de clinique chirurgicale, 2e ed., t. iv., p. 236.
[2] Gaz. d. Hôp., No. 14, 1857.

certainty exist, the patient should always have the benefit of a trial of specific remedies before resorting to operative procedures.

Treatment.—In the treatment of this disease Ricord relies almost exclusively upon iodide of potassium, administered in doses of from five to thirty grains three times a day. It would appear that Ricord is here somewhat inconsistent with his own doctrines, since he elsewhere recommends a mixed treatment consisting both of iodide of potassium and mercury in the transition symptoms of syphilis, among which he ranks syphilitic orchitis. In my own practice, I have been dissatisfied with the iodide of potassium alone and have obtained much more favorable results from its combination with mercury. For instance, in a case under my care, the patient had been taking ten grains of the iodide three times a day during two months for a tubercular syphilitic eruption, when my attention was first called to the affection of the testicle, which had either appeared or certainly had not improved during the treatment. The dose of the remedy was gradually increased to twenty grains three times a day without affecting the orchitis, which speedily improved after substituting half a grain of the protiodide of mercury for the iodide of potassium taken at noon, and continuing the latter remedy morning and night. In many cases, and especially in broken-down constitutions, it is better to employ mercurial inunction together with the iodide of potassium and tonics internally.

Local treatment is of secondary importance, and, in most instances, may be entirely dispensed with, except that the testicles should be relieved of their own weight by a suspensory bandage. Judging from the case reported by Rollet, even a fungoid growth of the testicle projecting through an ulceration of the scrotum, will disappear, and cicatrization take place under the use of constitutional remedies alone. The local treatment commonly recommended, and which perhaps in a few cases may be employed with advantage, consists in daily mercurial inunction upon the scrotum, or compression by means of straps of adhesive plaster, as in swelled testicle from gonorrhœa. The effusion into the tunica vaginalis is in most cases soon absorbed under general treatment, but if excessive, may be evacuated by means of a lancet or broad needle. The danger of wounding the swollen testis is too great to admit of the use of a trocar as in the ordinary method of tapping for hydrocele.

Affections of the Vasa Deferentia, the Vesiculæ Seminales, and the Prostate.

The *vas deferens* is usually intact in cases of syphilitic orchitis, but in a few rare instances has been known to be consecutively involved. Verneuil[1] met with a gummy tumor of the cord as large as the two fists, extending

[1] Bull. Soc. anat. de Par., 2e Serie, t. 1er, 1856.

into the iliac fossa, of firm consistency, and the seat of dull pain; the patient had a similar deposit in the right auricle of the heart.

No instance of disease of the *vesiculæ seminales* dependent upon syphilis has as yet been reported.

Neither is anything definite known of the liability of the *prostate* to be attacked by the later manifestations of syphilis, although Lancereaux regards such occurrence as probable, and states that our knowledge on this point has been obscured by the confusion existing until comparatively a recent period between gonorrhœa and syphilis.

Affections of the Penis.

I have already spoken of a number of cases occurring in my own practice, of what proved to be a deposit of syphilitic tubercle in the penis, especially near the furrow at the base of the glans, and readily mistakable for a chancroid. (See "Diagnosis of the Chancroid.")

According to Ricord, such deposits may also take place in the corpora cavernosa. He says: "A small hard point sometimes appears in one or both corpora cavernosa of a patient in the tertiary stage of syphilis. The patient, without previous pain or other appreciable symptom, suddenly discovers a slight hardness of the size of a millet seed in the substance of the penis. This gradually increases in size, either on one or both sides, without showing any preference for any one point of the corpora cavernosa over another; thus we find it either above or below, or on either side. The progress of the disease is slow and without pain, but soon the penis begins to deviate from a straight line, and presents the following peculiarities: if, for example, there is induration of only one cavernous body, the erectile tissue loses its permeability at the point indurated; if the patient has an erection, the corpus cavernosum on the healthy side alone becomes turgid; the opposite body remains in a state of flaccidity, and the penis has a lateral curvature; the erection might be called an inguinocrural one, since the extremity of the penis points to the fold of the groin.

"If the induration occupies the dorsum of the penis, the latter forms an arc of a circle with its concavity upwards, the glans approximating to the symphysis pubis. I have seen every variety of this affection and have even met with patients in whom the penis formed a complete ring."

It is well to mention that these symptoms are not always due to syphilis; I have known of several instances in which they were produced by injury to the penis in a state of erection, and others still in which the cause was not appreciable, and in which anti-syphilitic remedies failed to afford the slightest relief.

Affections of the Ovaries, Fallopian Tubes, Uterus, and Vagina.

Syphilitic affections of the ovaries are rarely met with. According to Lancereaux, they present a close analogy to syphilitic affections of the testicle, and are either diffuse or circumscribed. This author has only met with the diffuse form after it has arrived at the stage of atrophy; the ovaries were of the usual size, or smaller than natural, fibrous in their structure, with scattered cicatrices and destitute of Graafian vesicles, although the patients had not yet arrived at the usual age for the cessation of the menses. Lancereaux gives a representation of a case furnished by Dr. Richet, in which there was a circumscribed deposit of gummy material, similar to that found in syphilitic orchitis. The symptoms of these affections are said to be a slight, dull pain in the region of the ovaries, possibly at the outset some increase in the size of these organs, perceptible on abdominal and vaginal palpation, a loss of sexual passion and sterility. It is evident that these signs, taken in connection with the history of the case, can only furnish a probability of the nature of the disease, which may be further increased by the success of anti-syphilitic treatment.

No instance is known in which the Fallopian tubes have been affected with syphilis.

Certain cases in which uterine tumors in syphilitic subjects have yielded to the internal administration of iodide of potassium and mercurials, render it probable that this organ is not exempt from the late manifestations of syphilis, but nothing more definite is known upon the subject, since post-mortem investigation has been wanting.

Exulcerative Hypertrophy of the Neck of the Uterus.

Our limited knowledge of this affection is derived chiefly from the writings of Henry, Aimé Martin and De Fourcauld. It consists in a total or partial enlargement and hardening of the os, which appears congested and is more or less superficially ulcerated; its surface is granular or often presents a varnished aspect. The hypertrophy is greatest in the transverse diameter and is but slight in the antero-posterior. The parts are indurated and resistent, or sometimes doughy, and generally are not sensitive to manipulation. In most of the cases there were no symptoms referrible to the utero-ovarian system; in others the patients complained merely of certain unpleasant sensations, such as pain in the loins, back and thighs, and a bearing-down feeling. The secretion from the ulcer is scanty, and muco-purulent, and is contagious like the secretion from other secondary lesions. The affection may be accompanied by various displacements of the womb.

According to A. Martin this lesion occurs in 48 per cent. of syphilitic women, beginning on an average in fifty-eight days after infection, while in the three cases reported by Henry it was developed in the second, eighth, and ninth years of syphilis. According to the former observer it

is frequently preceded by fever, and in thirty-one cases out of forty-seven it coexisted with hypertrophy of the tonsils. It runs a chronic course but yields readily to internal treatment alone. Martin, who observed its cure in from four to five weeks, considers local treatment of merely secondary importance.

We know nothing positive of the pathology of this affection. Its usual occurrence in the early months of syphilis and the frequent coexistence of hypertrophy of the tonsils suggest the idea of hyperæmia with perhaps slight cell infiltration. Its curability also favors this opinion, while all the facts oppose the view of its being gummy infiltration.

This affection is important not only in the matter of diagnosis but also as explaining certain cases of syphilitic infection in men, after connection with women who are found to be free from vulvar lesions.

There is probably no reason why the vagina should not, like other mucous canals, be affected by the deposit of syphilitic tubercle in the submucous cellular tissue, and undergo subsequent contraction, but no instance of the kind has been recorded.

Affections of the Kidneys.

M. Rayer was the first to trace a connection between the form of Bright's disease, known as waxy degeneration, and syphilis, and this subject has since been investigated by several observers, especially by Frerichs, Virchow, and Lancereaux.

I have myself met with a number of instances of albuminuria in persons suffering with syphilitic cachexia, but have had no opportunity for post-mortem examination. In one case, complicated with ascites, I was obliged to tap the patient on three occasions; the symptoms yielded for a time under full doses of iodide of potassium and mercurial inunction, but death ensued a short time after the patient had passed from under my observation.

Virchow attributes the albuminuria of syphilitic subjects to *amyloid* or waxy degeneration of the kidneys, presenting nothing specific in its character, but common to all forms of cachexia.

Lancereaux recognizes the same forms as are met with in other organs; the interstitial inflammatory form, the gummy form, and cicatrices the result of the preceding forms. Of twenty cases of visceral syphilis observed by him, there were four of interstitial nephritis (twice with waxy degeneration); one of small gummy tumors; several of cicatrices upon the surface with atrophy.

"*Diffuse Form, Interstitial Nephritis.*—This change in the kidneys is characterized by a new formation of the constituent elements of the stroma. At the outset, the appearance of nuclei of connective tissue, and multiplication of the cellular element; in some cases fatty degeneration of the new products. The kidneys, of average consistency, present a smooth, pale surface, scattered with fine striæ and slightly yellowish spots. Later, they are firmer than natural; their capsule is thickened and their surface

mammillated; their size is at first normal or exaggerated, but they gradually become atrophied in virtue of the tendency of the tissue of new formation to contract, and, according to the greater or less extent of the nephritis, this atrophy will be general or partial. In one case, the cortical substance was only two millimetres in thickness, the columns of Bertin were small and atrophied, and the whole medullary substance was of a yellowish and lardaceous appearance. Consecutive to the changes in the stroma, an alteration occurs in the active elements of the kidneys. The Malpighian corpuscles, compressed by the connective tissue, are soon atrophied, and several of our observations make mention of this atrophy together with adhesion of the capsule to the renal parenchyma. The epithelium gradually undergoes fatty degeneration. In addition to this form of degeneration, we sometimes find amyloid, lardaceous, or waxy degeneration, which partially obstructs the diminution in volume; but the latter is always an indirect alteration similar to that occurring in cirrhosis of the liver due to syphilis."

With regard to the diagnosis of this form, and that produced by the abuse of alcoholic stimulants, Lancereaux says: "Interstitial parenchymatous inflammation due to the immoderate use of spirituous liquors is more general; it leads to more complete atrophy, and does not usually occasion upon the surface of the organ the deep and cicatricial depressions of syphilitic inflammation."

Circumscribed Form, Gummy Tumors.—Gummy tumors, though rare, still exist in the kidneys as in other organs. In one of Lancereaux's cases, upon the surface of the kidneys and in the thickness of the cortical substance, were found small tumors of the size of a pea, of firm consistency, of a yellowish color, and presenting, under the microscope, the usual cellular and nucleolar elements of gummy deposit.

Cicatrices upon the surface of the kidneys are the result of the advanced stage of the preceding forms, and are due to the absorption of the normal elements of these organs. "They present a strong resemblance to the depressions and cicatrices which succeed hemorrhagic deposits, but the latter may be recognized by the ordinary integrity of the fibrous capsule, and the presence of the coloring matter of the blood. They stand in some relation to the bloodvessels, and are constantly associated with disease of the heart."

Syphilitic affections of the kidneys may be attended or not with albuminuria. In the latter case, the prognosis is not necessarily serious; in the former the contrary holds good, the usual symptoms produced by uremia may ensue, and although the affection is usually of long duration, the termination is commonly fatal, and death often takes place suddenly from coma.

CHAPTER XX.

AFFECTIONS OF THE NERVOUS SYSTEM.

No department of syphilography has been studied so extensively and so thoroughly, within the past ten years, as that relating to the effects of syphilis upon the cerebro-spinal axis. Syphilitic nervous affections are very numerous, and are now generally conceded to be of frequent occurrence. Our knowledge of them has been extended, and facility and certainty in their diagnosis increased by numerous monographs and reports of cases which have been published, especially during the last five years.

Our limited space compels us to describe these affections briefly, and we shall be unable to refer in detail to the writings of various authors.

Syphilitic nervous affections may be developed as early as the sixth month and as late as the twentieth year after infection.

They are seen more frequently in men than in women, and are most common between the ages of twenty and thirty, simply because syphilis is most likely to be contracted at this period of life. It seems to be an established fact that nervous phenomena are likely to follow a course of syphilis in which the external manifestations have been insignificant, or so slight as to have been entirely overlooked.

Syphilis does not primarily attack nervous tissue, but begins in surrounding or investing structures. For instance, lesions of the meninges, or of the bones, induce softening or induration of the brain. These lesions are peculiar in their distribution; they rarely involve an entire hemisphere, or all parts of any particular region; they are limited in extent and unsymmetrically arranged. Thus, one hemisphere may be involved in two places, and there may also be a lesion of the cord, or the surface of the brain may be attacked at the same time with one or more of the large cerebral arteries, and, as a result, irregular and incongruous nervous symptoms are exhibited. Associated with hemiplegia, there may be optic neuritis, mydriasis, or paralysis of one of the cranial nerves, or even paraplegia.

The brain is more frequently attacked than the spinal cord. Our knowledge of the effect of syphilis upon the cerebellum is very limited.

The prominence and constancy of some of the nervous phenomena of syphilis enables us to recognize them as distinct affections, namely, subacute meningitis, hemiplegia, epilepsy, paraplegia, and aphasia, and certain others of minor importance.

Predisposing Causes of Syphilis of the Nervous System.

Nervous symptoms are especially likely to appear in persons of a neurotic or neuropathic constitution, which may be hereditary or acquired. Chorea, migraine, apoplexy, melancholia, and neuralgia are common features in the family history of such individuals. Those who have previously had some simple nervous affection are particularly liable, when infected by syphilis, to the development of specific nervous symptoms. Protracted mental anxiety, depressing emotions, sexual excesses, the abuse of alcohol and of narcotics, have been known to act as predisposing causes. Of diseases, those accompanied or followed by cerebral congestion, also malaria and other conditions producing cachexia, may act indirectly. Sunstroke and injuries of the skull may be included, as well as the gouty diathesis, particularly in elderly persons and in those in whom gouty cerebral symptoms have been prominent.

The inadequacy or the absence of treatment, in relation to the invasion of the nerve centres by syphilis, should be observed. In reading the histories of cases thus far reported, it is found that in many no treatment at all had been attempted, in some the treatment had been insufficient, while in very few had it been carried to the extent which we deem necessary in even the slightest cases.

The nervous phenomena of syphilis generally originate in lesions developed in one or more of the following structures:—

1. The Cranial Bones and Vertebræ.
2. The Dura Mater.
3. The Arachnoid and Pia Mater.
4. The Brain and Cord.
5. The Arteries.
6. The Nerves.

Affections of the Bones.

Any lesion seated on the inner surface of the cranium or vertebræ, may excite inflammation of the membranes, and may finally lead to morbid changes in the brain itself and in the spinal cord. The most frequent lesions are nodes, exostoses, caries, and necrosis.

Although nodes may occur early in the course of syphilis, these are generally considered tertiary lesions. In one instance we have seen multiple nodes developed on the external surface of the cranium, ten months after syphilitic infection; the presumption is that similar growths may appear as early on the inner surface. We may, therefore, expect grave disturbance of the nervous system during the first year and as late as the twentieth, since syphilitic osseous lesions are known to be developed even at this advanced period. The phenomena may be referred to pressure, or to inflammation of the brain substance, and are of the most varied character, including paralyses, convulsions, ataxic symptoms, and mental disturbances.

Cases have been observed, in which extensive destruction of the skull bones has occurred, even with partial loss of the dura mater, without the production of cerebral symptoms.

A remarkable case, reported by Gama, in which there was destruction of the bones of the face, including the ethmoid, caries of the frontal bone, erosion of the dura mater, disorganization of the arachnoid, and localized superficial softening of the anterior hemispheres, which were bathed in pus, presented as the single nervous symptom, severe pain in the head.

It is interesting to notice that large portions of the cerebral mass in the anterior basal region, which was the part involved in the foregoing case, have been removed in surgical operations for injury, without producing any bad symptoms.

The membranes of the brain may be the seat of hyperæmia, which produces no permanent alteration, or the process may become chronic and result in structural changes.

Affections of the Dura Mater.

The dura mater, being a fibrous membrane, is peculiarly susceptible to the syphilitic influence. The changes, which usually consist of thickening due to increased cell-growth, roughening of the inner surface of the membrane and abnormal vascularity, are generally not striking. In some cases the membrane has a brownish-red color and gelatinous appearance, yet its structure remains firm.

The extent of the structure involved and the amount of thickening vary, but are generally considerable.

The dura mater may be exclusively affected, or the disease may invade the inner table of the skull and the arachnoid, or the dura mater may be secondarily affected by processes beginning in the arachnoid and pia mater. In the case of nodes of the inner table, the dura mater is found thickened and abnormally adherent.

The syphiloma may form a circumscribed tumor, or may be diffused over a large area.

In his atlas, Lancereaux[1] gives an excellent illustration of gummatous infiltration into the dura mater.

The portion of the membranes enveloping the brain is more often involved than that covering other parts. There may be but one focus of disease, or several; in the latter case they are, as a rule, unsymmetrical.

Syphilomata of the spinal dura mater have an origin, and pursue a course, similar to those of the cerebral.

Affections of the Arachnoid and Pia Mater.

In simple hyperæmia of the pia mater, the arachnoid may not be involved, but when the process advances to cell-proliferation it is impossible to demonstrate a line of demarcation between the two membranes.

[1] Atlas d'anatomie pathologique, pl. 41, Paris, 1874.

In most cases, the affection of these membranes consists of congestion and visible enlargement of the vessels, followed by increase of connective tissue and consequent thickening; but sometimes gummatous infiltration supervenes, constituting a gummous meningitis.

More or less change in the subjacent nervous tissue always follows, and the lesion may involve the dura mater and the cranial bones.

This is perhaps the most frequent syphilitic nervous lesion. It is found in single or multiple patches, distinctly circumscribed, of round or oval shape and of various sizes.

When multiple, the patches are scattered irregularly, most frequently at the base, in the anterior and middle fossæ, less frequently on the convexity of the brain, seldom on the cord and medulla, and exceptionally on the cerebellum.

Affections of the Brain and Cord.

The changes in the brain and cord are always secondary to lesions of the bones, of the meninges, or of the vessels, and consist of two kinds of softening, the red and the white, which are similar to these lesions when non-specific.

The softening is likely to be more superficial when the lesion begins in the meninges, than when it originates in the bones.

A primary vascular lesion on the basal surface will produce much more serious and extensive structural change in the brain than one at the vertex, for the reason that, in the latter situation, the vessels anastomose freely, whereas, in the former, each vessel is distributed to a region which has no other source of nutrition.

Affections of the Arteries.

Although the effect of Syphilis upon the cerebral arteries has been referred to by several English authors, our knowledge of the subject was meagre and unsatisfactory until the appearance of the excellent monograph by Heubner, in which he gives a minute description of the various morbid changes.

These changes, which are chiefly sub-endothelial, consist of thickening of the lamellæ of the endothelium, between which and the membrana fenestrata is soon deposited a finely granular substance, with a few nuclei, some in process of division, as well as a few nucleated spindle-shaped and stellate cells. In the normal condition this part is nearly free from cells and nuclei.

Subdivision and fresh proliferation of cells constitute the subsequent changes. An important point of distinction between atheroma and the syphilitic process is, that, in the latter, the development of cells is more active than that of intercellular substance.

As the process continues, the endothelium becomes separated from the membrana fenestrata, the interposed cells become compressed and flattened,

and, by their fusion, probably result in the formation of giant cells. The endothelium becomes thickened, and encroaches on the lumen of the vessel. Owing to the irritation produced, small round cells, perhaps derived from the vasa vasorum, are observed. While the essential lesion is limited to the locality mentioned, adjacent parts may become secondarily involved, and these small round cells may be seen in the meshes of the tunica media and tunica adventitia. The new growth gradually becomes organized, and is supplied with nutrition by newly formed capillaries, most clearly seen in a transverse section.

The subsequent morbid process is a subdivision into layers of the new tissue between the membrana fenestrata and the endothelium. At the same time a new membrana fenestrata is formed beneath the endothelium, which is regarded by Heubner, not as an essential part of the syphilitic process, but as due to increased activity of the endothelium.

In the early stage of this lesion, very slight impediment to the blood current results, but, as contraction of the lumen of the artery goes on, white blood corpuscles are deposited along its inner wall, until a perfect thrombus may be formed. Occasionally the vessel still remains slightly permeable.

There are several points of distinction between atheroma and this syphilitic lesion. The latter is much more rapid in its course, and usually occurs much earlier in life. In atheroma the calibre of the vessel is seldom diminished, while in syphilitic endarteritis complete stenosis may result. Atheroma generally involves more extensive surfaces and a larger number of vessels than the syphilitic lesion, and, moreover, in the latter, there is no tendency to calcific degeneration, so common in atheroma, which, unlike the product of the syphilitic process, is incurable.

It is the opinion of Heubner, with which we and other observers, particularly the English, agree, that this process is not at all specific in its nature, since the cells are similar in structure and arrangement to those of certain sarcomata and gliomata. The syphilitic virus seems to excite irritation of the endothelium, which results in the condition previously described. The resemblance of this lesion to gummata or granulation tissue is very marked. We have observed an instance in which it existed in the left Sylvian artery, continuous with a gumma completely encircling that vessel.

Although this arterial lesion may occur as early as the first year of syphilis, it is usually developed much later, having generally been found associated with nodes and gummata of the liver and testes. As a rule, it is to be expected at about the third year of syphilis, but may occur as late as the twentieth. (Heubner.)

The arteries most frequently involved are the large vessels at the base of the brain, and, for reasons already given, the danger to an extensive portion of the cerebral mass from defective nutrition, is much greater than in disease of arteries distributed to the convexity.

The changes in the arterial wall may be so slight, that unless opened longitudinally, the vessel shows to the naked eye no evidence of abnor-

mality, yet there may have been sufficient interference with the circulation to have caused decided nervous symptoms. In such cases, the process being limited to the internal layers of the tunica intima, there is little rigidity of the vessel and no external change, hence the necessity of careful and thorough examination of all the vessels of the brain. Several cases have been recorded, in which the symptoms indicated vascular lesions, but at the autopsy nothing abnormal was found, although probably a slight sub-endothelial change was overlooked.

The morbid change is rarely confined to a segment of the artery, but usually involves its entire circumference, and generally from an inch to an inch and a half of its continuity. Several vessels may be involved in different stages of the lesion, or only one may be affected.

In advanced stages of the morbid process, the vessel is found to be thickened, rigid, and slightly compressible, and may even have a nodulated appearance, due to excessive cellular development and invasion of the outer tunics at certain points. A thickened artery of small size may present several rounded expansions within the limit of an inch.

Longitudinal sections of an artery which is affected to an extreme degree shows roughening of its inner surface, which has lost its normal gloss and color, being dull gray where the lesion is recent, and brownish where it is older.

Thrombi, with or without distinct laminæ, are found, some very thin and friable, others firm and fully occluding the vessel.

Friedländer and Köster believe that the cellular infiltration of the tunica intima, and, in proportion to the intensity of the process, of the other coats of the artery, is not peculiar to syphilis, but is found in inflammatory, tubercular, carcinomatous, and other growths. They compare the process to that of organization of a thrombus, and conclude that the new cells of the intima are derived from the vasa vasorum.

While Heubner admits that the cellular infiltration of the outer coat is derived from the vasa vasorum, he is positive in his opinion that the cells found in the inner coat are furnished by proliferation of the epithelial lining of the vessel, due to irritation by the syphilitic poison. He thinks that it is a gummatous affection beginning in the intima, independently of inflammatory processes without the vessel.

Baumgarten of Königsberg has studied the subject carefully, and though agreeing in the main with the former observers, he thinks that Heubner is right in his belief that the infiltrating cells have two sources. The growth in the outer coats he considers gummatous and peculiar to syphilis, while that in the inner coat he thinks is non-specific; in other words, the cells from the vasa vasorum form a gumma, while those derived from the endothelium form a tissue resembling ordinary granulation tissue.

In the thesis of Rabot, another variety of syphilitic arteritis is described, on the authority of M. Charcot, who calls it "syphilitic periarteritis." The details are given of an autopsy made upon a syphilitic woman, thirty years of age, at which, among other lesions, was found upon the trunk of the left Sylvian artery, near its origin, a nodosity as large as a haricot bean,

whitish in color, irregular in form, and appearing to involve the external tunics of the vessel. Similar lesions were found on other arteries, but they were much more numerous on those of the base than on those of the convexity. Microscopic examination of these tumors showed that they were the result of an acute arteritis, producing thickening of the internal coat, with infiltration of connective tissue cells into the tunica media. The new tissue consisted of fusiform cells in the midst of a finely granular fibrillated substance. The internal elastic tunic was intact, while the tunica muscularis was infiltrated with round embryonic cells, and permeated by capillaries. Similar young cells were found throughout the external coat, chiefly around the vasa vasorum, which were much enlarged. Contraction of their walls and the formation of thrombi had produced occlusion of the vessels.

Charcot leans to the opinion that this is a true syphilitic periarteritis, but refrains from a positive statement until he has made further observations.

We have seen similar changes in the left middle cerebral artery coexisting with a gummy tumor.

In a discussion on visceral syphilis at the Pathological Society of London, Dr. Gowers showed the basilar, middle, and posterior cerebral arteries of a syphilitic man, which presented several nodules, found on microscopic examination to consist almost entirely of small round and fusiform cells imbedded in a delicate fibrillated stroma. The primary change appeared to have been in the tunica adventitia, with subsequent invasion of the tunica media. The suggestion of Charcot is sustained by this observation, and we are therefore disposed to believe in the existence of a syphilitic periarteritis.

An acute syphilitic inflammation of the arteries has been described by Dr. Moxon.[1] At the autopsy of a syphilitic man, he found, among other characteristic lesions, that the basilar artery, which was much increased in size and diminished in calibre, presented a milky appearance, resembling boiled macaroni. The walls were soft and had the appearance of fresh lymph. The microscope showed swelling of *all of the coats*, in and between which were numerous closely aggregated corpuscles, resembling pus corpuscles. The lesion was abruptly limited and had a smooth surface.

Affections of the Nerves.

The *cerebro-spinal* nerves may be involved in the various affections of the meninges; they may be encircled by gummy tumors, or they may be compressed by swellings at the bony foramina. The resulting symptoms are anæsthesia, hyperæsthesia, analgesia, neuralgia, paralysis, or disturbances of the special senses.

Syphilitic lesions being most frequent in the neighborhood of the interpeduncular space, the nerves near this region are most commonly involved.

[1] London Lancet, Sept. 25, 1869.

The third pair are perhaps most often affected, the first, second, fourth, and sixth quite frequently, while syphilitic changes of the seventh pair, or facial nerves, are rather exceptional.

The syphilitic lesions of the optic nerve have been studied by Barbar,[1] Arcoleo,[2] and Hulke,[3] but more recently by Schott,[4] who describes them very accurately and illustrates them copiously with lithographic plates. This observer confirms the view of Virchow, that there may be both neuritis and perineuritis. In two cases he found free proliferation of young, round, nucleated cells in the connective-tissue sheath, with some increase of the spindle-shaped cells. He found similar cells, in rows and solitary, in the nerve tissue itself and around the nutrient vessels of the nerves. The nerve bundles were separated and thinned by the pressure. In one case the process was limited to a portion of one optic nerve, and was more pronounced near its origin. In the other case, though both nerves were involved, the left was more markedly affected.

Other cranial nerves and the spinal nerves may be altered in a similar manner, with or without coincident lesions of adjacent parts. Heubner states that a nerve has been found to pass through a syphilitic new growth and yet remain normal.

We know little of the changes caused by syphilis in the peripheral nerves, but certain clinical facts indicate that they may be affected in a similar way. A number of writers describe the gross appearances as follows: in the early stage they lose their rounded shape and become swollen; they assume a reddish-yellow color and a soft and pulpy consistency; at the same time, the swelling may give them a bulbous appearance; subsequently, they become atrophied into yellowish-white, cartilaginous cords. This, like all other syphilitic lesions, is limited to certain portions, and never attacks the entire length of a nerve. We are wholly ignorant of any primary change in the nerve fibres and axis-cylinder.

The *sympathetic* nerves may undergo two varieties of change: one affecting the nerve cells and characterized by pigmentary and colloid degeneration; the other consisting of a connective-tissue proliferation. These conditions were found by Dr. Petron, on microscopic examination both of fresh specimens and of those hardened in chromic acid, in the cervical, thoracic, and solar plexuses of syphilitic subjects. He draws the following conclusions from his studies:—[5]

1. The syphilitic diathesis affects the sympathetic nerve, determining very distinct alterations.

2. The nerve cells may undergo change independently of the connec-

[1] Ueber einige seltenere syph. Erkrankungen des Auges, Zürich, Inaug. dissert., 1873.

[2] Clin. ottal. di Palermo, 1871. Quoted by Schott.

[3] Ophth. Hosp. Rep., London, 1869.

[4] On some Affections of the Optic Nerve, Arch. of Ophth. and Otol., N. Y., 1877, vol. vi, Nos. 1, 2.

[5] Arch. f. path. Anat., etc., Berlin, 1873, S. 121.

tive tissue, consisting of pigmentary, and, less frequently, of colloid degeneration.

3. The connective tissue may undergo, as elsewhere, sclerosis, and cause atrophy of the nervous elements.

4. The membrane covering the nerve cells may be involved, at first by hypertrophy from cell-infiltration, which may afterwards undergo fatty degeneration.

Cerebral Syphilis sine Materia.

There are certain groups of symptoms observed in syphilitic subjects, which can be explained only by admitting the possibility, now generally recognized, of a temporary condition, possibly hyperæmic, of the nervous system, caused by the syphilitic virus.

The term *Cerebral Syphilis sine Materia* has been given by some prominent authors to syphilitic nervous affections, which present no perceptible nervous lesion. The view that these affections may exist without structural change, is based on the autopsies of several cases, in which severe nervous symptoms had been present, yet nothing abnormal was found. Some, who hold this view, think that the morbid change may have been so occult and delicate as to have eluded discovery by the methods of investigation then known.

Our present knowledge of the lesions, which may cause syphilitic nervous affections, is much more extensive and precise. There is reason, therefore, for the suspicion that changes actually did exist in the cases referred to, which were overlooked; possibly minute tumors, which easily escape notice, or structural changes in the walls of the cerebral arteries, which may be invisible except on longitudinal section of the vessels.

We cannot deny that *cerebral syphilis sine materia* may exist, but before accepting it as the diagnosis in a given case, it must be proved that the autopsy was carefully and thoroughly made.

Prodromal Symptoms.

The sudden invasion of cerebral syphilis is unusual. In most cases there is a well-marked prodromal stage, in which one or more of the following symptoms may be presented.

One of the most frequent, and often the only symptom of this stage is headache, which is usually general but may be limited to the occipital and frontal regions. It may be very slight, or so excruciating that patients say they feel as though the head were in a vice. In mild cases the pain ceases at night, but in others sleep is entirely prevented. It may disappear without treatment in a week or ten days, but has been observed to continue fully two months. Its duration is wonderfully influenced by mercury, even though it may resist the most powerful narcotics. Several recurrences of this form of headache may take place within the first year or two of syphilis. Neuralgia of one or more of the cranial nerves may

accompany it, especially in those subject to this affection. The fact that this form of headache occurs when the blood is most profoundly modified by syphilis indicates that it is due to changes in that fluid.

A variety of headache which sometimes comes on early in the secondary stage exhibits an important diagnostic feature in nocturnal exacerbation. It may exist during the day with abated severity or may be wholly absent, and begin at some time during the evening or night. It is usually confined to a single region, and frequently small patches of syphilitic lesions of the bones or of the meninges may be defined by pressure with the tip of the finger, which intensifies the pain. It is always symptomatic of grave structural change, and is likely to vary in intensity with the seriousness of the lesion. Its course is always chronic. Sometimes it is distinctly intermittent, or it may cease spontaneously for days or weeks, then return and continue for weeks or even months. Usually it does not cease with the onset of the profound symptoms of which it is a premonition, but persists throughout. A headache with somewhat similar features may accompany the development of nodes on the exterior of the cranium.

In exceptional cases, sleeplessness is a troublesome and persistent prodromal symptom, and exists without any disturbance of the general health, or towards night there may be a feeling of uneasiness and nervousness. Sometimes this feeling persists through the day. Such patients are indisposed to active exercise, and become excessively tired on slight exertion. They may seem to be otherwise in good health and well nourished, or cachexia may set in, with emaciation and that earthy pallor peculiar to syphilis. This cachectic state is probably present in one-half of the cases of cerebral syphilis, especially those in which the nervous symptoms appear late in the course of the disease.

Vertigo is a prominent prodromal symptom, and a constant accompaniment of that headache which lasts through the day. It may be a temporary dizziness, or so extreme that the patient feels at times as though he were losing his senses.

There may be a varying degree of mental confusion or weakness. Slight impairment of the memory, slow, and perhaps incoherent mental action may be exhibited, while the speech may be hesitating, not from difficulty of phonation, but from impaired intellection. Such patients may become petulant, melancholy, and morbidly emotional. They frequently complain of nervousness and a tendency to become frightened and to tremble on the slightest cause. Numbness in the head, darting pains, hyperæsthesia or anæsthesia, with weakness of the extremities, may be experienced. Sometimes choreic movements are marked. Photophobia, intermittent or continuous, and often coexisting with dull frontal headache, has been noticed in some cases. There may also be mild ataxic symptoms in the prodromal stage, and not infrequently paralysis of one or more of the cranial nerves, especially those distributed to the muscles of the eye.

Finally, nocturnal delirium, mild or maniacal, is, in some cases, a very prominent symptom. This condition leaves the patient in the morning depressed and unin vigorated, with a dull, heavy sensation in the head.

Some or all of the preceding symptoms may exist for variable periods, and on the outbreak of grave manifestations, they undergo modifications to be hereafter described.

Syphilitic Tumors of the Nervous System.

Two forms of syphiloma, or syphilitic tumor, are found in the cranio-vertebral cavity, which differ widely in gross appearances, but are composed of similar structural elements. These tumors are usually connected with the cerebrum; they have rarely been found in the medulla oblongata or in the cord, and we are not aware of any having been observed either upon or within the cerebellum.

The first form is of a grayish-red color and is extremely vascular, most of the vessels being very minute, while some are plainly visible to the naked eye. When developed exclusively in the pia mater and arachnoid, the tumor is soft and slightly fibrous; but, if it is formed only in the dura mater, its consistence is quite firm, owing to the abundance of fibrous tissue.

Under high powers of the microscope the tumor is found to consist of small round cells, arranged regularly or without order in a very delicate alveolar stroma of connective tissue. The walls of the newly formed vessels are usually much thickened by cell increase.

The second form of tumor, which is harder and of a yellowish color, is merely a late and degenerating stage of the first variety. Excess of fibrous tissue renders its structure more dense and its boundaries more clearly defined. The bloodvessels are few, and, while permeable at the periphery, at the centre of the tumor they are converted into fibrous cords. On section, the tumor is slightly resistant to the knife, and appears more or less desiccated. Microscopic examination shows a distinctly fibrous stroma, in which is imbedded a large quantity of withered cells, granular and fatty matter, and blood crystals.

These tumors vary greatly in number and in size; there may be a single one or the surface of the hemisphere may be studded with large numbers of them, resembling the condition in miliary tuberculosis; they may be of the size of a pea or of a small walnut. They are usually round or oval, but in some situations they become flattened. They have been found encircling an artery, and it is probable that their origin is always around some vessel, particularly one traversing the large fissures of the brain. In rare instances the soft form of tumor has been found in large patches, involving chiefly the vascular cerebral membranes, and having a thickness of from one-quarter to one-half an inch, and constituting in reality a gummous meningitis.

These tumors are found chiefly on the inferior surface of the brain, in the region of the fissure of Sylvius. Great care must be employed in examining the hemispheres, since such growths may exist in any recess of the brain, into which the vascular membranes are reflected. Heubner

says that frequently, after having, as he supposed, finished an autopsy, he has run across minute tumors hidden in such situations.

The facts thus far recorded warrant the opinion that these tumors are always peripheral, and, if found imbedded in the brain tissue, they have grown inwards from the vascular membranes.

Meningeal Symptoms.

There is a group of symptoms of constant occurrence, especially in the early years of syphilis, which are distinctly referrible to inflammation of the meninges.

The first of the group is the headache already referred to. This symptom continues for a variable period, during which the general health is gradually but evidently becoming impaired. The patient complains of feeling weak; he is fatigued on slight exertion and is indisposed to physical or mental effort. Emaciation may be a marked symptom in some cases, while in others there is a tendency to fatty development with a consequent flabby appearance. Not infrequently there is true syphilitic cachexia, with its typical facies. Coincidently with these general disturbances of nutrition, we find prominent symptoms of mental impairment. Thus, a patient affected in this manner expresses himself vaguely in conversation, is slow and uncertain in his utterance or even incoherent. His statements are confused and rambling; his replies hesitating, more or less inexact, and perhaps inappropriate. In short there is general dulness and torpor of the intellect.

In other cases we find the patient with a dull, vacant stare upon his face. If asked what he is thinking of, he gives no intelligent answer. His memory, his reasoning and his perceptive faculties are sadly at fault. In health he may have been vivacious and quick of comprehension: he is now dull, stupid, and morose; his ordinary habits, tastes, and inclinations are changed and debased. He is fault-finding, suspicious, and quarrelsome, often very emotional, laughing or crying on the slightest provocation; or, again, he may present the silly, stupid appearance of complete hebetude. A case of this kind, if not checked by treatment, is likely to terminate in confirmed dementia.

Again, the above series of symptoms may be varied. Hemiplegia, aphasia, or convulsions may appear at either an early or a late period. In very many instances paralysis of one or more cranial nerves supervenes at an early date, and mydriasis, either with or without ptosis of one or both lids, has been so frequently noted that its occurrence should always excite suspicion. Other ocular disturbances, such as progressive atrophy of the optic nerve, paralysis of the muscles of the eyeball, serous iritis of one or both eyes, with its accompanying photophobia, are not uncommon, and have been more fully described in a previous chapter.

We have noticed, and several authors also allude to it, a peculiar and persistent hyperæmia of the eye and lids, similar to that which accompanies iritis. This condition may become chronic, and it has often been

found to be intermittent, becoming most marked during exacerbation of the nervous symptoms. Such patients complain of photophobia, which is sometimes so intense that they are completely dazed by any sudden or strong ray of light. These symptoms are undoubtedly dependent upon a low stage of choroiditis.

Other special senses may also, though less frequently, be impaired. That of smell is sometimes diminished, or, at an advanced stage, wholly lost; or it may be much perverted, so that unpleasant odors are constantly complained of. The hearing may be impaired or destroyed. Noises of various kinds (tinnitus aurium) are experienced; while otalgia, generally nocturnal, is an occasional symptom.

A general adynamic condition sometimes supervenes in patients affected with chronic inflammation of the meninges, which either ends fatally or renders them hopelessly bedridden. This weakness may be due to mere lack of innervation, or may be complicated by mild ataxic phenomena, characterized by unsteady gait and uncertain movements. The dulness of intellect by day is succeeded by nocturnal delirium. When lying in bed such a patient resembles one in typhoid fever, but there are marked points of difference. He is sleepy and dull, and his face is utterly expressionless. The tip and edges of his tongue are red, but the organ is never, unless late in fatal cases, dry, cracked and covered with sordes.

Anorexia and constipation are often quite marked.

The pulse ranges from 80 to 110, is full and not wiry. The temperature may be elevated in the morning to 100° F., and at night to 103° or 104° F.

If conscious, the patient complains of intense headache and weariness. In a week or ten days he passes into a condition of complete unconsciousness, perhaps broken by brief lucid intervals.

The urine and feces are passed involuntarily. If not relieved, the condition soon becomes more serious; the temperature continues to rise, and the pulse increases in rapidity: no food is taken, and the stupor merges into fatal coma.

The above course of events has been observed in a number of instances of quite recent syphilitic infection, varying between the second and sixth years; it may occur even as early as the first year.

Thus it is seen that inflammation of the meninges has a distinct group of symptoms by which it may be recognized, and that it may be complicated by other, and perhaps more formidable symptoms. In the simple inflammation, the lesion is probably limited to the convexity of one of the hemispheres; when the opposite side of the brain is involved, or when the basal portion, where the cranial nerves have their origin, is attacked, the case becomes complicated by a series of new features, such as paralyses, and other impairments of nervous function.

This view, which is supported by the clinical history of cerebral hyperæmia and simple meningitis, and by our knowledge of the course and pathology of syphilis, seems to simplify a large number of apparently obscure cases. The various phenomena, such as paralyses, epilepsy, aphasia,

etc., which may arise from similar causes in both the chronic and the more acute form of syphilitic meningitis, will receive separate attention hereafter.

The time of the invasion of meningitis is uncertain: the acute form is generally observed in the early years of syphilis. It is only the adynamic form which is liable to be mistaken for typhoid fever. A correct diagnosis may be reached from the history of the case, from the severity and early supervention of the head symptoms, and from the absence of the characteristic typhoid tongue and of signs indicating intestinal lesions. In certain cases of sunstroke, which may present features of striking resemblance, the acuteness of the invasion and the totally different character of the headache, in addition to the previous history of the patients, may enable us to avoid error.

Syphilophobia.

Syphilophobia is sometimes included among the manifestations of syphilis, but we do not believe that it is directly due to this disease. It is quite as often met with in patients affected only with gleet, prostatorrhœa, or who have nothing in the world the matter with them, except their own disordered imagination. Moreover, in truly syphilitic cases, the fear of syphilis often increases in proportion as the specific symptoms disappear. A few years ago, I had under my charge a member of Congress affected with syphilis, who imagined, while his eruption was fading, that he was "rotting internally." So long as I was willing to continue treatment, he was somewhat pacified, but one day when every trace of his affection had long since passed away and I told him that he needed no more medicine, he went to his room and shot himself dead with a pistol.

Syphilitic patients will sometimes state that they have resolved to give up their business and devote their time to the cure of their disease. Such a course should always be discouraged, since it favors mental depression, interferes with the general health, and thus retards the effect of remedies, and may lead to confirmed hypochondria or syphilophobia.

Hemiplegia.

One of the most frequent phenomena of cerebral syphilis is hemiplegia, which may occur as early as the sixth month or as late as twenty years after infection. The interference with the motor function may be slight or there may be complete loss of power. It is generally preceded by a stage, in which a prominent symptom is localized headache, often associated with many of the other symptoms already mentioned, such as mental disturbance, hebetude, vertigo, and convulsions which are often immediately followed by the paralytic stroke.

In some cases muscular spasm, a form of pre-paralytic chorea, has been observed in the limbs afterwards paralyzed. For instance, the arm may be jerked in various directions, or the patient may find it impossible to

place the foot firmly on the ground, the leg being pulled suddenly from under him, when he attempts to stand.

In other cases darting pains are felt in the leg or arm, or constant neuralgic pain may exist in some part of the limb; or there may be numbness or tingling in the hands and feet with patches of hyperæsthesia or anæsthesia.

In cases of gradual invasion total paralysis seldom occurs. The patient first notices that he is losing strength, perhaps in his fingers, so that he finds himself unable to button his clothing or to hold a pen firmly. This condition may continue until paralysis comes on, or it may be intermittent, the normal strength returning at intervals. When the leg is thus affected the patient naturally has more or less difficulty in walking. Complete hemiplegia has been seen to come on in this gradual manner, but is generally sudden. Sometimes the leg is affected several hours before power is lost in the arm. The reverse, however, is infrequent. Patients are usually attacked with hemiplegia, when engaged in some act of muscular effort, such as pulling on the boots, walking briskly, reaching for some object, or on the point of shooting at game (Van Buren and Keyes). On the contrary, the attack may happen during the night, and the patient be unable to rise from bed in the morning.

The course and duration of hemiplegia vary greatly. When partial, the paralysis may gradually improve, and even disappear spontaneously in a few days; or, as improvement takes place, the opposite side may be similarly affected, followed by recurrence of the paralysis on the side first involved. These cases are accompanied by excessive mental impairment, and, as a rule, have an early fatal termination. Syphilitic hemiplegia is caused by lesions of the arteries, and, in cases of the latter class just mentioned, the vessels of each side of the brain are implicated.

Disturbance of general sensation is usually limited, but instances of slight loss of motor power with complete loss of the sensory function have been reported. In exceptional cases there may be total loss of both motion and sensation.

A great variety of phenomena, depending upon the extent and situation of the lesions, may accompany syphilitic hemiplegia; such as paralysis of various nerves; aphasia, mydriasis, optic neuritis, and epilepsy. Mental depression seems to be constant, and most patients either display a condition of complete hebetude or are excessively emotional.

Early and energetic treatment may accomplish the relief and even the cure of hemiplegia, but the prognosis is greatly influenced by the age and extent of the lesion. The arteries arising from the circle of Willis supply the most important regions of the brain, and are most frequently affected by syphilis; obviously, if but one is involved, the prognosis may be more favorable than if many are. The number and gravity of the symptoms will usually give an idea of the extent of the lesion. In a simple case of hemiplegia, probably only one or two vessels are affected, and complete recovery may take place, but when other symptoms, indicative of extensive disorganization of the brain are exhibited, the prognosis

must be less favorable. As a rule, perfect health is in no case restored, although the patient may present no conspicuous abnormality. We may say, however, that the prognosis in syphilitic hemiplegia is better than in the simple form.

Syphilitic hemiplegia usually occurs much earlier in life than the simple variety, which is not commonly seen before the age of forty years. In diagnosis, therefore, it should be remembered that syphilis is the cause of most of the cases of hemiplegia in the young and middle-aged. The fact that a patient rarely loses consciousness when attacked by syphilitic hemiplegia, is an additional diagnostic point of importance.

Syphilitic Epilepsy.

This is of frequent occurrence in cerebral syphilis, and, like non-specific epilepsy, presents two forms, the *grand mal* and the *petit mal*. Headache, increasing in severity, always precedes an attack. The symptoms of the severe form are similar to those of the non-specific variety, consisting of sudden loss of consciousness, tonic followed by clonic spasms, facial distortion, foaming at the mouth and stertorous respiration. According to some authors the epileptic aura and cry are absent. Such convulsions generally recur at short intervals, and frequently, with distinct regularity, every ten days or once a month. Instances of their regular occurrence in the evening and at night have been reported, but, as a rule, they come on at no definite time. In some cases consciousness returns in a few minutes, in others the patient remains in a stupid condition for hours, and may not be fully restored for several days. After the seizure the headache may be much less severe for a time, but, unless treatment is followed, its intensity soon returns.

The course of syphilitic epilepsy is uncertain, and may be greatly modified by treatment. When convulsions follow a long prodromal stage, in which symptoms of mental disturbance have been particularly severe, the prognosis must be rather unfavorable; cases in which they follow a short period of headache, generally yield to proper treatment, as we have several times observed. Tonic spasms may precede or follow an attack of hemiplegia, and are often seen in connection with permanent or intermittent aphasia. They are generally caused by pachymeningitis, though probably, in some cases, as claimed by Jackson, irritation from a tumor is the exciting cause.

The intervals of syphilitic epilepsy, unlike those of apparent health in the simple form, are marked by symptoms of mental disturbance, which tends to increase, and may finally end in dementia.

The mild form, called by Charcot partial syphilitic epilepsy, may exist independently, or combined with the severe form. The paroxysm may begin either with a twitching of one side of the face, a turning of the tongue to one side, a tendency on the part of the patient to whirl around, extreme giddiness, general trembling, or great weakness or cramps of the extremities, which are followed by loss of consciousness and a convulsion,

consisting either of slight muscular tremor or of general tonic spasm. The seizure may be limited to a single limb or to one side of the body, and in some cases amounts to nothing more than slight rigidity. The severity and length of the attack are much less than in the *grand mal*.

Frequently there is no convulsion at all, but the patient, while talking or in performing any act, becomes unconscious, and is seen to stare vacantly. If sitting, he becomes motionless; if walking, he does not fall, but proceeds in an uncertain aimless manner, and, if in the midst of conversation, he suddenly becomes obtuse and fails to comprehend any question addressed to him. While in this condition, which may last only a few seconds or even twenty minutes, he may perform rational acts, such as paying properly for a purchased article, or he may even walk along without staggering, and when his senses are restored, he may recall indistinctly or not at all what he has said or done.

Dr. Hughlings Jackson has described a form of seizure which he has found to be caused by syphilis, and to be accompanied or followed by optic neuritis. It begins unilaterally as a mere twitch, a slight rigidity, or a violent convulsion, in most cases in the thumb and forefinger. It may be limited to the arm, along which it extends, or it may also involve the face of the same side; it may reach the leg, and constitute a hemispasm or finally it may proceed to general convulsion. During the intervals, which vary in length, a course of symptoms, similar to those of the *grand mal*, though perhaps of milder character, may be observed.

The diagnostic points of syphilitic epilepsy are:

1. The history of the patient.
2. The paroxysmal headache.
3. The frequency of mental disturbance.
4. The frequent coexistence of optic neuritis, hemiplegia, aphasia, and paralyses of various nerves.
5. The age of the patient.
6. The result of treatment.

Simple epilepsy is usually developed before puberty, whereas that caused by syphilis generally occurs between the ages of twenty and thirty, the period when syphilis is most frequently contracted. The former is either uninfluenced or aggravated by the iodide of potassium and mercurials, whereas their influence on the latter is favorable, and, in some cases, curative.

Syphilitic Paraplegia.

Though the spinal cord is attacked by syphilis less frequently than the brain, at least one-half the cases of paraplegia are of syphilitic origin.

The symptoms are not strongly marked. The patient, who may or may not suffer from pain in the back, notices slight weakness of the lower extremities, and may also complain of one or more of the following symptoms: darting pains and spasms in the legs, numbness, tickling, or aching pains in the feet, hyperæsthesia, anæsthesia, dermatalgia, and formication. Loss of co-ordinating power may be observed. There is usually progres-

sive weakness in the expulsive power of the rectum and bladder. This condition may remain stationary for a long time, or it may improve temporarily, but, unless treatment is adopted, complete paralysis of both legs finally ensues. On the other hand the development of paraplegia may be much more rapid.

General sensation may be preserved, slightly impaired or wholly lost. Exceptionally it is destroyed while the motor function remains perfect. After the establishment of full paralysis, there may be short intervals of slightly restored power or there may be jerking of the muscles.

Paraplegia may be the only manifestation of syphilis existing at this time, but frequently there are evidences of lesions in the brain, such as headache, vertigo, mental impairment, paralysis of one or more cranial nerves, particularly those supplying the muscles of the eye, or optic neuritis. Mydriasis has also been observed. The presence of any of these latter symptoms confirms the diagnosis of syphilis, which is ordinarily less clear in this than in other nervous affections of specific origin. Careful inquiry into the history and age of the patient is demanded. Simple idiopathic paraplegia generally occurs later in life than the syphilitic form, and the latter, like all specific nervous affections, is greatly influenced and frequently cured by treatment, which should be adopted early in all cases, even in those of doubtful character.

The prognosis, unless treatment has been long delayed, is favorable.

The causes of syphilitic paraplegia are lesions of the vertebræ, of the spinal meninges, and tumors which by pressure on the cord lead to myelitis and softening.

Cases thus far observed indicate that paraplegia is a later manifestation of syphilis than hemiplegia and epilepsy, though probably the lesions which cause it, may be developed as early as within the first year of syphilis. In the majority of recorded cases its invasion has occurred after the sixth year of infection. It may of course occur very much later.

Aphasia.

Various disturbances of speech, included under the term aphasia, frequently occur in the course of syphilis of the nervous system. These may consist merely of hesitation in speaking, called *embarras de parole*, or of inability to remember certain words in writing and in speaking, or of the use of utterly inappropriate words on all occasions.

Keyes and Van Buren have reported an interesting case of a man, who, prior to an attack of syphilitic hemiplegia, spoke English and French, besides German, his native language, but, during recovery, he could speak only French.

Syphilitic aphasia may be continuous or intermittent, and always accompanies other symptoms, which determine its origin, since it presents in itself no diagnostic features.

The prognosis depends to a great extent upon the early adoption of antisyphilitic treatment.

Locomotor Ataxia.

Although so eminent an authority as Fournier claims that syphilis may be the cause of locomotor ataxia, we are inclined to hold the contrary opinion, which has the support of many prominent observers. Locomotor ataxia is known to be caused by sclerosis of the posterior columns, a lesion exactly limited to this portion of the cord, though often involving it to a considerable extent. The lesions of syphilis, on the contrary, are patchy, and less diffused, and, moreover, always originate in investing structures, subsequently involving the cord itself. The staggering gait, lack of co-ordination, darting pains, and muscular spasms, caused by syphilis, may suggest locomotor ataxia; but the slow, definite progress of the latter affection, compared with the irregular grouping and uncertain course of syphilitic symptoms, renders the distinction clear.

Chorea.

The spasmodic muscular movements caused by syphilis are irregular and occasional, and never constitute complete chorea. Pre-paralytic chorea, characterized by spasmodic contractions, without loss of consciousness, preceding an attack of hemiplegia or paraplegia, has been already referred to; similar contractions not infrequently follow these paralyses, and the condition is then called post-paralytic chorea.

The spasms vary in intensity from a mere twitch to a decided convulsion, and may be limited to an arm, or may at the same time include the face; or they may occur unilaterally in the arm and the leg. They do not as a rule become general, and always coexist with other symptoms of graver importance.

Pseudo-general Paralysis.

The relation of syphilis to general paralysis of the insane has been until recently a disputed question. While some authorities claimed that the latter affection was in a measure due to syphilis, others believed that its occurrence in a syphilitic subject was a mere coincidence. The subject has lately been carefully studied by Mickle[1] and Fournier,[2] who have arrived at the conclusion that syphilis does produce an affection resembling in certain respects the general paralysis of the insane, but that the two diseases are not identical.

This affection, to which Fournier gives the name *pseudo-general paralysis of syphilitic origin*, consists of an association of intellectual, sensory, and motor disturbances, evidenced by numerous and complex symptoms. The intellectual disorder is indicated by cerebral excitement and exaltation of ideas with incoherence, and by gayness of spirits alternating with hebe-

[1] Brit. and For. Med.-Chir. Rev., Lond., July and October, 1876; April, 1877.
[2] La syphilis du cerveau, Paris, 1879, p. 333.

tude, together with delirium and even mania. The motor disturbances are well marked, and consist of uncertain movements without paralysis, trembling, and imperfect prehensile power of the hands, sudden loss of equilibrium, imperfect co-ordination, staggering gait, and hesitating speech. Besides these there are frequently special affections, such as tremblings of muscles and partial paralysis, ephemeral or persistent, and also certain symptoms of cerebral congestion; of the latter may be mentioned, a sense of weight and pain in the head, dizziness, sudden dazzling sensations, vertigo, and various impairments of sight and hearing; to these should be added epileptic and epileptiform convulsions, and sudden seizures of an apoplectic character. Of course, we never meet with all the above symptoms combined, but in all cases many of them are associated.

The peculiarities of this syphilitic affection are that the paralytic symptoms predominate; that symptoms appear in a capricious and irregular manner, fibrillary contractions of the facial and lingual muscles being absent; that there are no well-defined exalted ideas; and that behind all there is generally a syphilitic cachexia.

After considering the subject exhaustively and criticizing the loose manner in which the term "syphilitic insanity" is used, Mickle gives the following points of differential diagnosis between true general paralysis and the pseudo-general paralysis of syphilis:—

1. Distinct history or symptoms of syphilis.
2. Preceding cranial pains, nocturnal and intense.
3. Exaltation less marked, less persistent, and perhaps less associated with general maniacal restlessness and excitement.
4. Sometimes complicated by palsies of one or more cranial nerves, or by hemiplegia, paraplegia, etc., having the character and course of syphilitic palsies.
5. The greater frequency of optic neuritis, early amaurosis, deafness, local anæsthesiæ, vertigo, and local rigid contraction.
6. The affection of the articulation is paralytic rather than paretic, and usually speech is not accompanied by any facial or labial tremors.
7. Cerebral or spinal meningitis or pachymeningitis.
8. Great variety of motor and sensory symptoms, their capricious association or succession and their transitory character, and the absence of general progressive muscular paresis.
9. Effect of anti-syphilitic treatment.

Mickle adds that in the simple affection the faradic contractility of the muscles of the extremities becomes considerably and progressively lessened, while in syphilis it is normal or but slightly impaired.

Treatment.

In the treatment of the nervous affections caused by syphilis, and especially those involving the brain and spinal column, there must be no half-way measures. A fraction of a grain of corrosive sublimate or three to five grains of the potassium iodide, administered three times a day, will do no

more good than would the water in which they are dissolved. If the patient's life is to be saved, or at least serious and permanent consequences be averted, iodine and mercury must be used in heroic doses.

If the patient has not already taken the iodide of potassium, it may be well to commence with the moderate dose of fifteen grains (1.00) after each meal, for fear he may be one of those exceptional individuals in whom the iodides exercise a poisonous influence, and if he is found to bear it well, the dose should be rapidly increased. But when his tolerance has already been tested, a dose of half a drachm (2.00), or, in urgent cases, even a drachm (4.00), three times a day, is not too much to commence with, and it should be increased—say, by the addition of five grains (0.30) every other day—until amelioration of the symptoms takes place or at least two drachms (8.00) for each dose have been reached. At the same time free mercurial inunction every night should not be neglected. For more minute directions we would refer to our chapter on the treatment of syphilis.

CHAPTER XXI.

SYPHILITIC AFFECTIONS OF THE MUSCLES AND THEIR ACCESSORIES.

Syphilitic affections of the muscles, although noticed by Astruc,[1] attracted but little attention until investigated during the present century, more especially by Boyer,[2] Ricord,[3] Bouisson,[4] Notta,[5] and Virchow.[6] The most important contributions, however, to this subject are the elaborate lectures by Mauriac,[7] published within a year.

Syphilis affects the muscles in two ways: 1, by an abnormal development of the connective tissue in the inter-fibrillar spaces—*the diffuse form;* 2, by the deposit of gummy material in circumscribed masses—*muscular tumors.*

Diffuse Form. Muscular Contraction.—According to Virchow, this lesion is analogous to that produced by rheumatic inflammation. "In the interspaces between the muscular faseiculi, a connective tissue is developed, which hardens and results in atrophy, and finally in the destruction of the primitive muscular fibrils." We thus find at the outset the presence of abnormal nuclei, cells, and fibres in the cellular tissue, and afterwards a secondary degeneration of this new formation, resulting in atrophy of the normal elements, contraction of the muscle itself, and, in some instances, calcareous and bony deposits. This lesion usually escapes observation until the contraction of the muscle, interfering with motion or producing flexion of the limb, attracts attention.

One or more muscles may be attacked. Those most frequently affected are the flexors of the upper extremity, and especially the biceps. Notta met with six cases, in two of which the disease was confined to the biceps; in two others, to the biceps and supinator longus; and in the remaining case to the flexors of the fingers. The biceps has been affected with the same frequency in the cases reported by other observers.

[1] A Treatise of Venereal Disease, etc., translated from the Latin, London, 1754, vol. ii, p. 15.

[2] Traité pratique de la syphilis, Paris, 1836.

[3] Notes to Hunter, 2d Am. ed., 1859, p. 458.

[4] Gaz. méd. de Paris, 1846, p. 211, and Tribut à la chir. moderne, t. i, 1858, p. 527.

[5] Mém. sur la rétraction muscul. syph., Arch. gén. de méd., Dec. 1850, 4e sêrie, t. xxiv, p. 413.

[6] La syphilis constitutionelle, p. 105.

[7] Leçons sur les myopathies syphilitiques, Paris, 1878.

In each of the ten cases reported by Mauriac the biceps was the seat of this affection; in nine it was the only muscle involved, while in one case the triceps was attacked at the same time. In seven of these cases the left biceps was affected, in two both right and left, and in only one was the muscle of the right side alone affected. When both biceps and triceps are involved muscular anchylosis of the elbow results.

The contraction comes on insidiously, and the first symptom noticed by the patient is an inability to extend the limb. On examining the affected muscle, no change is perceptible by palpation either in its size or texture; its power of contraction is normal; and there is simply a diminution in length, as shown by its tension when the limb is forcibly extended. The tendon of insertion of the biceps is always prominent and tense, and the muscle itself appears to be in a state of partial contraction.

In neither of Notta's six cases was the fleshy portion of the muscle sensitive to pressure; but in five, pain was excited by pressing upon one or both of the tendinous insertions, and by forced extension.

According to Mauriac spontaneous pain was absent in some cases, while in others the muscle was the seat of a dull aching sensation, which was subject to exacerbations. In other instances the patients suffered from neuralgia of the muscle or other parts. The contraction increases, slowly in most cases, but rapidly in some, up to a certain point, when it remains stationary. In five cases in which the biceps was affected, the angle formed by the arm and forearm, when the latter was extended to the utmost, measured 160°, 135°, 135°, 130° and 90°, respectively. In another case, the ring and little fingers were completely flexed upon the palm of the hand.

In none of Notta's cases had the patients ever suffered from rheumatism, which, therefore, could have had no part in producing the muscular contraction; but all presented unquestionable syphilitic symptoms, which, in three, belonged to the tertiary; in two to the secondary; and in one to both the secondary and tertiary periods.

Mauriac, however, regards this as a precocious rather than a tertiary affection. He has observed it as early as the second and as late as the fifteenth month of syphilis, and thinks that we may fix upon the tenth month as the average date of its appearance. It occurs in the mild rather than in the severe cases of syphilis. He thinks that rheumatism has no etiological relation to this affection, which is myo-neuropathic in its nature; in other words, syphilis affects the peripheral nerves and muscles. The intensity of the diathesis has slight influence upon its development; of nine cases but one was severe, five were mild, and three were of medium severity. It is accompanied by non-ulcerative more frequently than by ulcerative lesions.

This affection may last months or years, and while it yields with moderate promptness to treatment, it is capable also of spontaneous cure. Its course is not always uniform, since it is liable to remissions and relapses. Mauriac believes the lesion to be a subacute myositis. He passed a gal-

vanic current through muscles thus affected, and found impairment of motion and of sensation.

Under the name of "chronic syphilitic tetanus," Deville[1] has reported a case in which a large number of muscles were involved, and death ensued from contraction of the muscles of the pharynx, which was impassable to a probang. Notta coincides with Deville in regarding the disease as syphilitic.

In the opinion of Mauriac, syphilis plays an insignificant part, or perhaps no part at all in the production of this affection. He looks upon it as tetanus, *névrose tetaniforme generalisée*, occurring in a syphilitic.

The treatment of this affection consists in the combined administration of mercurials and the iodide of potassium. Friction with stimulating liniments and inunctions of mercurial ointment have proved beneficial in our experience. Brisk rubbing and massage may also be tried with the daily use of the Faradic current. As is true of other syphilitic symptoms, the disease is likely to return if treatment be suspended too soon.

Muscular Tumors.—Our knowledge of syphilitic tumors of the muscles, is due in a great measure to M. Bouisson, late Prof. of Surgery at Montpellier.

These tumors are dependent upon circumscribed deposits of the same material as is found in gummata of the subcutaneous cellular tissue, and in most of the syphilitic affections of the viscera.

Gummy tumors have been met with in the glutæus maximus, trapezius, sterno-cleido-mastoideus, vastus externus, pectoralis major, and some other muscles; and in the walls of the heart by Ricord,[2] Lebert,[3] and Virchow.[4] Tubercles of the tongue are frequently seated in the muscular as well as in the cellular tissue; and many of the sloughing ulcers of the velum palati, pharynx, and larynx, commence as gummy tumors of the neighboring muscles, the mucous membrane being involved secondarily. Mention has also been made of similar tumors in the lips, which are said to have been mistaken for epithelial cancer, but doubt may be entertained whether they were not merely the induration underlying labial chancres.

With regard to their mode of origin Bouisson says: "It is difficult to determine whether the earliest changes take place in the muscular fibrils or in the intervening cellular tissue; although analogy would lead us to believe that it is the fibro-cellular element connecting the fleshy fibres or serving as their sheath, which is first involved. But in advanced cases—no matter what the mode of termination, whether by suppuration or induration—all the anatomical elements appear to be affected; and, according to the progress of the morbid action, the muscular fibres are either surrounded by a material of new formation or are softened and destroyed, or,

[1] Bull. Soc. anat. de Paris, 1845, p. 276.
[2] Iconographie, pl. XXIX.
[3] Traité d'Anatomie Pathologique, t. i, Pl. LXVIII. Fig. 5.
[4] La Syphilis Constitutionelle, p. 108.

again, are transformed into indurated, sub-cartilaginous or even osseous tissue. Such at least are the different stages I have met with in these tumors.

"In the *first stage*, the muscle is the seat of a local and circumscribed swelling, of greater consistency than œdema. Upon a cut surface of the diseased tissue we can recognize decolorized muscular fasciculi in the midst of a plastic effusion of a grayish color.

"In the *second stage*, the adventitious deposit softens, and, if the attendant inflammation continues of a chronic character, is transformed into a viscid, stringy liquid, resembling a solution of gum. If, on the contrary, acute inflammation sets in, or if the tumor has been attended from the outset with constant pain and an increase of temperature, pus (?) is formed in the centre of the muscle, the fibres are softened and destroyed, and more or less disorganization takes place.

"In the *third stage*, those syphilitic tumors of the muscles which do not suppurate, become indurated. Like periostoses, they pass through successive stages of organization, and from being firm, become sub-cartilaginous, cartilaginous, and osseous. This final transformation, from its peculiarity and persistency, has especially attracted the attention of pathologists. I have seen a very remarkable example of it in the museum of the Faculty of Medicine at Strasbourg—an osseous mass of very considerable size developed in the substance of the quadratus femoris. Ossifications of the muscles and their tendons have frequently been observed in syphilitic persons with exostoses on various parts of the body. In the collection of my colleague, Prof. Dubrueil, is the skeleton of an Arab who was affected with syphilis, and in whom, besides numerous exostoses, there was ossification of a large number of muscles at the points of their insertion."

This "third stage," recognized by Bouisson, should rather be regarded as the termination of those muscular tumors which do not undergo softening.

More recent authorities also deny Bouisson's assertion that these tumors may terminate in suppuration; thus, Lancereaux (*op. cit.* p. 261) says: "It is very evident that this author has mistaken for suppuration either a muscular lesion consecutive to changes in neighboring bone, or else the results of fatty transformation of the plastic elements of the gummy tumors themselves; the suppuration was not the effect of syphilis."

Mauriac also states that they never terminate in suppuration and considers this an important point in the diagnosis.

These tumors vary in size from that of a filbert to an orange; they are usually globular in shape; the integument covering them is unaffected.

They grow slowly and without inflammatory symptoms, and at first cause no inconvenience. They are of various shapes, globular, fusiform, or irregular, according to the nature of the parts in which they are seated. When superficial they become adherent to the aponeurosis which becomes inflamed and hypertrophied. Being frequently developed near the ends of the muscles, the tendons are sometimes secondarily involved.

They are most easily detected when the muscle is relaxed, and their independence of the subjacent bone can then be best established. They

excite little or no pain unless the muscle be put upon the stretch, and their chief inconvenience is due to their interference with motion. They sometimes produce contraction of the muscle, but this is not a necessary result.

They usually appear late in the disease, but Mauriac has seen them in three cases as early as three and five months after infection, while we have observed a tumor in the sterno-mastoid muscle in the fourteenth month of syphilis.

They are almost always accompanied by other syphilitic manifestations, as nodes, exostoses, tubercles of the cellular tissue, or ulcerations of the fauces.

Their prognosis is good particularly if they are attended to early, and their treatment is that of the advanced stages of the disease, viz., by means of the iodide of potassium and tonics, either associated with, or followed by, mercurials.

Contraction of the Jaws.—Under this title Guyot and Beauvette describe a number of cases, in which there was inability to separate the jaws and swelling of the masseter muscle. In some cases there is no history of syphilis and in none is the affection clearly of syphilitic origin. Mauriac remarks of two of Guyot's cases that the muscles *at the end of three years* had not become sufficiently altered to render treatment inefficacious. Guyot says that syphilitic myositis of the masseter muscle is difficult of diagnosis, since it may be confounded with a similar condition caused by cold or hysteria.

Its actual nature must be determined by careful examination of the parts and from the history of the case. He also suggests that several cases of contracture of the masseter, reported as incurable, were really syphilitic, and might have been cured in an early stage.

Affections of the Tendinous Sheaths and of the Tendons and Aponeuroses.

For our knowledge of these affections we are indebted chiefly to Verneuil[1] and Fournier[2]. Under the name "dorsal hygroma," the former describes certain swellings which occur on the backs of the hands. These swellings follow the course of the tendons but never extend beyond the dorsal ligament; they are of triangular shape with their base towards the fingers. They are due to effusion and yield a sensation of fluctuation; they cause little if any pain, unless of unusually large size, when the skin over them may be inflamed and painful. They occur in the early years of syphilis and are developed rapidly.

Fournier describes an affection of the tendons of the wrist, ankle, foot, etc., and says that any tendon may be thus attacked. The lesion is a

[1] De l'hydropisie des gaînes tendineuses des extenseurs des doigts dans la syphilis secondaire. Gaz. hebd. de méd., Paris, Sept. 25, 1868.

[2] Note sur les lesions des gaînes tendineuses dans la syphilis secondaire; Gaz. hebd. de méd., Oct. 9, 1868.

hyperæmia of the sheath attended by serous effusion. The shape of the resulting tumors varies according to the conformation of the parts.

They are firm and elastic and sometimes fluctuate. The overlying skin is frequently reddened. They form rapidly and are often attended with pain. Fournier believes that many of the early pains of syphilis are due to hyperæmia of the sheaths of the tendons, and especially that the pain sometimes present in the bend of the elbow, intensified by firm pressure, is due to inflammation of the tendon of the biceps.

Tendons may, in rare cases, be the seat of gummy infiltrations, which exist in the form of small subcutaneous tumors, usually unattended by spontaneous pain. After remaining indolent for a long time, they may break down and form troublesome ulcers. Van Oort cites a case of gummy tumor of the third extensor tendon, seated over the middle of the metacarpal bone. Such a tumor might be mistaken for simple ganglion. When the tendon is attacked near a joint the latter may be secondarily involved.

The tendons are more subject to syphilitic changes near their insertion and in their thicker portions. The larger tendons and those most constantly in use are most frequently involved. Sabail reports a case of gummy tumor involving the tendo Achillis of each leg. Nelaton has twice found them in the tendon of the triceps cruris, and cases are on record in which the ligamentum patellæ, the tendon of the sterno-mastoid muscle, the anterior tendon of the thigh and the flexor tendons of the legs, were thus affected. Finally Bouisson has reported a case of strabismus due to a gummy tumor in the tendon of one of the orbital muscles.

Syphilitic tumors of the aponeuroses are less salient and less circumscribed than those of the tendons. They consist of thickening of these fibrous envelopes and are prone to attack the dense fasciæ of the limbs, particularly the fascia lata. These tumors run a course similar to that of tumors of the tendons, but they are not very prone to degenerate.

Affections of the Bursæ.

Our knowledge of the effect of syphilis upon the bursæ is still far from complete. Some observers think that congestion of these structures, possibly attended by serous effusion, may occur in the secondary stage of syphilis. This view seems to be supported by the occurrence of rheumatoid pains in the neighboring parts.

In the tertiary stage, affections of the bursæ are quite frequent. The bursæ over the patellæ are most commonly attacked. The lesion is a gummous infiltration with formation of connective tissue. It begins insidiously and without pain; the patient's attention is first attracted by a hard movable lump beneath the skin. It varies in size and shape in different bursæ. Over the knee-joint we have found tumors as large as a walnut or as an egg. The tumor may remain indolent for a long time giving very slight discomfort. In some cases it is excessively hard, in others it is quite elastic. Sometimes the parts seem to be infiltrated with fluid. If not treated, and particularly if subjected to irritation, the tumor grows and

becomes adherent to the overlying skin. Inflammatory symptoms appear and the integument over the bursa ulcerates. The inflamed and infiltrated bursa may sometimes be seen at the base of the ulcer. Under such circumstances the course of the lesion is very tedious. In other cases, even of very large tumors, treatment causes their absorption within two or three months. The lesion may be unilateral but frequently attacks both patellar bursæ. In many cases traumatism is an important exciting cause; in others the bursæ are secondarily involved by the extension of gummatous infiltration from adjacent parts. Relapses are quite frequent.

Keyes who has written an excellent paper on this subject has collected twelve cases; in three, the bursæ of both patellæ were involved and in two the bursa of one patella only was affected; that over the tuberosity of the tibia once; that between the insertion of the semitendinosus and the lateral ligament of the knee, double once and single once. In the other four cases the bursitis was unilateral, once over the malleolus, once beneath a corn, once in the palm of the hand, and once over the olecranon. It occurs most commonly in women and, according to Keyes, at an average age of thirty-five years. It may appear within one year after infection, as in two cases now under our care, but it is usually a late manifestation, being developed after the fifth year. In a third case of our own, ten years have elapsed since infection.

The treatment should be both internal and local. In quite a large experience we have obtained good results from the mixed treatment. Mercurial ointment externally hastens absorption of the subcutaneous tumors. In the ulcerative stage the neoplasm must be destroyed by caustics, of which potassa fusa is the most effective. Its application should be repeated as the case demands. The patient must be kept in bed and excessive reaction prevented by water-dressings. The subsequent treatment is similar to that of gummous ulcers.

CHAPTER XXII.

AFFECTIONS OF THE FINGERS AND TOES.

DACTYLITIS SYPHILITICA.

Besides being the seat of primary and secondary lesions, the fingers and toes are, in the tertiary period, attacked by gummy deposit in their subcutaneous connective tissue and by infiltration and inflammation of their bones. This affection was little known until recently, and was formerly called syphilitic panaris. We use the term *dactylitis*, derived from the Greek δακτυλος, a digit or finger, as being more correct and expressive.

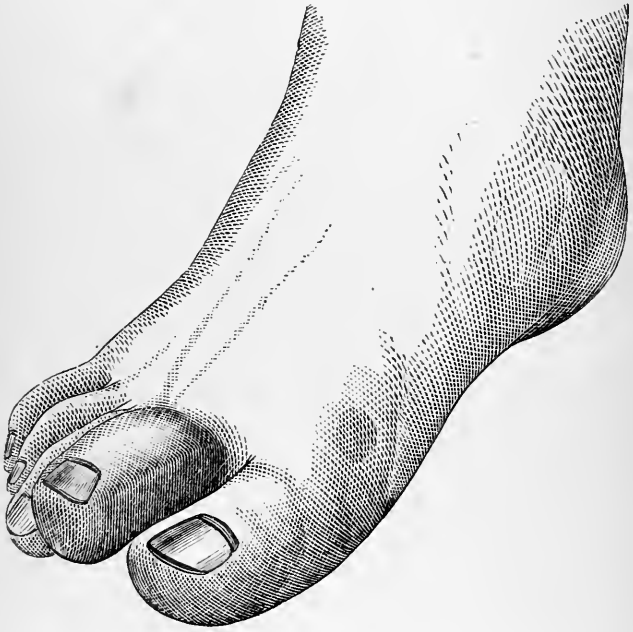
To Chassaignac, in 1859, is due the credit of first calling attention to it, but his description was vague. In 1860, Nelaton, in a clinical lecture, reported one case and referred to another. In 1866, Prof. Lüche, of Berne, published two cases; in 1869, Archambault one; in 1870, Volkmann and R. Bergh, of Copenhagen, each published one. In 1871, we reported two new cases in a monograph, containing briefly all the cases up to that time published, with a description of the disease. Since then we have seen several cases in practice and others have been published.

The affection is caused both by acquired and by hereditary syphilis. The cases due to the former are much less numerous, there being under two dozen reported up to the present time, whereas hereditary dactylitis is by no means uncommon. In this section the acquired form will be described. Of this there are two varieties: first, that in which the subcutaneous connective tissue and the fibrous structures of the joints are involved; second, that in which the morbid process begins in the bones and periosteum, secondarily implicating the joints, and perhaps accompanied by deposit in the subdermal connective tissues. These varieties are constantly found, and their adoption will simplify description. The size of the affected member is materially increased and its mobility is more or less interfered with. The lesion comes on slowly, and first attracts the patient's attention by the slight enlargement of one or more fingers or toes. The swelling gradually increases and the member becomes hard and firm. When the toes are affected, their whole length is generally included; but when a finger is attacked, the lesion may be quite sharply limited to one phalanx, almost invariably the proximal one; or the adjacent phalanx may be involved to a less degree; or, finally, the whole finger may be affected. Fig. 122 shows this infiltration into the second toe of the right foot of a patient who was under our care, and whose history is given in full in our original article.

A finger or a toe thus attacked presents a reddish, violaceous appear-

ance, and to the touch is quite resistant and tense, the normal lines of the integument being effaced. Unlike gummy tumors developed where the connective tissue is plentiful, and which are isolable and movable, these infiltrations of the fingers and toes are firmly attached to the skin, the process

Fig. 122.



apparently involving the corium even to its papillary layer. In most cases the thickening is greatest on the dorsal aspect, very rarely being equally free on the palmar or plantar surface. The swelling ends abruptly at the metacarpo-phalangeal joint.

These swellings are usually developed slowly and painlessly, but in some cases a dull aching pain is present. When the infiltration is complete it is impossible, on account of the density of the tissues, to determine accurately the condition of the bones, although they seem to be thickened. As the affection subsides, the bones and joint-structures can be more thoroughly examined, and we then find more or less periosteal thickening. In most cases, however, the bones are quite superficially involved, whereas, in the second form of dactylitis, they are profoundly attacked. It is impossible to say whether the morbid process begins in the periosteum or in the connective tissue over it; it is certain that the lesion is sometimes sharply limited to the tissues over one or more phalanges, and, again, it may involve the whole member.

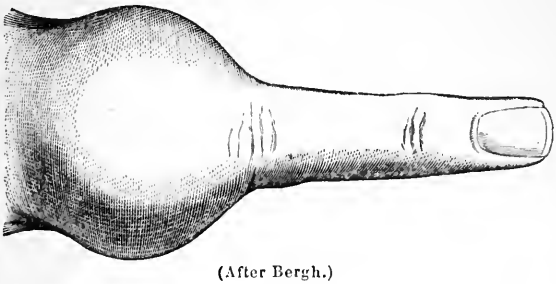
Within a few weeks after the development of the affection, symptoms of joint implication appear. At first, flexion of the joints is impaired by the swelling. In the course of one or two months, if no treatment is fol-

lowed, the joints become flaccid and unnaturally mobile. Sometimes in this variety of dactylitis, there is slight hydrarthrosis and often crepitation in the metacarpo-phalangeal joint, or between the articular surfaces of two phalanges. This will be again referred to in speaking of the second form of dactylitis.

This gummous infiltration of the integument and periosteum of the fingers and toes may be limited to one of these members or may involve several. A single hand or foot, or both, may be involved, one or more fingers and toes being attacked simultaneously or in succession. The lesion, being a late manifestation, very often follows or accompanies gummous infiltrations elsewhere. It runs a chronic course, and in its early stage is amenable to treatment. The fact that gummy tumors of these parts are not prone to ulcerate is incapable of positive explanation. The character of the deposit is certainly not peculiar, but it may be that the vascularity and density of the tissues modify the course of the lesion. The wonderful reparative power of the fingers after injury is well recognized. This form of dactylitis generally results in restoration of the affected members, but in neglected cases the joints may be rendered permanently useless and the bones may remain enlarged. The nails either escape, or, in very chronic cases, present minute transverse furrows, indicative of impaired nutrition.

The second form of dactylitis is sharply limited to the bone, and is due either to specific periostitis or osteo-myelitis. The affection may progress rapidly, slowly, or with intermissions. The earlier after infection the lesion occurs, the more acute is its course. The degree of its induration is generally in proportion to the chronicity of its development; a rapidly formed swelling may be so soft as to be susceptible of indentation by firm pressure. The affection may be speedily cured by energetic and early treatment, but if unchecked it may progress to an extreme degree. Fig. 123, taken from Bergh's case, gives an idea of the size and shape of a

Fig. 123.

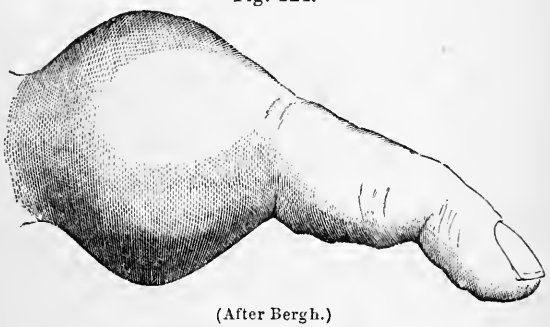


(After Bergh.)

swollen phalanx, whose normal circumference of about two inches was increased to five by this lesion. A similar case was under our care several years ago. It seems to be the rule that when only one bone is affected, the swelling is greater than when several are. The shape of the swelling depends upon the phalanx attacked. When the first is involved it may

assume an acorn-shape or the appearance of a balloon; the second and third phalanges may be fusiform or cylindrical. In most cases the whole bone is involved. The disease may be limited to the extremity of a phalanx adjacent to one already the seat of dactylitis.

Fig. 124.



(After Bergh.)

The proximal phalanx is most frequently, the distal phalanx least frequently, involved. We have seen in two instances enlargement of the second phalanx only, and of the third in one case. In hereditary syphilis it is not uncommon to find swelling of the second and even of the third phalanges.

The fingers are attacked more commonly than the toes; in a few cases they have been involved simultaneously. More than one phalanx of the same finger may be affected, as well as several fingers, either unilaterally or symmetrically. In the latter case swelling of one or more toes is likely to occur at the same time. Other osseous lesions may coexist, and articular affections and gummous infiltrations of the skin may be associated with these lesions of the fingers.

The metacarpal, and less frequently the metatarsal, bones become swollen coincidently with a dactylitis, or they alone may be affected. The extremity adjoining the phalanx or the opposite extremity may be involved.

The mode of invasion and the course of these swellings are similar in the metacarpal bones and in the bones of the fingers. The metacarpal bones of the thumb and index finger are those most frequently the seat of dactylitis.

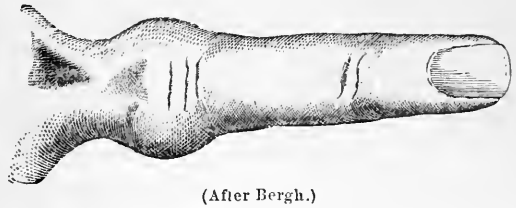
The integument is rarely infiltrated in this form of dactylitis, gummous deposit having been found in the subcutaneous tissues in but two cases of primary lesion of the bones. The skin may undergo very little change, unless the swelling is excessive, when it becomes tense and thinned, and the normal furrows are effaced. When the process is rapid the skin becomes red and inflamed; when the growth of the lesion is slow the skin accommodates itself, and very slight if any inflammation occurs. In some cases ulceration takes place or an incision is required to relieve the tension. The inflammatory focus is always on the sides of the fingers. In case an opening forms or is made, a soft cheesy detritus mixed with pus comes away. Necrosis may occur, but the destruction of bone tissue

is usually limited, and after a short time the fistula closes. In the majority of cases resolution of the bony swelling takes place.

The joint structures are generally much thickened. After the dactylitis has existed about a month, crepitation may be detected from friction of the articular surfaces. This is undoubtedly due to erosion of the articular cartilages in consequence of impaired nutrition. In some cases an effusion into the joint cavity takes place, slowly and without pain. This condition of hydrarthrosis varies in degree, and may be due either to infiltration or simple congestion of the synovial membrane. This complication is not serious, and generally ends in absorption. The thickening of the ligaments and joint-structures results in impairing the motion of the joints or in rendering them preternaturally mobile.

These bony swellings may remain in an indolent condition for a long time, and finally the gummy deposit may be absorbed, or it may soften and be discharged through a sinus. The shaft of the bone may resume its normal size, or it may be rendered thinner and lighter, as shown in the accompanying illustration of Bergh's case (Fig. 125). Sometimes it is

Fig. 125.



(After Bergh.)

shortened, and in other cases again it is slightly longer than normal. The bone may be left in a condition of eburnation, being decidedly thickened.

The process of involution may be slow or quite rapid, and seems to be in proportion to the rapidity of the development of the lesion. In most cases the deformity is not very marked; in some cases of necrosis a less fortunate result is obtained (Fig. 126). The illustration, taken from our paper on the subject, shows deformity and shortening of the index finger, so that its extremity scarcely reaches the first phalangeal joint of the middle finger. In this case the greater part of the first phalanx and the distal extremity of the metacarpal bone had been absorbed, and the remnants of the two bones were connected by fibrous tissue. In a similar manner the second phalanx of the ring finger had been reduced to about one-fourth of its original length. After the process of absorption is complete, the contiguous bones are always united by a ligamentous band, which serves as a joint. The function of a finger in such a condition is of course greatly impaired, and excessive deformity may result. The manner in which the soft parts adapt themselves to the altered condition is very remarkable, their contraction being of great service in giving steadiness and solidity to the false joints.

In spite of the extent of the osseous lesions, pain is either very slight or altogether absent. In no case have the tendons or their sheaths been

found implicated. The absorption of the bones is unaccompanied by ulceration of the soft parts.

This affection is one of the late manifestations of syphilis, occurring usually between the fifth and fifteenth years. The average age of its subjects has been about forty years. Exceptionally, it appears early, we having seen one case in which it occurred eighteen months after infection.

Fig. 126.

The early recognition of these two forms of dactylitis is important in order to prevent destruction of tissue and deformity. The subcutaneous variety in its early stage may be mistaken for paronychia, but the absence of acute inflammatory symptoms, especially pain, establishes the diagnosis. Dactylitis of the great toe might be mistaken for gout, but for the subacute character of the former. When several fingers and toes are attacked, particularly if there is a coincident affection of one of the larger joints, the case may be regarded as one of rheumatoid arthritis; but the latter is essentially a joint-affection, and is quite painful; it attacks the metacarpo-phalangeal (and rarely the metatarso-phalangeal) joints more frequently than the phalanges, and generally involves the sheaths of the tendons; sometimes tophi are deposited in the tendons, especially of the flexors and elsewhere, as in the cartilages of the ear; deformity begins early, and there is a tendency of the fingers to be drawn to the ulnar side of the hand and to be flexed and extended at various angles. Dactylitis syphilitica may be confounded with enchondroma or exostosis, but in each of the latter the swelling is more localized, being limited to a portion of the circumference of the bone.

The prognosis depends in a measure upon the period at which the lesion is recognized. When the swelling is developed quickly, rapid involution follows the use of energetic treatment. The longer it has persisted the less amenable to treatment it becomes.

The treatment is that of late syphilis, a combination of the iodide of potash with a mercurial; locally, mercurial ointment or plaster applied with pressure is beneficial. Sometimes an incision is required.

CHAPTER XXIII.

AFFECTIONS OF THE BONES, CARTILAGES, AND THE JOINTS.

Precocious Osseous Affections.

The bones may be attacked in the early months of syphilis, although osseous lesions are generally quite late. The bones most liable to early affection are those of the cranium, the ribs, the sternum, the clavicle, and the tibia. According to Mauriac[1] these lesions may occur even before the cutaneous manifestations of syphilis. We have observed localized pain in the bones at the period of invasion, but never distinct swellings much before the sixth month of syphilis. The swellings appear quickly and with fixed pain which is worse at night, and may be accompanied by radiating, neuralgic pains.

Of the skull bones, the frontal and parietal are most commonly attacked. The swellings vary in diameter from half an inch to an inch and a half, and reach a height of half an inch. They are round and smooth, and if slowly developed are quite hard. They may be single or multiple, unilateral or symmetrical. We have now under observation a patient infected six months ago, upon whose skull there are thirteen of these nodes. They may occur at the angle of junction of the frontal bone with the orbital plates, or on the occipital bone, but they are usually on the sides of the skull. Mauriac states that they are sometimes confluent. In some cases cerebral symptoms indicate that similar lesions exist on the internal surface of the cranium.

The clavicle is usually affected at its sternal extremity, the articulation sometimes being involved. The upper third of the sternum is more commonly involved than the lower third. Occasionally its borders are attacked with portions of the costal cartilages, when the patient may complain of severe dyspnœa and pain on deep inspiration. In such a case a localized pleurisy has probably been excited. In severe cases the ribs themselves may be invaded, especially their anterior portions. Its subcutaneous surface is the portion of the tibia most frequently the seat of these tumors. They vary in size and number, but are usually not as salient as similar swellings of other bones. The radius and the ulna are also sometimes attacked. The swellings are usually near the joint, the wrist more commonly than the elbow.

[1] Mauriac; Mémoire sur les affections syphilitiques précoces du systeme osseux. Paris. 1872.

These tumors often attain a large size in one or two weeks. The pain which is always present, is aggravated by pressure, and is worse at night.

The lesion is undoubtedly due to hyperæmia of the periosteum and the formation of new fibrous tissue. Gummy infiltration probably does not occur. The tumors have a tendency to spontaneous involution, and very rarely break down and form ulcers. If left to themselves they become converted into bony nodes, but they yield readily to proper treatment. In but one case, a tumor of the sternum, have we seen necrosis take place. The ulcer, which resembled a gummatous ulcer, had the eroded bone for its base and healed slowly, leaving a depressed cicatrix. Early treatment prevents deformity, but delay may result in superficial atrophy of the bone.

These lesions are generally accompanied by others of the secondary stage; they may occur even before the disappearance of the primary sore. A mild form of hydrarthrosis is sometimes induced by their proximity to a joint.

Treatment should be both local and internal. Mercurial ointment well rubbed in twice daily and kept constantly applied to the parts, is the best. If it cause irritation it may be mixed with an equal quantity of oxide of zinc ointment. Internally the mixed treatment is required.

Late Osseous Affections.

These, like other tertiary lesions, do not necessarily occur in every case of syphilis, even if left to itself without treatment; experience shows that in the great majority of cases the disease wears itself out or disappears under treatment during the secondary stage. The causes which give rise to their evolution in the few, while the many escape, are but little understood. In some cases we feel justified in ascribing their development to a strumous diathesis, to dissipated habits, to unfavorable hygienic influences, or to absence of or improper treatment; but the cases are so numerous in which none of these causes can be legitimately evoked, that we are often obliged to find a refuge for our ignorance in "individual idiosyncrasy."

The attempt, which has repeatedly been made by different authors to attach tertiary lesions, and especially lesions of the bones, to the mercury which was administered during the earlier stages of the disease, is now shown to be groundless by abundant evidence. The investigations of Mitscherlich, at Idria, the official reports of physicians at Almaden, and the observations of Singer, Pappenheim, and others, among gilders, hatmakers, and men employed in the preparation of rabbit skins, all prove that persons who labor with mercury, and who are constantly exposed to its fumes, are by no means subject to affections of the bones. Virchow, who has been quoted as supporting this error, strongly repudiates it in his recent work on syphilis.

In the time of their development affections of the bones sometimes coincide with late secondary lesions, or follow the latter after a brief interval. In other instances they occur long after every trace of the disease and

almost its very recollection has faded out, and they are then especially dangerous, because many years of health may lead the patient to overlook their cause and to neglect them until such time as irreparable injury has been done.

The division of these lesions adopted by Lancereaux appears to be the best, and is as follows: 1. Inflammatory form. 2. Gummy form. 3. Dry caries, including their sequelæ—exostoses, caries, and necrosis.

Inflammatory Form. Osteo-periostitis.—This form commences with increased vascularity of the periosteum and subjacent layer of bone, and an effusion and infiltration either of fluid or of a yellowish gelatinous substance of more or less consistency. The deeper texture of the bone is sometimes attacked, when the canaliculi are found to be dilated and filled with a similar substance.

The bones most liable to be thus attacked are those which are the most superficial, as the tibia, ulna, clavicle, sternum, and cranium; but no portion of the skeleton can be said to be exempt. The external manifestation of this affection consists in ill-defined doughy tumors of variable size, shading off gradually into the surrounding tissues, adherent to the osseous structure beneath, but independent of the overlying integument, usually very sensitive to pressure, the seat, at certain hours in the twenty-four, of severe pain, and bearing the common name of nodes. A striking peculiarity of the pains produced by nodes is their marked nocturnal character. They are generally absent or are scarcely felt during the day, but return at night with great severity after the patient retires to bed, and only abate towards morning. This nocturnal exacerbation is attributed to the warmth of the bed by Ricord, who states that in bakers and others, who are obliged by their occupation to turn day into night, the pains are chiefly diurnal. This explanation, however, does not appear to hold good in all cases, for in some they return at a certain hour in the evening, whether the patient has or has not retired; and, in a few instances, they are equally as severe during the day as at night. These pains sometimes exist without the appearance of any organic lesion, and in such instances have been regarded as the direct effect of syphilis, but it is extremely probable that they are always dependent upon changes, however slight, in the periosteum or bone. The student should notice the difference between these pains and those attending early secondary symptoms—the former being confined to certain regions, usually the continuity of the long bones and those portions of the skeleton which approach nearest the surface, and nocturnal in their character, while the latter affect by preference the neighborhood of the joints, and rapidly change their locality from one part of the body to another.

In the majority of cases of nodes the serous effusion is absorbed under appropriate treatment, and the tumor undergoes resolution. In other cases the inflammation is more acute; the skin becomes adherent to the tumor, is reddened and thinned; degeneration and softening take place, and an opening is formed; the ulcer shows little or no tendency to extend,

but a superficial portion of the bone to a limited extent usually becomes necrosed and comes away, and an adherent cicatrix is the final result.

Exostosis.—In other cases still, the effusion is more plastic and organizable, and is capable of being transformed into bony tissue, constituting an exostosis.

Such productions are often, for a time at least, movable upon the bone beneath, and are then called *epiphysary exostoses.* In this form they are due rather to periostitis than to ostitis. They are generally of small size, sometimes thin and flat, sometimes hemispherical or pedunculated, and at times annular. "At an early period of their existence, they consist of cellular tissue, containing a well-developed network of vessels. They acquire greater consistency with time, and finally present an eburnated texture. Arrived at this point, resolution is no longer possible; the tumor remains stationary, and treatment has no other effect than to quiet the osteocopic pains. If resolution be attained at an earlier period, their surface, which before was smooth, becomes irregular, indicating partial absorption. Sometimes this absorption continues after the whole of the tumor has disappeared, so that local atrophy of the bone succeeds the exostosis."[1] In other instances, syphilitic exostosis is not preceded by periostitis, but is the result of ostitis terminating in hypertrophy of the normal bony tissue, in which case it is denominated *parenchymatous exostosis.*

This new formation assumes two characters: that of cancellated and that of compact tissue. If made up of layers which have interspaces or areolæ between them, they receive the name of cellular or laminated exostoses; if, however, formed of compact tissue, and accompanied by increased volume, weight, and density of osseous material, they are called eburnated.

An exostosis situated externally rarely occasions sufficient inconvenience or deformity to necessitate its removal by an operation unless under peculiar circumstances, as was the case with a violinist from whose metacarpal bone a tumor of this nature, which had interfered with the exercise of his profession, was removed by Ricord.

But exostoses may also spring from the internal surface of the cranial bones and give rise to symptoms of the most serious character, as convulsions and the various forms of paralysis. The frontal bone is by far the most frequently affected in this manner. Lagneau, in his work[2] upon Syphilitic Affections of the Nervous System, has been able to collect but three cases of exostosis springing from the parietal, and one from the sphenoid bone; he appears to have met with none in the occipital or temporal. These intracranial exostoses vary very much in size. Saltzman[3] reports a case in which the tumor occupied the internal surface of one of the parietal bones commencing at two fingers' breadth from the sagittal

[1] Nélaton, Pathologie chirurgicale, t. ii, p. 16.

[2] Maladies syphilitiques du système nerveux, par Gustave Lagneau fils. Paris, 1860, p. 45.

[3] Acta Phys. Med. Academiæ Ces.-Leop. Carol. Naturæ Curiosorum Ephemerides, Norimbergæ, 1730, t. ii, p. 222, obs. 99 (as quoted by Lagneau fils, op. cit. p. 361).

suture and extending to the coronal suture in front and the temporal below; the patient died with symptoms of apoplexy. Within the cranium[1] of Clermont-Ferrand, deposited in the Dupuytren Museum, are two exostoses, one of which is as large as an orange. In general, however, these tumors are much smaller, and often multiple. They also vary in density, some presenting a hard, eburnated texture, while others are cellular. Most of them spring directly from the surface of the bone (parenchymatous exostoses); indeed, the existence of epiphysary exostoses within the cranium has been denied, but Vidal[2] gives a representation of a specimen in the Dupuytren Museum, in which the tumor is separated from the normal tissue by a distinct line of demarcation.

Syphilitic exostosis of the vertebræ, either external or within the spinal canal, is rare; but Lagneau[3] has adduced several instances reported by Cloquet and Bérard, Godelier, Piorry, and Minich.

Syphilitic exostoses may generally be distinguished from similar growths due to other causes by the nocturnal pains attending them, by their usually occupying the continuity of the more superficial bones, by their hemispherical form, and by the fact that they are rarely multiple or symmetrical on opposite sides of the body.

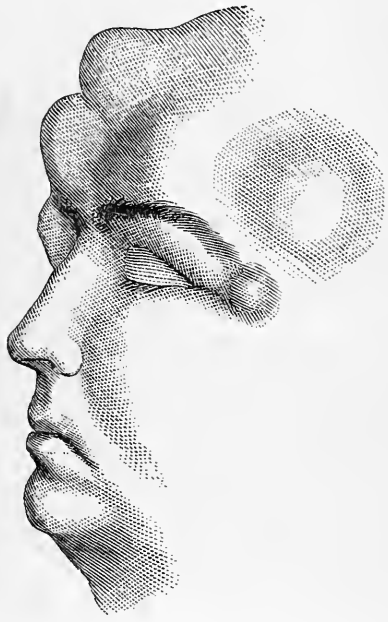
Gummy Form. Osteomyelitis.—The deposit of syphilitic tubercle in the osseous tissues most frequently takes place in the medullary canal of the long bones, although it sometimes occurs in the periosteum and in the substance of the bone itself, giving rise to one of the most painful and obstinate of tertiary lesions. Ricord[4] gives two fine representations of cases of this description. "In one, the two radii which had been the seat of very violent osteocopic pains and of exostoses, were remarkably hypertrophied in their inferior portions. At an inch and a half from the lower extremity of the right radius there was such a considerable enlargement as to lead one to believe in an old fracture which had united badly; but on close examination it was evident that there was only hypertrophy with development of the osseous canaliculi; the bone was here redder, and more porous than anywhere else; the medullary substance was hardened and yellowish, and looked like rancid lard. The left radius was hypertrophied in a similar manner and to a much greater extent, the whole of the inferior half being involved." In the other case there was plastic infiltration in the medullary canals of both bones of the leg, at points corresponding to exostoses upon the surface.

In rarer instances, a similar deposit of a whitish or yellowish color, and of the consistency of mucilage, or sometimes firmer, occurs in the periosteum external to the bone itself, and gives rise to a soft fluctuating tumor, which, like the gummata of the cellular tissue, finally softens and discharges its contents through inflammation and ulceration of the overlying

[1] Figured by Vidal, Pathologie externe, 2e édition, t. iii, p. 111, 1846.
[2] Op. cit. t. iii, p. 116. [3] Op. cit. p. 193.
[4] Iconographie, Pl. XXVIII *bis* et XXXIX *bis*.

skin; more rarely it undergoes calcareous degeneration and leaves a projecting mass. This degeneration is of more frequent occurrence in this than in any other form of gummata.

Fig. 127.



Gummata of the head and face. (After Jullien.)

This exudation may also affect the bones of the head, where it commonly occupies the diploë, separating in its development the two layers of the skull, and leading to their ultimate caries or necrosis, and frequently to perforation of the external or internal table. More or less of one of these tables may exfoliate, leaving the diploë and opposite layer intact. In a case observed by Dupuytren,[1] two-thirds of the internal table of the skull were necrosed; and in another, reported by Pétrequin,[2] the whole external table of the frontal bone exfoliated. More frequently, although the external table is involved to the greater extent, the diploë and internal table are perforated at one or more points, laying bare the dura mater, which, when the opening is large, may protrude externally, either preserving its normal character, or assuming a highly vascular and fungous appearance.

In the case of a woman recently under my care at Charity Hospital, Blackwell's Island, I removed nearly the whole of the frontal bone, which was necrosed, including portions of both supra-orbital plates. The exposed

[1] Clinique de l'Hôtel Dieu; Transactions médicales, par MM. Foget et Sandras, Paris, 1832, t. x, p. 269 (quoted by Lagneau, op. cit. p. 403).

[2] Gaz. méd de Paris, 1836, t. iv, p. 643.

surface of the dura mater over this large extent of surface afterwards put on copious granulations, and would from time to time be nearly covered with cicatricial tissue, when the process of repair would seem to flag, and ulceration again set in. This occurred repeatedly, and the patient finally left the hospital without the wound being firmly closed.

When the disease affects chiefly the internal table of the skull, the inflammatory products and portions of necrosed bone sometimes find exit through perforation of the external parts; or, in other instances, they accumulate between the bone and dura mater, cause compression of the brain, or give rise to encephalo-meningitis and disorganization of the cerebral substance. Moreover, in nearly every case of syphilitic disease of the cranial bones, the dura mater, upon its internal or cerebral aspect, presents thin layers of fibrinous or hemorrhagic deposit, which are easily detached from the surface.[1]

Virchow[2] states that necrosis produced by syphilis may be distinguished from that due to other causes by the following symptoms: "In syphilitic necroses, the surface of the sequestrum is pierced with large holes, which unite internally and lead to the suspicion that they have been due to a deposition of gummy material; the surrounding tissue, whether necrosed or not, is often dense and eburnated, presenting a strong contrast to the above."

Follin and Lancereaux both remark that the specimens of syphilitic necrosis of the cranial bones deposited in the Dupuytren Museum of Paris, exhibit an outline similar to the semicircles of certain annular syphilides. This is a curious fact as showing the tendency of syphilitic symptoms to assume a circular form even in deep lesions, but no great importance can be attached to it in the diagnosis of any individual case.

It is hardly necessary to add that other bones than the cranial are also subject to caries and necrosis under the influence of syphilis; in practice, however, we find these lesions mainly in the bones of the head, the nose, the hard palate, and the alveolar process of the upper jaw, where unfortunately they are most likely to result in deformity of feature or voice, only partially remediable by plastic or dental surgery.

Dry Caries.—Under the head of "dry caries" or "inflammatory atrophy of the bone," Virchow has described an affection which he believes to be peculiar to syphilis, and the chief characteristic of which is the *entire absence of suppuration*. With the exception of a single instance in which the sternum was involved, all his observations relate to the bones of the head, and chiefly to the frontal and parietal bones which were attacked either in their external or internal tables, or in both conjointly.

The changes observed consist in atrophy or rarefaction at certain points upon the external or internal surface of the bone, with hypertrophy or condensation of the osseous tissue surrounding them. The rarefaction commences with enlargement of the vascular canals of the bone. Openings

[1] Virchow, Syphilis constitutionelle, p. 50.
[2] Op. cit. p. 49.

are found which are the extremities of the Haversian canals of the cortical substance, and towards these converge radiated furrows which are formed by the canals parallel to the surface. Thus small star or funnel shaped depressions are formed, which gradually increase somewhat in size. When existing on both the external and internal aspect of the bone, they sometimes though rarely correspond to each other, and *may* produce complete perforation.

At the same time osseous tissue of new formation is being deposited at the periphery of these points of atrophy; it is first seen as a thin, soft, and very vascular pellicle, which rapidly ossifies, and unites with the original bony structure, constituting a simple hyperostosis or periostosis, and not an exostosis. A similar hypertrophy also occurs around the extremities of the funnel-shaped depressions, whereby the medullary cavities of the diploë are obliterated, and sclerosis of the whole affected portion is produced. Unlike ordinary caries, this affection never exhibits the slightest trace of pus.

In several instances, Virchow has found the depressions above described filled with a conical-shaped mass of tissue of new formation, which he regards as syphilitic tubercle originating partly in the pericranium (upon the external surface) or the external layer of the dura mater (on the internal surface) and in the bone itself; and he arrives at the conclusion that this form of atrophy is "intimately allied to the formation of gummata, and that the sensible depression of the cortical layer of the bone only occurs after the absorption of the gum, which takes place more readily upon the external than upon the internal surface of the cranium."[1]

Syphilitic Cicatrices in the Bones.—It remains for us to inquire whether such syphilitic lesions as involve a loss of substance of bony tissue leave behind them any peculiarity in the cicatrix, which may enable us, if not always to determine, at least strongly to suspect, their nature. Observation answers—yes.

Under other circumstances, as, for instance, after the removal of a portion of one of the cranial bones by trephining, the opening is, to be sure, never entirely filled again by a new formation of osseous tissue, yet there is an attempt in this direction, since we find the hole contracted by means of a bony outgrowth from its edges. Now in the loss of substance from syphilitic necrosis, it is entirely exceptional to find anything of the kind take place.

"*A syphilitic cicatrix of the bones is distinguished by a want of productivity at the centre, and by an excess of productivity at the periphery.*" In a word, we have here on a larger scale what we have just seen to obtain in the depressions of dry caries or inflammatory atrophy. Still supposing one of the cranial bones to be the seat of the lesion, "the dura mater becomes thickened from the outset, and when the necrosed portion has been eliminated, a cicatrix is produced, the edges of which are formed

[1] French translation, p. 49.

by the union of the skin and the soft parts covering the cranium with the bones and the dura mater; towards the centre is found a callous, uniform, whitish mass, which is very compact and poorly supplied with vessels, and which gradually thickens and contracts; the natural arching of the cranium finally disappears at this part, and is replaced by a depression of the whole cicatricial surface.

"The peripheric portions of the bones undergo quite a different change; they are affected with sclerosis, often in combination with considerable hyperostosis. The medullary cavities are gradually filled with an osseous substance; the bone becomes hard, thick, heavy, and at last quite eburnated, and on its surface there are smooth prominences, either aggregated or mammillated; but there is this decided peculiarity about these new formations, viz., that they form slowly and in small quantity, and that the periosteal collections are totally unlike the porous, voluminous masses resembling pumice-stone, which are so abundantly produced in mercurial or phosphoric necrosis of the maxillary bones, and which are also met with, although to a less extent, in all other forms of necrosis."[1] These changes therefore closely resemble those occurring in inflammatory atrophy without suppuration or necrosis, and the diagnosis must sometimes be made from the history of the case and an examination of the surrounding soft parts.

If any portion of a bone has been entirely destroyed, as, for instance, the vomer or a part of the hard palate, nature does not attempt to supply the deficiency, at least with osseous tissue.

Several authors have mentioned extreme fragility of the bones in general as one of the effects of syphilis. A patient who was under my care a few years since for syphilitic necrosis of the bones of the head, fractured his thigh while simply turning in bed. Death ensued from exhaustion in the course of a few weeks, but no opportunity was offered for a post-mortem examination. It is not probable, however, in this and other similar cases that have been reported, that a condition of mollities ossium exists, but rather that the bones at the point of fracture have had their integrity impaired in one of the modes previously mentioned.

Treatment.—Most of the above affections of the osseous tissues yield with great facility to the treatment appropriate for tertiary syphilis. Osteocopic pains, and nodes especially, often disappear in an almost marvellous manner under the free administration of iodide of potassium, but they are very apt to return. As I have previously stated, I believe the greatest protection against a relapse is the combined use of mercury in the form of inunction.

In most of the supposed desperate cases of syphilitic disease of the bones that I see in consultation, the attending surgeon has been trifling with insignificant and insufficient doses of his remedies—giving for a while some ten or fifteen grains of the iodide of potassium in the twenty-four hours, and, this failing, resorting to a sixteenth or the twelfth of a grain

[1] Virchow, op. cit. p. 62.

of corrosive sublimate, three times a day, until his patient had such a diarrhœa and was so run down that he was obliged to desist, and was now at the end of his resources. At the suggestion of forty, sixty, or a hundred or more grains of the iodide *per diem*, and the nightly use of a drachm of mercurial ointment by inunction, it is often objected: "Why, I have been giving just these remedies"—as if it were sufficient to have the proper tools, and it made no difference how they were used!

In the great majority of cases of osteocopic pains, ostitis, nodes, etc., I prefer to abstain entirely from local treatment; the small benefit that it can afford is more than counterbalanced by its inconvenience and its diverting the patient's mind from his chief source of relief. If, however, any local treatment be adopted, the best is the repeated application of blisters, which may be dressed with an ointment containing morphine.

Many practitioners are altogether too prone to plunge a lancet into the tumor. Resolution may often be obtained even after fluctuation is evident, and when an incision and consequent exposure of the bone would be followed by caries or necrosis of its superficial layer. This treatment should be left as a last resource after other means have failed, in which case it is probable that there is some sequestrum that can only be got rid of in this manner.

"When suppuration or caries occurs, especially of the bones of the face which are so often necrosed in these cases, we should never fail to remove them as soon as they can be separated from the sound parts. We must recollect that caries engenders caries; that when the organic tissue of a bone has been destroyed by suppuration or has lost its vitality, it cannot be regenerated by any constitutional or local treatment whatsoever; and that its *debris* should never be left to spontaneous evolution, since they are foreign bodies, maintaining and extending suppuration, which, by involving important parts, may occasion the most serious symptoms, or even result in death."[1]

Affections of the Cartilages.

Syphilis may attack the cartilages as well as the bones. The cartilages of the larynx are a favorite seat for tertiary syphilis, which often results in necrosis, and the sequestra are sometimes expelled in the attempts at expectoration.

Lancereaux reports a case in which the purulent collection in this region was the origin of pyæmia and metastatic abscesses; severe chills suddenly occurred, and the patient died in a week; the autopsy confirmed the diagnosis.

Bouisson speaks of a case of perichondritis of the costal cartilages in a man who also had a syphilitic tumor in the pectoralis major muscle. (Lancereaux.)

We also have seen swellings of the costal cartilages developed simultaneously with tumors of the sternum. Syphilis may therefore cause gummy

[1] Ricord, Notes to Hunter, 2d Am. ed., 1859, p. 507.

infiltration of cartilage as well as of bone. When the joints are the seat of these syphilitic changes the cartilages may be eroded and crepitation may be heard. This condition is probably merely a result of impaired nutrition.

Affections of the Joints.

The joints are frequently affected by syphilis in both the secondary and tertiary stages. In some instances the morbid process begins in the joint structures, and in others inflammation of the articular ends of the bones and of the large tendons inserted near the joints involves the latter secondarily.

Arthralgia.—In the secondary stage, and frequently as early as the appearance of the first general manifestations, one or more joints may be the seat of pain. Externally there is no redness of the skin nor subcutaneous inflammation, no swelling from effusion and no elevation of the temperature of the parts; in fact very often the only evidence of disease is the pain. In some instances pressure causes no pain, but movement of the joint does, and there is more or less stiffness and inability to move the joint. The pain is slight or of a dull character during the day, but is often attended with marked exacerbation at night. After considerable motion the stiffness and pain may disappear to return at night when the joint is in a state of repose. In other instances, however, the suffering of the patient is very great, preventing sleep until late in the night or towards morning. Not unfrequently, coincidently with the joint affection, there is marked fever of the remittent type, and patients may also suffer from rheumatoid pains in the muscles, neuralgias and periosteal pains.

This affection is very uncertain in its duration, being sometimes very ephemeral and at other times very persistent.

It is readily amenable to treatment when this is commenced early, but otherwise, it is obstinate and troublesome. It most commonly attacks the larger joints either symmetrically or the opposite, and the joints of the hands and feet are not infrequently involved. The knee-joint is most frequently attacked, but those of the shoulder, elbow, wrist, and ankle are also often affected. In general only two or three of the larger joints are involved at once, and there is not, as in articular rheumatism, a tendency to metastasis from one joint to another. When the affection involves the smaller joints, as those of the phalanges or carpal bones, several of them are generally attacked simultaneously, and the earlier it occurs in the course of syphilis, so is the tendency to its symmetrical development greater. While in most cases there is no evidence of any abnormal condition of the articular surfaces, in others crepitation may be heard, indicating some impairment of nutrition of the opposed surfaces. The lesion, which cannot be positively determined, is probably a low grade of hyperæmia of the synovial membrane and fibrous tissues.

This affection is called by Fournier both arthralgia and pseudo-rheumatism, and by Vaffier syphilitic rheumatism. The diagnosis between it and

ordinary rheumatism is to be derived chiefly from the history of the case and the concomitant lesions and symptoms. The course of this affection is very subacute; there is not the same tendency for so many of the joints to be affected as in rheumatism, and there is absence of the systemic condition and of the perspiration peculiar to the latter disease. The appropriate treatment is by mercury if the affection occurs at an early stage of syphilis, and by the mixed treatment if in the late stage.

Synovitis.—There are two forms of synovitis occurring during the course of syphilis; the one simply a chronic effusion into the joint without any appreciable change therein; the other an affection, in which there is, besides the effusion, a thickening of the synovial membrane.

Synovitis of the Early Stage.—This begins slowly and painlessly. The patient experiences slight stiffness in the joint which is found to be swollen. On examination, the usual symptoms of effusion are found, which vary according to the joint attacked. The skin covering the joint is not changed. Firm pressure may cause slight pain, and dull pain may often be felt at night, but the articular surfaces may be crowded together with impunity. The amount of effused fluid varies; in some cases it is very slight, in others copious. A peculiar feature of this affection is the intermittent character of the effusion. For example, a patient may have complained of a moderate effusion which seemed to wholly pass away; after a longer or shorter period it returns, and reaches a certain stage where it remains for a time; then the swelling increases; afterwards it decreases very perceptibly, and again increases to marked proportions. During this whole period the patient has suffered little inconvenience, except a slightly painful stiffness of the joint in the morning, which passes away in an hour or two, and perhaps a slight pain at night. Not infrequently such patients also suffer from periosteal pain in the course of the long bones, or from nocturnal neuralgia. The effusion may remain for a long or short period. In some, particularly those who are subjected to treatment, it passes slowly away, and the joint is apparently left in its normal condition. In other cases, the affection is chronic and persistent, and the effusion disappears very slowly. In these cases we usually find the whole joint somewhat enlarged and indurated, and subject to frequent small effusions. There is no tendency to suppuration or destruction of the joint.

The diagnosis of this affection can be generally made out without difficulty. The history of the case, and the slow, painless, intermittent, and subacute character of the effusion, establish its distinct nature from the synovitis of rheumatism or of gonorrhœa.

Synovitis of the Late Stage.—The synovitis which occurs late in the secondary and during the tertiary stage, is also markedly subacute. It is attended with the same symptoms, and is mainly distinguishable from that of the earlier period by appreciable lesions of the joint structures. The attention of the patient is called to the affection by slight pain and impairment of motion, and the joint is then found somewhat enlarged. The effusion into its cavity takes place slowly and perhaps intermittingly, so

that in many cases several months elapse before the joint is very decidedly enlarged. When the affection is fully developed we find evidence of intra-articular effusion and general thickening of the fibrous coverings and of the synovial membrane. The affection has been called by Richet,[1] who first described it, "syphilitic white swelling," and was said by him to be due to gummy infiltration into the sub-synovial connective tissue and into the reflections of the membrane which lined the joints. This view was not generally received, but the more recent post-mortem observations of Lancereaux[2] have confirmed them. The latter in his excellent text-book gives a colored lithograph of the appearances presented by a joint thus diseased, and clearly shows masses of gummy material in the sub-synovial tissues.

It is probable that this is the chief focus of the lesion, but in some cases, there is a coexisting hyperplasia of the fibrous structures of the parts. This affection may remain in an indolent condition for years without undergoing any further changes. There is little tendency to complete anchylosis, though quite frequently there is more or less erosion of the articular cartilages, as shown by the crepitation on motion. We seldom find sinuses near the joints, and the stationary character of the affection is in marked contrast to the tendency to degeneration, which is such a prominent feature of the strumous affections of these parts. The knee-joint is the one most commonly attacked.

The prognosis of this affection is rather more serious than that of the earlier form. If it is submitted to treatment early, it is in general curable, but if it is neglected, permanent thickening occurs, and consequently more or less impairment of motion.

The constitutional treatment consists in the administration of the iodide of potassium and of mercury. Locally, frictions with a mild mercurial ointment, and compression of the joint by means of strips of mercurial plaster are very efficacious. In the most rebellious cases it is necessary to render the joint thoroughly immobile by means of the starch, plaster of Paris, or, preferably, the silicate of soda (so-called "glass") dressing.

In some cases in which there is a syphilitic affection of the tendons inserted near a joint, there is a coincident effusion into the cavity of the latter. This occurs slowly and painlessly and disappears on the subsidence of the disease of the tendon.

Accompanying the osteo-chondritis of children, in which there is inflammation of the diaphyso-epiphyseal junction, there is also, in some instances, effusion into the cavity of the joint at the end of the affected epiphysis. This affection, which is described in the chapter on hereditary syphilis, occurs most commonly within the first year, but in some cases even as late as the twelfth year. In such cases we find a general enlargement of the epiphysis and swelling of the joints.

[1] De la tumeur blanche; Mémoires de l'Acad. de. méd., Paris, t. xvii, 1853, pp. 249, 250, 251, 253.

[2] Traité historique et pratique de la syphilis, Paris, 1873.

CHAPTER XXIV.

AFFECTIONS OF THE EYES.

A LARGE number of tissues enter into the composition of the orbit and its contents, and syphilitic affections of this region are correspondingly numerous; but a minute description of all of them would be inconsistent with the limits of this work; and I shall therefore merely allude to several of them and dwell chiefly upon those which are the most common and most likely to fall under the care of the general practitioner.

AFFECTIONS OF THE BONES OF THE ORBIT.

These may show themselves either as periostitis, caries, or necrosis. They produce the same general symptoms and appearance as in other parts of the body, but, from the very seat of the trouble and the proximity of the inflammatory action to the delicate and complex organ of the eye on the one hand and the sensorium on the other, the symptoms are apt to be graver and the results more disastrous here than elsewhere, except within the cavity of the cranium itself.

The inflammation is very liable to be propagated from the bony walls to the contents of the orbit and there give rise either to a superficial or deep-seated cellulitis, which, if unchecked, may result in the formation of an abscess, and this, in its turn, may either seriously threaten the integrity of the eye or cause its total destruction. Again, sinuses may be found in different directions in the lids or their surroundings, through which the products of inflammation may be discharged for an almost indefinite period accompanied by ulceration and contraction of the soft parts, with eversion or displacement of the lids.

The favorite seat of these troubles is the inner portion of the orbital plate of the frontal bone, the orbital border, superior and inferior, and the os unguis, in which latter they often lead to troubles in the lachrymal passages.

The results of orbital cellulitis may be the same here as in the idiopathic form and the surgeon must be prepared, in case a deep-seated abscess forms, to evacuate this with a bold free incision into the orbit in order to save the eye, or it may be the life of the patient.

The constitutional disturbances in these affections of the bones, especially when of a chronic form, are sometimes very great, and the patient often becomes reduced in a marked degree through pain and general nervous prostration, so that the attending physician is often fearful of subjecting

him to a rigorous course of specific treatment. This I am convinced is a mistake, for there is no occasion where the good effects of a vigorous anti-syphilitic course is more marked than here, as well in regard to mercury as to iodide of potassium. Very large doses of this latter drug (ʒj) two or three times a day are indeed often the only thing which seems to effect a change for the better.

Syphilitic nodes may be met with upon either of the four walls of the orbit. They are most frequent near the anterior opening of the socket, but may occur at a greater or less depth within its cavity and cause protrusion of the eyeball and loss of vision consequent upon stretching of the optic nerve. The following cases are reported by Mr. Poland—[1]

Case 1. John M——, æt. 41, a large, bony, well-developed man, became an out-patient at Moorfields, suffering from an extensive swelling of the bone at the upper part of the orbit, encroaching upon the eyeball so as to displace it downwards and forwards. The history of the case, as well as the present marks of old mischief, at once indicated the nature of the growth.

From his statement, it appeared that about ten years ago he had undeniable syphilitic inoculation, hardened chancre and a non-suppurating bubo, followed by secondary symptoms of a rather protracted form. He underwent mercurial treatment, both internally and by ointment, and with benefit; ultimately he became free from all symptoms, and since that time at intervals he has had occasional attacks of rheumatism, which have been relieved by iodide of potassium, and on more than one occasion he has had nodes on the tibia, which were relieved by blisters. The present swelling on the frontal bone had been in existence for nearly six weeks, and, within the last few days, had increased most rapidly in size; it was perfectly firm and hard, but very tender and painful, and seemed to extend towards the orbit, instead of taking the usual course over the forehead, and had already encroached upon the eyeball, slightly displacing it downwards and forwards. There were no cerebral symptoms whatever.

The man was ordered to take three grains of the iodide of potassium three times a day, and to rub an ointment of the same on the swelling morning and night. By persevering with this treatment for three months the swelling entirely disappeared.

Case 2. The second case was that of a woman nearly six feet in height, and of immense bony development, who came under Mr. Poland's care at Moorfields, having a large node growing from the inner wall of the orbit; it was perfectly solid to the touch, but pushed the eye outwards and forwards, and had caused tension of the optic nerve, so that there was loss of sight, dilated fixed pupil, and perfect immobility of the eye. She soon afterwards had severe cerebral symptoms, and died suddenly in a comatose condition. There was no examination of the body.

I never met with exophthalmos dependent upon this cause during many years' connection with the N. Y. Eye Infirmary.

Real exostoses may form in the bones of the orbit as the result of syphilis.

[1] On Protrusion of the Eyeball, Ophthalmic Hospital Reports, vol. ii, p. 223.

Affections of the Lachrymal Passages.

Syphilis not unfrequently gives rise to changes in the lachrymal passages, causing obstruction to the flow of tears, epiphora and lachrymal abscess and fistula. Since these passages are not exposed to direct observation, the exact nature of the changes in their walls is not always apparent. In a few instances, the disease appears to be confined to the mucous membrane and submucous tissue, and to consist in catarrhal inflammation, consequent œdema, and ulceration; in the majority of cases, however, it commences in the bony wall or periosteum, and the mucous membrane is affected secondarily; changes which correspond to those met with in other mucous membranes contiguous to bony tissue. The character of the coexistent syphilitic symptoms may afford some idea of the changes in the tear passages, which, however, can only be accurately determined by direct exploration.

The symptoms are sufficiently obvious. The tears meeting with obstruction to their transit through the lachrymal passages, collect upon the conjunctival surface; if profuse, they flow over upon the cheek, especially when the patient is exposed to the wind, and the eye is evidently more moist than its fellow, whence the name "watery eye" applied to this disease. Soon, pressure over the lachrymal sac causes a reflux into the eye of the lachrymal secretion mixed with more or less purulent matter, or the same result takes place spontaneously; the conjunctiva, especially that of the lower lid and inferior portion of the globe, is maintained in a constant state of irritation and inflammation, and the puncta are abnormally red, swollen and prominent. In extreme cases an abscess forms in the lachrymal sac or neighboring cellular tissue, opens and gives rise to one or more fistulæ.

These affections of the lachrymal passages may occur at any period of the constitutional taint, but here, as elsewhere, the catarrhal inflammation of the mucous membrane coincides, as a rule, with the secondary stage of the disease, while the deeper-seated troubles of the periosteum and the bones are the development of the tertiary period.

Much may be done for the relief and permanent removal of obstructions of the lachrymal passages by the persevering and long-continued use of specific remedies. The bichloride of mercury and iodide of potassium may give satisfactory results. Most cases, however, refuse to yield to internal remedies alone, and in all a cure may be expedited by a resort to the improved local treatment for which ophthalmic surgery is so largely indebted to Mr. Bowman of the Moorfields Ophthalmic Hospital.[1]

This treatment consists in slitting up the canaliculi as far as the caruncle, and afterwards dilating the passage into the nose by means of graduated probes as we would a stricture of the urethra. The first part of the above procedure is often sufficient to afford great relief to the patient by opening

[1] See Mr. Bowman's papers in the Medical and Chirurgical Transactions, 1851, and in the Ophthalmic Hospital Reports for Oct. 1857; also Remarks on Diseases of the Lachrymal Passages by the author in the Report of the N. Y. Eye Infirmary, N. Y. Journal of Med., July, 1859.

a free communication between the conjunctiva and sac, and by preventing collections of matter in the latter or facilitating their evacuation. One or both canaliculi having been slit up, an opportunity is afforded to explore the nasal passages with a full-sized probe (about one-twentieth of an inch in diameter), and to ascertain the nature of the obstruction. If this be due to swelling of the mucous and submucous tissues alone, the passage of a probe repeated every two or three days for a few weeks, and retained on each occasion for about half an hour, will in most cases suffice to re-establish the patency of the canal; but when denuded bone can be felt, showing that the disease is seated in the periosteal or osseous tissues, Mr. Bowman's method will sometimes prove unsuccessful, and it becomes necessary to resort to the following course of treatment. If, after the canaliculus has been slit up, explorations with a small Bowman's probe show that the seat of the trouble is in the lining membrane or periosteum of the canal, whether this be from simple thickening or from an actual stricture, then the upper canaliculus should also be slit up and the orifice made by the juncture of the two wounds enlarged, and a long slender knife, such as Agnew's[1] lachrymal knife, should be passed the entire length of the canal and the membrane freely incised down to the bone. After the bleeding which relieves the congestion of the parts has ceased, the largest size of Bowman's probes should be passed so as to fully dilate the canal. This having been once accomplished, it is usually a comparatively easy matter to keep the canal open by the occasional use of a smaller probe.

In long-standing chronic cases, where there is not much active inflammation, instead of a probe, a piece of lead wire of the same size as a probe may be inserted and left for a day or two, or even for a week or more, until the divided stricture and membrane have healed. Weak injections of nitrate of silver through the sac and nasal canal, by means of a small syringe such as is used for hypodermic injections, may often be used with benefit once or twice a week. These should, however, never be stronger than a grain to the ounce.

Sometimes cases appear with every appearance of a severe trouble in the sac and canal, showing a large and reddened tumefaction which is exquisitely painful to the touch, and in which there is a slight sense of fluctuation with every indication of confined pus. There is however little or no epiphora, and no pus escapes when the canaliculi are slit up. Moreover, the probe shows that there is no stricture or even narrowing of the canal. The real seat of the trouble is then not in the sac or canal, but in the periosteum of the nasal process of the superior maxillary bone and contiguous parts. In this case the incision should be made from the outside and be deep enough to go through the periosteum. The cut should be kept open for a day or two, and small poultices used for only twenty minutes or so once or twice a day. Sometimes, though rarely, we see a permanent thickening of the bones in this region, which makes a distressing deformity.

[1] For an admirable article on "The Treatment of Lachrymal Diseases," see The American Practitioner, Jan. 1871, p. 1. C. R. Agnew, M.D.

Should this treatment not suffice, it sometimes becomes necessary to resort to obliteration of the sac and canaliculi (which should always be included) by the actual cautery, or to wait for the slow elimination of the carious portions of bone under the internal administration of iodide of potassium. The old-fashioned style has been entirely abandoned. The danger and inconvenience attending its employment far more than counterbalance any benefit that can be derived from it.

Syphilitic Affections of the Lachrymal Gland.

The only recorded case of affection of this gland is, according to Dr. R. W. Taylor,[1] that reported by Chalons[2] of Luxembourg. "This case was that of a person in the first year of his disease, having lesions of an exanthematous character and an iritis. Coincidently, these glands were observed to become swollen, and their increased size was very perceptible, as they pushed the upper lids forwards. The gland on the right side was much more tumefied than its fellow, and caused the eyelid, which was slightly reddened, to droop down over the eye as in the affection named ptosis. There was no pain, and the symptoms were of a mild character. The appearance of the person is described as being very peculiar. The swellings subsided under the influence of a mercurial treatment."

The writer has seen one or two similar cases in which inflammation of the lachrymal gland or surrounding tissue was supposed to exist. In all these cases, however, excepting one, there was no specific history and no concurrent, nor had there been any anterior manifestations of syphilis. In one case there was a doubtful specific history in a man of forty years, and the trouble, which had lasted a long time, yielded at once to very large doses of iodide of potassium. In all the trouble was one-sided. Dr. Taylor also mentions in the same paper two unique cases where there was gummy infiltration into the caruncles.

Syphilitic Affections of the Eyelids.

These lesions are very rare, but when they do occur they present the same general appearances and characteristics that the same lesions do in the corresponding tissues elsewhere in the body, and they may for clinical purposes be divided into eruptions, infiltrations, and ulcerations.

An eruption of a pustular syphilide, of ecthyma, of ulcerating rupia, and other forms may occur on the eyelids, and especially, according to Lancereaux, in the tertiary period, the external surface of the lid may be the seat of ulcerating or even serpiginous syphilides, which, by cicatricial contraction, may cause ectropion or other displacements of the lid. Lawrence states that the lining mucous membrane may share in the eruption which, as a rule, affects it superficially. He mentions a case of general papular

[1] American Journal of the Medical Sciences, vol. lxix, 1875, p. 370.

[2] Adenitis Lachrymalis Syphilitica, Preuss. Vereins Zeitung, No. 42, 1859.

eruption in a man with specific iritis in whom papules were also seen on the inner surface of the lid. The writer has seen a similar case where the papules, which covered the external surface, extended a little beyond the juncture of the mucous membrane with the edge of the lid.

Syphilitic eruptions of the eyelids are more frequent in infants affected with hereditary syphilis, than in adults. The external surface of the lids is the seat of an eruption of pustules, which run into each other, break, and leave the skin excoriated and red.[1] The conjunctiva of the lid and the globe may become involved through extension of the inflammation, and the cornea destroyed by infiltration of pus. This affection may be distinguished from ophthalmia neonatorum by its later development—the latter appearing about the third day and the former several weeks after birth—and by the presence of the eruption upon the external surface of the lids to which the conjunctivitis is only secondary.

Syphilitic Ulcerations.—These may be either due to a chancroid or to true syphilis, and be either primary or secondary.

Soft chancres upon the lids are of extreme rarity; I have never seen any myself, but Galezowski[2] and Hirscher[3] have each reported a case.

The true syphilitic ulcer is more common, and may occupy any part of the external or internal surface of the lid, and may either continue superficial, or, gradually extending, may involve all the tissues of the lid. It most frequently occurs on the delicate skin on the margin of the lid, or in the cul-de-sac, where it usually begins as a papule, to be followed by the appearance of a superficial or excavated sore having an indurated base, the induration being, as a usual thing, deeper and more marked here than in other parts of the body. The ulcer is generally accompanied by inflammation and swelling of the pre-auricular and submaxillary glands. This must be considered the most valuable, and sometimes the only, diagnostic mark of the true nature of the trouble. For without this sign, these primary ulcerations may be, as indeed they have been more than once, taken for simple styes or a discharging tarsal tumor. I have seen two cases of primary ulcers on the inner surface of the lid, which simulated so exactly a tarsal tumor with a small opening, as to render the discrimination between the two at first impossible. The only guide to a certain diagnosis was the rapid development of an adenitis in both the pre-auricular and submaxillary glands, which, according to Zeissl, seldom occurs in any but strumous subjects. In neither of these cases, however, were there the slightest signs of a strumous diathesis. The diagnosis was, however, corroborated in the fullest manner by the successive appearances of secondary, and in one case of tertiary manifestations in other regions.

In the secondary period, syphilitic lesions of the inner surface of the lids appear as small, circumscribed, prominent spots, usually of a moderate degree of vascularity, though not always, as the surrounding tissue sometimes becomes congested, and the congestion may then extend to the

[1] Figured by Devergie, Clinique de la maladie syphilitique, Pl. 37.

[2] Galezowski, Journal d'ophthalmologie, mai et juin, 1872.

[3] Hirscher, Wiener med. Wochenschrift, No. 72, 73, 74. 1866.

ocular conjunctiva. The color of these spots sometimes varies from a grayish-red to a yellow or even copper color. Mucous patches, pure and simple, may occur on the palpebral conjunctiva, and they present the same general characteristics as they do elsewhere on the body.

Secondary ulcerations of the eyelids usually begin as gummy tumors or as submucous infiltrations. They are very destructive of tissue and often leave behind them a scar which, with the destruction of the hair follicles and the consequent loss of hair, is for some a diagnostic mark. Still the fact should not be lost sight of that the same result may occur from a simple furuncle or an aggravated sty.

Secondary ulcers are almost always situated near the free border, encroaching upon the mucous membrane or upon the skin, and sometimes, as in a number of cases collected by Mackenzie,[1] causing complete destruction of the lid. I have seen but one case in a lad aged nineteen, affected with syphilitic disease of the lachrymal passages and nodes upon the tibia, and who had several small excavated ulcers upon the mucous membrane of the lower lid bordering upon its free margin. His disease could be traced to a chancre contracted three years previously, and disappeared under iodide of potassium and mercurials. These ulcerations may be mistaken for ophthalmia tarsi, and epithelial cancer, or, when situated near the inner canthus, for disease of the lachrymal passages.

Moreover Zeissl declares that the gross and microscopical appearances of the initial lesion are so similar that they can hardly be distinguished, and moreover the rapid and enormous growth of a papule on the lid sometimes causes it to resemble a gumma.

Sometimes infiltrations into the substance of the lid between the cartilage and the external surface do not ulcerate, but remain for a long time as nodules varying in size from a shot to a large-sized filbert. Under these circumstances the skin over these nodules is but slightly if at all reddened, and in this case these protuberances bear a close resemblance to tarsal tumors or chalaza for which they have been mistaken. These masses usually resolve themselves under the free use of antisyphilitic remedies, especially the mercurials.

Syphilitic inflammation of the tarsal cartilage has been reported latterly by various observers under the name of *tarsitis syphilitica* (Magawby, Fuchs, Vogel, Bull, and others). It is characterized by a thickening from inflammatory infiltration of the cartilage, which usually maintains its shape, and swelling of the lid, in which the skin may or may not be involved. As a rule it is found that after the acute stage has passed and the tumor has disappeared, the cartilage has lost its normal elasticity and resistance. The affection is very obstinate, lasting over several weeks if not months, and it is apt to be followed by a more or less complete loss of the ciliæ.

Finally inflammation due to constitutional syphilis may attack the tendons and fasciæ of the muscles of the globe and especially the capsule of Tenon. This is always a grave lesion, as deep-seated abscesses are liable to form, hemmed in by the fasciæ and thecæ. Besides constitutional treatment,

[1] Diseases of the Eye, Phil. ed., 1855, p. 160.

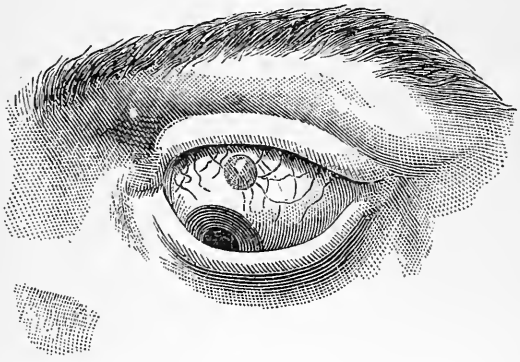
these affections often require surgical interference in the way of deep and broad incisions into the orbit, especially in the line of the muscles and close to the globe. They are apt to end, in spite of all care and skill, in total destruction of the globe through panopthalmitis.

Affections of the Conjunctiva.

If we except the ulcerations of the lids already described as sometimes encroaching from the mucous membrane of the internal surface upon the cul-de-sac, the conjunctiva, that is, the ocular conjunctiva, is very rarely the seat of syphilitic manifestations.

Savy,[1] however, reports a case (Fig. 128) of a syphilitic papule developed upon the ocular conjunctiva, three millimetres above the cornea.

Fig. 128.



Syphilitic papule of the conjunctiva.

The patient contracted syphilis six months before, and had over the whole body an obstinate lenticular eruption; the eyelids were red, the lashes had fallen off, and the papular eruption had extended to the under surface of the lids. A cure was obtained after three weeks, specific treatment. Savy quotes two similar cases from P. Horteloup and from Lailler.

Infants tainted with hereditary syphilis are, indeed, more frequently than others the subjects of ophthalmia neonatorum, to which they are peculiarly exposed from their general cachectic condition and the frequency of vaginal discharges in their syphilitic mothers; but there is no direct connection between their hereditary taint and the purulent inflammation of the conjunctiva, which usually makes its appearance before the development of other symptoms.

Mr. Smee[2] and Mr. France[3] have met with "blotches" upon the conjunctiva, coinciding with syphilitic eruptions upon the integument and disappearing under mercurial treatment. The appearances, as described by

[1] Claude Savy, Contribution à l'étude des eruptions de la conjunctive, Thèse de Paris, 1876.

[2] London Medical Gaz., 1844, pp. 347–8.

[3] Guy's Hosp. Repts., third series, vol. vii.

Mr. France, are as follows: "This form of disease presents itself as a limited and well-defined discoloration of the mucous membrane of the globe, which, within the affected area is slightly thickened and raised, but not conspicuously, if at all, more vascular than the neighboring surface. There does not seem to be any disposition to ulceration, as when the margin of the lid is attacked with syphilis; there is no pain and no morbid discharge." Mr. France met with two cases, of which he gives a plate, Mr. Smee with only one.

There would appear to be no reason why the ocular conjunctiva should not be affected both by true chancre and chancroid. I have never seen the occurrence of either, but as this work is passing through the press, Boucheron reports a well authenticated case of a true chancre of the semilunar fold conveyed in a kiss from mucous patches in the mouth, and refers to another in the same situation in a physician who rubbed his eye to relieve itching with his fingers soiled in examining a case of syphilis (Gaz. d. hôp., 14 juin, 1879).

I have seen several times what I have taken to be ulcerations of a secondary nature, such as have been described by Magni, Noyes,[1] and others. The latter says the common site for these ulcerations is near the margin of the cornea, where a reddened and elevated spot appears, resembling a severe phlyctenule. It rises higher, and is more extensive than such eruptions usually are, and it soon begins to ulcerate. The surface not only becomes excavated, but shows a jelly-like semi-transparent tissue about the eroded part, and this may spread to the cornea, which then often has a hazy appearance in the neighborhood of the ulceration, giving, especially just before the surface of the protuberance begins to ulcerate, the picture of episcleritis. The search for corroborative symptoms of syphilis in other parts of the body will usually be rewarded by success.

Magni describes an affection under the name of kerato-conjunctivitis gummosa, in a woman who was affected with constitutional syphilis. There appeared, on the *ocular* conjunctiva, several semi-globular tumors, varying in size from the head of a pin to that of a bean. These were of a whitish color at their summits and red at the base, and, except when situated near the cornea, were freely movable with the conjunctiva.

The ocular membrane, moreover, according to Desmarres,[2] is sometimes the seat of syphilitic tubercles coexisting with a similar eruption upon the skin. This author relates the case of a patient affected with syphilitic iritis, in whom one of the so-called condylomata of the iris, situated near its external margin, penetrated the sclerotic and formed a protuberance beneath the conjunctiva, which, moreover, was studded on every side with small, indolent, hard, and oblong tumors, exactly similar to an eruption of syphilitic tubercles upon various portions of the integument. The disease disappeared under mercurial treatment.

The mass which penetrated the sclera was probably a gummy tumor of the ciliary body, about which more will be said a little later.

[1] Syphilis of the Eye, 1874, p. 4.

[2] Traité des maladies des yeux, t. ii, p. 216.

Wecker, Estlander, Bull, and others have reported cases of gummy infiltration of the ocular conjunctiva. In most of these the product in the conjunctiva has appeared to be simply the extension of that in the sclera from continuity of tissue. Dr. Bull's[1] case is worthy of note as possessing what would appear to be an independent focus of infiltration in the conjunctiva proper, or, at least, in the limbus. This was in the case of a man, the victim of a combination of constitutional syphilitic manifestations, among which, "there was a peculiar eruption upon the hands and face, composed of elevated spots with flat tops, some round, others oval, yellowish-red in color, with a narrow dark-red areola, neither painful nor tender to the touch, and presenting a mid-state between vesiculation and pustulation.

"The eyes were almost identical in appearance. Surrounding the corneæ there was a growth, most marked on the outer and lower sides, varying in height from one and a half to two lines, seated in and beneath the ocular conjunctiva. This growth extended away from the cornea on all sides about one-third of an inch, was pale yellow in color, moderately hard to the touch, with an irregular, knobby surface and apparently destitute of vessels. The conjunctiva was firmly adherent to this growth, and the cornea was imbedded in this wall like a watch-crystal in its frame. On being incised, it cut like brawn and the hemorrhage was very slight. Upon the sclera of each eye, between the tendons of the superior rectus and external rectus muscles, and partially covering the latter, was an extensive and extremely well-marked gummy infiltration of the sclera, very vascular, very tender to the touch, and especially painful when the eyes were turned outwards. This infiltration extended backwards symmetrically in the two eyes, but was somewhat more extensive in the right eye. The media were clear, and an ophthalmoscopic examination revealed nothing abnormal in the deeper tunics of the eyes."

Syphilitic Affections of the Cornea.

While ulceration of the cornea with loss of tissue is in non-specific cases the commonest form of disease to which this membrane is liable, in syphilis, ulceration rarely, according to some never, occurs as the direct result of the constitutional taint. When, therefore, an inflammation of this membrane does occur, it is usually in the substance of the cornea and in the form usually known as parenchymatous keratitis. And this interstitial affection again may show itself as diffuse or punctate. In these forms, moreover, it is usually the result of hereditary syphilis.

Diffuse keratitis is usually ushered in by a slight pericorneal injection and with a slight grayish opacity near the centre of, and in the substance of the cornea. The haziness gradually increases until the greater part of the cornea is involved, giving to this membrane the appearance of ground glass, especially when the epithelial layer is implicated. It is usually in

[1] American Journal of the Medical Sciences, October, 1878.

the beginning not accompanied by much pain or photophobia, though both may be present, together with abundant lachrymation, especially as the disease progresses to the deeper parts of the cornea. There is little vascularity as a rule, though, especially at the periphery, minute vessels may be descried, which, increasing in number and extent, may give, especially at a little distance, a rosy hue to the cornea. I have seen cases in which there has appeared to be an interstitial hemorrhage, so deep and close was the injection. In one case, indeed, the entire cornea was a blood-red mass, as if the bleeding had occurred into the very substance of the membrane, the epithelial layer retaining its polish. Diffuse keratitis is the form which the disease usually takes in young children, while the punctate variety appears later in life, or, at least, such has been my observation. Mr. Jonathan Hutchinson[1] has expressed the opinion, founded upon a lengthy and ably conducted series of observations, that the peculiar inflammation of the cornea, met with for the most part between the ages of three and twenty, and known by the name of "strumous corneitis,"[2] is always due to hereditary syphilis. In his attempt to establish this point Mr. Hutchinson has attached no little importance to certain peculiarities in the form, size, and color of the permanent incisor teeth, which he regards as diagnostic of inherited syphilitic taint, and which he states are all but invariably coexistent with strumous keratitis.

In describing this condition Mr. Hutchinson says: "As diagnostic of hereditary syphilis, various peculiarities are often presented by the others

Fig. 129.

"The teeth converge towards each other, are very short, have a vertical notch or cleft in their free edges, and are also very narrow from side to side at their edges, not being so wide there as their necks."

especially the canines, but *the upper central incisors are the test teeth.* When first cut these teeth are usually short, narrow from side to side at their edges and very thin. After a while a crescentic portion from their edge breaks away, leaving a broad, shallow, vertical notch which is per-

Fig. 130.

manent for some years, but between twenty and thirty usually becomes obliterated by the premature wearing down of the tooth. The two teeth often converge, and sometimes they stand widely apart. In certain in-

[1] Ophth. Hosp. Rep., vol. i, p. 229.

[2] The name "Keratitis" is much preferable to "Corneitis."

stances in which the notching is either wholly absent or but slightly marked, there is still a peculiar color ('a dirty brownish hue resembling that of bad size'[1]), and a narrow squareness of form, which are easily recognized by the practised eye."[2] The first set of teeth do not exhibit this malformation.

Since the publication of the former edition of this work, I have carefully examined into the symptoms and histories of the numerous cases of interstitial keratitis coming under my care, and have, in so many instances, been able to confirm Mr. Hutchinson's statements relative to the deformity of the teeth, and a clearly marked syphilitic taint inherited from the parents, that I can testify to the general correctness and great value of his observations, although I am not prepared to say that interstitial keratitis is always due to congenital syphilis. In some instances I have not been able to satisfy myself that the parents had been affected with this disease, but the difficulty of such inquiry is well known, and the truth often escapes detection.

It has been the custom from time to time since Mr. Hutchinson made his observations to question the validity of his views, both as to the fact of interstitial keratitis being due to hereditary syphilis and the diagnostic value of the so-called characteristic teeth. Thus it has been asserted not only in England but on the Continent, and especially in Germany, that the disease may be the result of mal-nutrition in scrofulous and rickety subjects, and it has been maintained that the malformation of the teeth is the simple arrest of development in a perverted constitution from other causes than syphilis. Thus Maunther[3] declares that "the German ophthalmologists have in no way been able to endorse the theory of Hutchinson;" while, on the other hand, Förster,[4] an eminent German authority, states at a still more recent date just the contrary, and maintains that "the view that interstitial and parenchymatous keratitis is frequently due to hereditary syphilis is constantly gaining more adherents."

It would be out of place in a work like the present to go deeply into a discussion in regard to matters about which there is so great a difference of opinion, but I may state briefly that I believe that the hereditary taint, though not the only, is still the predominating cause of interstitial keratitis. And this I consider important in a clinical point of view, for I can fully confirm Mr. Hutchinson's statement, that the most efficacious treatment of this disease in the majority of cases is by means of mild mercurials and iodide of potassium assisted by a nourishing diet, fresh air, and tonics.

Keratitis punctata differs from the diffuse in that the opacity is arranged in small circumscribed spots or points. These as a rule do not show a tendency to coalesce. Still this may occur so that the masses become large

[1] Hutchinson, on the Means of Recognizing the Subjects of Inherited Syphilis in Adult Life, Medical Times and Gaz., Lond., Sept. 11, 1858, p. 265. Syphilitic Keratitis in a Child, aged three years, London Lancet, Dec. 18, 1875.

[2] Ophth. Hosp. Rep. vol. ii, p. 96.

[3] Ziessl's Lehrbuch der Syphilis, 1875, p. 288.

[4] Handbuch der gesam. Augenheilkunde, vol. vii, p. 186, 1876.

enough to occupy a quadrant or even the half of the corneal tissue. It also differs from the diffuse in being deeper seated and usually of a deeper grayish or yellowish color.

Maunther describes a form of punctate keratitis which is worthy of notice from the fact that it would appear to be even more pathognomonic of syphilis than the ordinary keratitis punctata, and, according to my experience, rather the expression of the acquired than the hereditary.

This form consists in the corneal tissue being studded with a multitude of minute dots not larger than a pin-point. These are not, as one would be inclined at first sight to infer, on the membrane of Descemet but in the substance of the cornea itself. I have at the present moment a most beautifully marked case of this disease in a young woman of three and twenty, who, when I first saw her some three months ago, had a secondary eruption on the legs, arms, and neck. Externally nothing whatever was visible which would suggest the slightest trouble with either eye, and the only complaint which the patient made was that she had noticed accidentally that she did not see as well as formerly with her left eye. There was no pain and no lachrymation, and not the slightest injection of the conjunctiva. The cornea and anterior chamber, moreover, seemed to have their normal clearness and the iris was normal in every respect. A glance with the ophthalmoscope showed, however, the cornea to be the seat of a multitude of most minute dots, none of which were larger than a pin's point. By means of oblique illumination the most anterior of these could be seen in their real color, which was of a dingy gray or dirty white. The trouble continued without any perceptible change and without any inflammatory symptom whatever for nearly three months, when on catching cold there was some pain in the eye and a slight pericorneal injection which rapidly subsided. A vigorous antisyphilitic treatment has been pursued from the first and within the last week or two the dots have begun to disappear, these only remaining now in the central portions of the cornea.

The treatment of these syphilitic affections does not differ from that in the idiopathic form and consists in the use of atropine with protection from light by means of colored glasses, antisyphilitic remedies with a judicious administration of tonics, diet, and fresh air.

It is moreover sometimes necessary to perform paracentesis or even iridectomy.

Syphilitic Affections of the Sclera.

These, like the non-specific, may be divided into two principal classes: those affecting the superficial tissue, or episcleritis, and those affecting the interstitial layers, or parenchymatous scleritis. To these some syphilographers add a third, or scleritis gummosa, when the sclera is the seat of this specific infiltration or product. Episcleritis begins commonly as a small hyperæmic spot, usually about a line from the margin of the cornea. As the inflammation increases in extent and degree, the spot looks very much like a phlyctenula, though the coloration is more subdued, and, after

a while, assumes a violet or purple tinge. On close inspection, the conjunctiva is seen to be but little if at all implicated, and, as a rule, the new formation has the appearance of a bulging of the surface which merges gradually into the surrounding tissue, rather than a circumscribed growth, though even this may occur, so that it resembles a defined tumor the size of half a pea, or even larger. The favorite spot for the development of this localized inflammation is near the insertion of the external rectus muscle or between this and the superior rectus. Still, any part of the anterior portion of the sclera may be affected, or more parts than one, either successively or at the same time. In this case the spots may spread and then coalesce, until the greater part of the circumference near the cornea is affected.

When the inflammation is confined to the episcleral tissue, there is, as a usual thing, but little pain, lachrymation, or photophobia, though all three may be present.

The trouble is, however, apt to propagate itself to the neighboring tissues, so that the cornea, iris, and ciliary body, one or all, may become implicated. In the last case, a kerato-irido-cyclitis is produced, than which there is no condition of ocular trouble more to be dreaded, or one which will more tax, even if it does not overcome, the skill and resources of the surgeon. The implication of the cornea is usually shown by a grayish diffuse opacity corresponding to the seat of the inflammatory spot and extending usually in a triangular shape into the clear area of the cornea; the participation of the iris manifests itself by adhesions and sometimes by exudation into the papillary space; and that of the ciliary body by the usual signs of cyclitis. When the episcleritis is due to a gummy deposit, it may resolve itself gradually, which is the rule under specific remedies, or it becomes eroded at its apex, forming an excavation with more or less ragged edges, while the area is occupied by a jelly-like substance of a grayish or yellowish color; and it is more than probable that some of the infiltrations which present these appearances, and which have been described as belonging to the conjunctiva proper, have had their origin in the episcleral tissue.[1]

Rare as the above affections are, those due to parenchymatous scleritis are rarer still. That such exist, however, I think there can be no doubt. The trouble usually begins by a circum-corneal zone of injection of a very delicate rose or pink color which often, after the disease has continued a short time, passes into a violet or purplish tinge, which close inspection shows to be due, not to vascularity of the conjunctiva, but of the sclera itself. The injection gradually extends backwards until the whole anterior zone of the eye presents the delicate rosy hue mentioned above, which differs entirely from the coarser mesh-like injection of an early conjunctivitis on the one hand, or the deep red of iritis on the other. The trouble may continue for a long time in a low chronic type, without much photophobia, pain, or lachrymation, though the latter two may be present in an intense degree, and then the disease forcibly reminds one of

[1] Sturgis, Scleritis Syphilitica, Archives of Dermatology, January, 1875, p. 112.

the description of what the older writers called rheumatic ophthalmia. Strange to say, through it all the iris may not become implicated, dilating ad maximum under atropine, apparently even to an abnormal degree, as sometimes the merest possible trace of the membrane remains visible. This is due, I think, to the fact that the limbus becomes congested and slightly salient, thus encroaching upon and narrowing the area of the clear cornea. I have several times seen this affection in those who had recently recovered from a severe and protracted attack of gonorrhœa, and thus perhaps representing the analogue of the much-disputed gonorrhœal rheumatism. Here, as elsewhere, there is, of course, always a danger that the inflammation may extend itself to the neighboring tissue, and its early origin and destructive features may thus be concealed in the signs and symptoms of the participating parts. Resolution of these foci of inflammation usually occasions a localized resorption and thinning of the sclera, which shows itself by a bluish area, that may subsequently become the seat of a staphylomatous projection.

Gummy infiltration into the stroma of the tissue merely differs from the episcleral in its locality.

The following case[1] is quoted entire, as it presents so complete an example of the way in which gummy formations of the scleral tissue arise, progress, and terminate, both clinically and microscopically:—

The patient was a well-developed woman of thirty years of age, and at the time of the attack was apparently in perfect health, and without the slightest signs of a syphilitic cachexia. Five years before, she had had a chancre, for which she had been treated in the regular way. The primary lesion was followed by the usual secondary, and these in their turn by the so-called tertiary, symptoms.

Three years after inoculation, and two years before the present trouble, the patient suffered from an attack of iritis in both eyes, and they had remained "weak" ever since.

The present attack was ushered in by similar symptoms, and the belief on the part of her attending physician was that the patient was suffering from a second attack of iritis. The trouble was, however, confined entirely to the left eye. The injection of this eye gradually increased for about a week or ten days, unaccompanied, however, by much pain or loss of vision. The patient was, however, shortly after awakened at night by a sudden and very violent attack of pain, with a very rapid loss of sight, which in a day or two resulted in total blindness. Becoming alarmed, the patient presented herself at the Eye and Ear Infirmary, where I saw her for the first time, about two weeks after the beginning of the attack.

The right eye at this time appeared to be perfectly normal in every respect. The left was very much injected, and the conjunctiva, besides being very much inflamed, seemed, in conjunction with the sub-conjunctival tissue, to be thickened and œdematous, especially to the outer side of the eye. The anterior chamber was filled by a yellowish exudation, so that the iris was concealed from view. The cornea was, however, free from any ulcerative process, and the epithelial layer was intact. There was no perception of light.

[1] E. G. Loring and H. C. Exo, Trans. Amer. Ophth. Soc., 1874, p. 174.

As the patient was suffering violent pain in and around the eye, and as she would not permit the eye to be removed without the consent of her friends, it was decided to do a free paracentesis. This was done with a Graefe's knife, a free incision being made in the lower margin of the cornea. The anterior chamber was thoroughly evacuated. This was followed by a great relief of pain.

The wound, however, gradually closed, and with its closure the pain returned, and the exudation began to reappear in the anterior chamber. The other eye (the right), which up to that time had shown no trace of any trouble, began now to be somewhat sensitive to light, and to show other symptoms which seemed to be of a sympathetic nature. Enucleation was therefore performed, and the eye given to Dr. Eno, whose description of the examination will be found below.

The enucleation of the left was followed by an amelioration of the condition of the right eye, so far as the dread of light was concerned; but four days after the operation a small circumscribed elevation began to make itself apparent in the line of the insertion of the rectus externus, but somewhat closer to the cornea. This had the appearance of a circumscribed elevation of the sub-conjunctival tissue, the conjunctiva proper being but slightly injected just over it. This injection of the conjunctiva proper gradually increased, following the line of the rectus externus muscle, till, within two or three days, it had spread out in a fan- or cone-like shape, the base of which was toward the external canthus, and the apex, sharply defined, towards the cornea.

At this time a serous exudation underneath the conjunctiva began to make its appearance, being limited to the external and lower part of the eye. The injection of the eyeball gradually extended round the cornea, above and below, till it had included the whole eye. Still, the region over and around the tendon of the externus was the seat of the most marked symptoms of the trouble, and from the serous exudation it was supposed that something was interfering with the circulation of both the superficial and deeper parts of this portion of the eye. At this time a grayish, spongy exudation began to be apparent over that part of the iris opposite the insertion of the externus rectus. This extended itself pretty rapidly in a circuit round the upper portion of the iris, so that on the day after it had been first noticed the exudation had extended over about two-thirds of the entire membrane, leaving the outer and lower parts unaffected. This exudation had a very peculiar appearance, looking more like mould of a grayish-yellow color than anything I can compare it to. It projected over the edge of the iris into the pupillary space; and vision, which had hitherto remained good, now sank rapidly, so that the patient could barely count fingers at four feet. On the following day this semi-transparent exudation had extended all round the iris and was occupying the greater part of the anterior chamber. Through it the iris could be dimly seen, of a dull velvety hue. Vision was so bad that fingers could be barely counted at a foot and a half. The pupil was contracted, though not markedly so, and there were no adhesions to the lens, as was afterwards shown by the free dilatation of the pupil under atropine. Specific treatment had from the first been pushed vigorously without apparently checking the progress of the disease, and great fears were entertained that the eye would follow in the same course as its fellow.

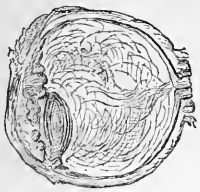
On the following day, however, the exudation began to be absorbed, and disappeared so rapidly that within thirty-six hours after its commencement

the anterior chamber was entirely free from it. Vision immediately rose and the eye made a steady and rapid recovery.

The left eye was placed in Müller's fluid immediately after enucleation. The eyeball appeared normal in size and shape, with the exception of a very considerable thickening of the episcleral tissue at the outer side of the cornea, and over the insertion of the rectus externus. The cornea was opaque, and there was a large cicatrix, the result of the previous opening, in the lower portion of it. At the end of two weeks the eye was removed from Müller's fluid, and opened by a section passing nearly through its horizontal meridian. The antero-posterior diameter of the eye measured 26 mm., the transverse diameter 25 mm. As seen in this section, the episcleral tumor above mentioned is about $1\frac{1}{2}$ mm. in thickness, and extends back nearly to the equator of the eyeball, inclosing in its substance the tendon of the rectus externus. The anterior chamber is filled with a mass of yellow exudation completely blocking up the pupil. The iris and ciliary body are enormously increased in size, but especially at the outer portion of the eye corresponding to the external swelling; here the iris measures $1\frac{1}{2}$ mm., and the ciliary body 3–4 mm. in thickness; here also the substance of the iris and ciliary body seems to be continuous with the mass of exudation in the anterior chamber, the ligamentum pectinatum iridis being broken through. The ciliary tumor is of quite firm consistence and yellowish in color. It extends backwards to the region of the ora serrata, where it gradually is lost in the choroid, which appears to be but slightly increased in thickness.

The lens is transparent and normal in appearance, but pushed over to the nasal side by the swelling of the ciliary body on the opposite side of the eye. The vitreous is cloudy. The retina and choroid are in place. The sclera is normal in appearance, and may be seen as a white band separating the intra- from the extra-ocular tumor. (Fig. 131.)

Fig. 131.



Section of eyeball. Natural size.

Microscopic examination shows that the episcleral tumor is due to an infiltration of the episcleral tissue, with a multitude of round cells. The cells are distributed between the fibres of the connective tissue, and the bloodvessels of this region are enlarged and engorged.

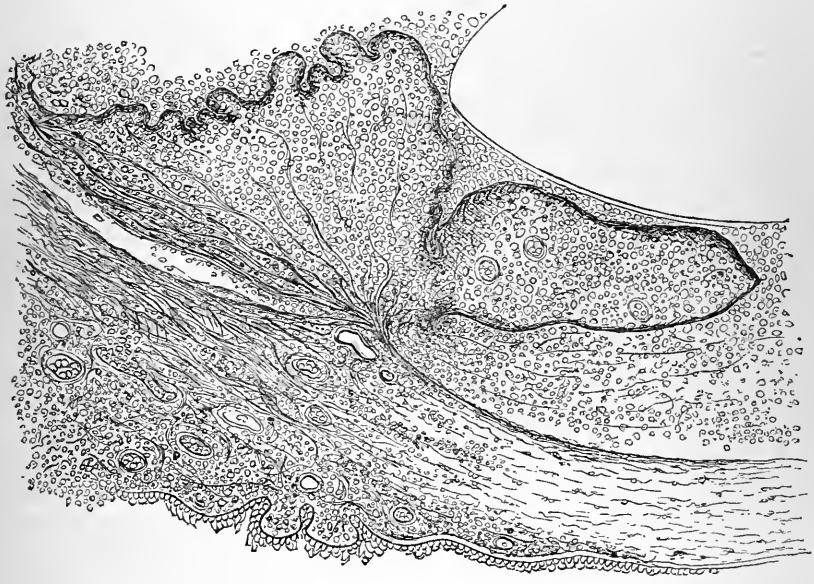
At the limbus a collection of cells is so disposed as to separate the lam. elast. ant. with the superjacent epithelium from the corneal tissue for a considerable distance. The rest of the cornea presents the appearances of moderate keratitis. The anterior chamber is filled with a mass composed of round cells and coagulated fibrine. The outer layers of the sclera are invaded by the cell-growth, and throughout its whole thickness collections of round cells may be seen lying between the bundles of fibrous tissue.

Thin meridional sections were made through the centre of the ciliary tumor, and the iris and ciliary body were found to be infiltrated with a great quantity of the same small round cells as exist in the episcleral tumor. (Fig. 132.)

In that portion of the ciliary body near the sclera, the cells are distributed between the bundles of muscular fibres; and as we pass toward the inner surface of the ciliary body, they become more numerous, separating the muscular bundles more and more widely, until, at the inner margin, we can distinguish only a mass of cells thickly packed together and tra-

versed by an occasional capillary vessel. These cells are identical in appearance with the so-called exudation, or lymphoid cells, being about the size of a white blood-corpuscle and containing a granular nucleus. In no portion of the tumor do they present the appearances of granular or fatty degeneration.

Fig. 132.



Section through ciliary region, showing ciliary tumor and episcleral tumor, etc.

In the iris the cells are very abundant, and in those portions most affected it is scarcely possible to recognize any element of normal iris tissue, except the pigment. The inner and under surface of the ciliary body and iris are also thickly covered with masses of round cells. The vitreous is filled with round cells and coagulated fibrine.

The retina and choroid of the posterior portion of the eye were examined, but presented no unusual appearances beyond those of an inflammatory condition.

In view of the clinical history and pathological appearances of this case it must be regarded as one not merely of irido-cyclitis syphilitica, but also of syphilitic gumma of the ciliary body and iris. For though the lesions do not differ essentially in kind from those of a simple inflammatory origin, still their intensity and circumscribed character together with the formation of a distinct tumor justify the name *gumma*, notwithstanding the absence of retrogressive metamorphosis.

The observations of three similar cases have been recorded, one by Von Hippel (Graefe's A. f. O. viii, p. 288), two by F. Delafield (Transactions of the Ophthalmological Society, 1871); but in all these cases the disease was more advanced and the changes more extensive, involving all the tissues of the eyeball.

Syphilitic Iritis.

Of all the affections of the eye there is none which, taken as a whole, is more serious in its immediate effects, or more disastrous in its subsequent results, than iritis.

It is estimated from carefully prepared statistics, that over one-fourth of the cases of total blindness proceed directly from inflammation of this membrane, and when it is taken into consideration that between sixty and seventy[1] per cent. of all cases of iritis are due to syphilitic infection, the important rôle which the specific virus plays in this class of diseases becomes at once manifest, and strongly emphasizes the fact, that, since the integrity of one of the most important organs of the human frame is involved, syphilitic iritis should be familiar to every student of venereal, in order that he may early be able to recognize and treat it.

Let me premise by saying that we have no certain means of distinguishing syphilitic iritis from that dependent upon injury, rheumatism, or other causes; although there are certain symptoms, presently to be described, which, when observed, render the former origin probable. Moreover, the majority of cases of iritis are doubtless due to syphilitic taint, so that the existence of this disease should always excite suspicion, and lead the surgeon to make a thorough examination of the present condition and past history of the patient.

In accordance with the teachings of pathological anatomy modern ophthalmologists have divided inflammation of the iris in general into three classes.

(1) Simple or plastic iritis.

(2) Serous iritis.

(3) Parenchymatous or suppurative iritis.

It is to this last division that the so-called syphilitic iritis as a rule belongs; still, as the disease may, and often does, assume either of the above forms, a short description of each will be given, omitting the more minute details which are chiefly of interest to the ophthalmologist, and which are apt to confuse the mind of one who has not made a special study of the eye.

Simple or Plastic Iritis.—This form is characterized by congestion of the membrane, but differs from simple hyperæmia of the iris by the production of an exudation either from the pupillary border, surface, or stroma, of the iris, and in some cases by an increase in the elements of the connective tissue.

This variety of the disease may assume a very mild character, presenting but a very moderate degree of subconjunctival injection, and accompanied with but little discoloration of the iris, pain, or dread of light. Indeed, it may happen that the entire trouble escapes detection till the use of atropine brings to light the existence of one or more adhesions of the

[1] My friend, Dr. Henry D. Noyes, of the Infirmary, informs me that, according to statistics collected and reported in his lectures by Prof. Graefe, about sixty per cent. of all cases of iritis occur in persons affected with syphilis. See also Wecker, Études ophthal., tome i, p. 394.

iris to the anterior capsule of the lens, producing under dilatation the characteristic irregularity of the pupil.

More frequently, however, there is injection of the conjunctival and sclerotic vessels, giving the eye a red appearance. But unnatural redness is observed in simple conjunctivitis; and how shall the two be distinguished? In the first place, by depressing the lower lid, and, at the same time, telling the patient to look upwards; whereby the inferior palpebral fold will be exposed. In most cases of conjunctivitis, the greatest amount of injection will be found remote from the cornea; while in iritis the contrary is the case; the redness is almost entirely confined to a circle round the cornea, called the "sclerotic zone," and the more distant portions of the white of the eye remain clear. If the eye has been congested by the injudicious application of poultices, alum curds, etc., this difference will be less or not at all apparent. Again, observe the character of the injection: some of the conjunctival vessels are distended, and may be recognized by their brick-red color, large size, tortuous course (chiefly over the recti muscles), and their mobility, if the conjunctiva, by means of slight pressure with the finger external to the lid, be made to slide over the sclerotica; but beneath these brick-red vessels a second layer is discovered on close examination, composed of others radiating from the margin of the cornea, much finer than the preceding, straight, and of a pinkish hue, and which are seen to remain stationary through the meshes of the sliding network of conjunctival vessels. It is these vessels which constitute the sclerotic zone, met with not only in iritis, but in other internal inflammations of the eye.

Next observe the condition of the iris and pupil, and compare them with those of the opposite and sound eye. The affected iris is seen to have lost its natural brilliancy; its minute texture is less apparent; its surface covered over with a thin layer of fibrin; and its color changed. In persons with blue eyes it assumes a yellowish-green hue; in others, the change is less marked but may generally be detected. Close the two eyes with the thumb of each hand, the fingers resting for support upon the temples, and alternately open one and then the other; and the iris of the affected eye will be found to be sluggish in its motions or quite immovable.

At an early stage of the disease, the pupil assumes a dull appearance, and is less clear and bright than in the normal condition, owing sometimes to a slight turbidity in the aqueous, and sometimes to a delicate film of exudation from the margin of the iris over the anterior capsule. I have, moreover, sometimes thought that the capsule itself or the underlying epithelial cell layer became implicated, though of this, so far, I have had no anatomical proof. The pupil may also become irregular in shape. This irregularity of outline, due to adhesions between its margin and the capsule of the lens or to exudation into its substance, becomes more marked as the disease progresses, and is especially evident if the pupil be dilated by belladonna or atropine, when its margin is found to be scalloped, owing to its being attached at some points and drawn out in others. In some cases the adhesions become continuous around the whole circumference, and the capsule of the lens is covered with a layer of lymph which completely blocks up the pupil.

Serous Iritis.—This is distinguished from the simple variety by the fact that the exudation is of a serous, instead of a plastic nature, and is due to a hypersecretion of slightly turbid aqueous humor, which produces, as a rule, an increase in the intraocular tension.

On this account the anterior chamber becomes deepened, and the pupil, instead of being contracted, moderately dilated, sometimes markedly so. This is probably due to direct pressure by the contents of the globe upon the nerves of the iris.

The circumcorneal injection is here much less than in the plastic form, or it may be entirely wanting. Besides the aqueous humor becoming slightly cloudy, the entire posterior surface of the cornea appears oftentimes as if covered with a delicate film, and minute punctated opacities make their appearances upon the internal lining membrane (membrane of Descemet). These spots owe their existence, at least in the beginning of the disease, to the precipitation upon the membrane of minute particles which are held in suspension in the troubled aqueous humor, and which often disappear when the anterior chamber is evacuated by paracentesis corneæ. Later in the disease, however, they assume a somewhat larger size, and are then permanent, being due to a morbid change in the epithelium of the membrane itself.

Sometimes these punctated spots are either entirely absent or are so slight as to escape any but a most careful examination. In this case the predominant symptoms, viz., slight discoloration, and dilatation of the iris, and trifling cloudiness of the aqueous humor, are very easily overlooked by an inattentive observer, and the disease is allowed to progress until it extends itself to the ciliary body and choroid, gradually involving the deeper structures, and the eye falls step by step into a state of low chronic glaucoma.

In this form of iritis it seldom happens that there are any adhesions of the iris to the capsule of the lens.

I have been particular in giving the principal symptoms of this peculiar form of iritis, both on account of its insidious nature, which renders it so liable to escape detection, and from the fact that it has been alleged to be oftentimes the product of hereditary syphilis.

Parenchymatous or Suppurative Iritis.—This form of iritis is characterized by a deep-seated inflammation, affecting the stroma of the iris, and giving rise to a considerable swelling of the membrane, and causing an increase in its cellular tissue elements. Owing to this fact the surface of the iris becomes elevated in different parts, and vessels, sometimes of considerable size, from arrest in their circulation, make their appearance on the surface of the membrane. These elevations are almost entirely composed of cellular tissue, and usually contain a number of vessels of new formation.

It is in this form of iritis that we meet most frequently with extensive adhesions between the margin of the pupil and the lens, together with a complete loss of contractility of the iris, and when these adhesions once take place they are far more obstinate in resisting the effect of atropine

than those of simple idiopathic iritis. Here, too, the production of pus in the anterior chamber is much more rapid and abundant.

The so-called syphilitic iritis of various authors is, strictly speaking, only a variety of parenchymatous iritis, its distinguishing characteristic being that the inflammatory action is more circumscribed, confining itself usually to one part of the iris, while the neighboring portions preserve, for a considerable time, at least, a nearly perfectly normal condition. In the same way it is less apt to propagate itself to the deeper lying membranes. It is here that we find those peculiar brownish or yellowish elevations upon the surface of the iris, which generally, though not always, occur on its inner ring near the margin of the pupil.

These "tubercles" or "condylomata," as they are called, gradually increase in size, and sometimes become organized and covered with a network of small vessels. They vary exceedingly in their dimensions, sometimes acquiring a growth sufficient to occupy the quarter or even one-half or more of the entire iris, and if then situated near the external border of the membrane they may cause projection of the cornea or sclerotic.

It has been demonstrated by Colberg[1] that the composition of "tubercles" is identical with that of gummy tumors, as described by Virchow.[2]

The presence of these tubercles affords a very strong probability, if not an absolute certainty, of syphilitic taint. Of sixty cases of iritic tubercle collected by Graefe, in only two was there no proof of syphilitic infection.[3]

Such evidence as this, from such a source, must be considered almost conclusive that there is a specific form of iritis differing from that of the idiopathic form, although such has been denied. So far as my own personal experience goes, I have never seen a case of "condyloma" of the iris which could not be traced to a syphilitic source. I have, however, seen one case in a non-syphilitic subject which might have been, and, indeed was, taken for a "tubercle." The trouble began and continued in its course precisely like a "tubercle," with all the signs and symptoms of iritis, until it had reached a certain stage, when it ruptured, sending out into the anterior chamber a feathery, purulent exudation, like the tail of a comet. After a careful consideration and observation of the case, I could attribute the appearances only to a papule in the tissues of the iris. Dr. Kipp has also reported a similar case in a syphilitic person.

When syphilitic iritis is early and successfully treated, the iris resumes its normal mobility and color, and the eye is restored to its original integrity. But in weak and cachectic subjects and in the absence of appropriate treatment, the changes which take place are more or less permanent. The tubercles are absorbed, but the iris never regains its original color and consistency; it is thinned and friable; and its adhesions to the capsule, unless stretched or broken by the persevering use of mydriatics, permanently impede the motions of the pupil. As a general rule, the pain

[1] Archiv für Ophth., t. viii, p. 288.

[2] Archiv für path. Anat., No. 15, p. 265.

[3] Notes of Graefe's Lectures, for which I am indebted to Dr. Noyes.

and photophobia in syphilitic iritis are much less than in the other forms of the disease. The patient may merely complain of a sense of fulness and uneasiness in the globe, and shrink from exposure to a strong light only. In other cases, severe pain is felt in the ball of the eye and in the temporal and supra-orbital regions, and the least ray of light causes the most intense suffering; the variations between these two extremes are numerous. There is almost invariably some dimness of vision which is due not only to the changes in the capsule of the lens, but also to those in the deeper structures of the eye which are always involved to a greater or less extent.

Iritis usually presents such marked symptoms that it is easily recognized by any competent person; and yet every ophthalmic surgeon must have met with not unfrequent instances in which through carelessness or ignorance it has been mistaken for simple conjunctivitis and treated solely with collyria of nitrate of silver, sulphate of zinc, etc. A few cases, however, are met with in which the most experienced surgeon may for a day or two fail to make a diagnosis. This generally occurs at the commencement of the disease, before any marked changes have taken place in the iris, and especially when the conjunctival vessels have been congested by the application of poultices. Impairment of vision will afford valuable aid to the diagnosis, and the instillation of a drop of a solution of atropine will soon decide the question, by showing irregularity of the pupil if the case be one of iritis.

It is well in these doubtful cases to use a very weak solution, as then the inconvenience of a lengthy mydriasis is avoided, in case the trouble should prove to be conjunctivitis and not iritis. One of Moore and Savory's atropine wafers divided into two or even four pieces, each piece then equalling only $\frac{1}{8000}$ of a grain, is sufficient. If the iris is not the seat of the trouble, it will dilate in less than an hour, and the next day the dilatation will have passed off. In place of a wafer, a solution may be used which can be readily made by putting one drop of the ordinary solution (gr. ij to ℥j) into half an ounce of water. One drop of this equals $\frac{1}{2000}$ of a grain.

I have already remarked that the diagnosis of syphilitic iritis, although rendered highly probable by the absence of severe pain and photophobia, and the presence of tubercles upon the iris, can only be satisfactorily established by the history of the case or the coexistence of undoubted syphilitic symptoms. I would also add that the presence of any general eruption upon the body leaves scarcely room to doubt that a coexisting iritis is of specific origin, since this disease, when due to other causes, is very rarely accompanied by affections of the skin. The practical surgeon, when called to treat a case of iritis, almost instinctively turns to the arms, chest, and abdomen, to look for traces of one of the syphilides, to the throat for mucous patches, and to the neck for engorged ganglia. As noticed by Carmichael, the accompanying eruption is in most cases papular.

In regard to the particular period of the general trouble in which specific iritis makes its appearance, no precise rule can be laid down; still, the form which is most common and most worthy of our attention is to be

ranked among the secondary symptoms of syphilis. Without being able to furnish any statistics from which the exact time of its development may be determined, yet I have often been struck with the fact that, when no mercury had been administered, this occurred from four to six months after contagion. In a number of instances, iritis has been the first general symptom which has induced patients to seek surgical advice, but careful inquiry has never failed to show that other symptoms, as alopecia, engorgement of the cervical ganglia, mucous patches, erythema, or papules, had preceded it, although regarded at the time as of no importance.

Wecker observes[1] that the specific form of iritis occurs more frequently when the disease has been a long time in developing itself, than when it has pursued a rapid course.

There is, however, another form of iritis which is met with chiefly as a symptom of tertiary syphilis, and differs from the preceding mostly by the insidious manner in which it attacks the eye, and by its greater persistency. There is almost a complete absence of pain and photophobia; the iris becomes infiltrated and covered with exudation and has a peculiar swollen and velvety appearance; numerous adhesions take place between its pupillary margin and the capsule of the lens; and the irregular pupil is blocked up with an effusion of lymph, upon which small, black, uveal deposits may often be detected. Both eyes are generally attacked in succession; the disease is exceedingly persistent, and with difficulty controlled by treatment; and the danger of complete loss of sight from obstruction of the pupil is very great. The deeper structures of the eye appear to be implicated to a less extent than in the acute form.

Among the absurdities of medical belief that have had their day is to be reckoned the idea that mercury may give rise to iritis—a disease which is often met with when no specific remedy has been employed, and which can in no way be better controlled than by the judicious use of mercurials; indeed, the surgeon rarely has an opportunity of witnessing a more remarkable effect of treatment than is seen in the absorption of lymph, the disappearance of the abnormal injection, and the restoration of the iris to its original condition, which take place under the administration of mercury in acute syphilitic iritis. It is hardly necessary to say that an agent of so much good is capable of doing a great amount of harm, and that I am here speaking of its use and not of its abuse.

The plan of treatment of the acute form of iritis which I have found almost uniformly successful, has, for its objects—

1. To bring the system under the influence of mercurials as speedily as possible without injury to the general health, and without inducing salivation.

2. In a depressed state of the system, to combine tonics with mercurials, or to employ the former in connection with iodide of potassium instead of the latter.

3. To keep the pupil constantly dilated by means of atropine, and thus prevent adhesions between the iris and capsule of the lens.

[1] Études ophth., t. i, p. 394.

4. To relieve pain and regulate the general hygienic management of the case.

The subjects of these different heads will be somewhat briefly considered, in view of the fact that most of them have been included in what has been said of the general treatment of syphilis.

In persons of a fair state of health, no form of mercurial is preferable to the ordinary pill of calomel and opium (one grain of the former to a quarter or half a grain of the latter) administered three times a day—an hour after meals. When the general condition of the system is depressed, a tonic should be combined with the mercurial; and the following formulæ are very serviceable, especially when the patients are of the poorer class, and under unfavorable hygienic influences:—

℞. Hydrargyri cum Cretâ, gr. ij 12
Quiniæ Sulphat., gr. j 06
M. et ft. plv.

℞. Hydrargyri cum Cretâ, gr. ij 12
Quiniæ Sulphatis, gr. j 06
Pulveris Doveri, gr. iij 18
M. et ft. plv.

The latter formula containing Dover's powder is to be preferred when the pain is severe. The frequency of the administration of these powders is to be determined by the strength and general condition of the patient. Under ordinary circumstances, one may be given three times a day; or, when the system is much depressed, one morning and night, with one or two grains of quinine in addition twice during the day; and when thus guarded by quinine, mercury may be employed in nearly every case of this disease. It is well to prolong the use of this remedy until evidence of its action upon the mouth is perceptible, but not to continue it until salivation is produced. So soon as the gums are in the slightest degree affected, the mercurial should be suspended, and chlorate of potash employed, while at the same time the tonic may be continued.

The opposite eye will sometimes be attacked while the patient is taking mercury for the one first affected, and, in rare instances, even during the existence of ptyalism; just as a new eruption will occasionally appear upon the skin while undergoing treatment for an old one.

It will be observed that the above mode of employing mercury in combination with quinine, as practised for many years at the New York Eye Infirmary, is widely different from the exclusive use of this mineral, which has been recommended by some authors. It would be out of place in the present work to enter into a discussion of the comparative merits of the two methods, and I must, therefore, content myself with expressing a strong preference for the one here proposed; merely adding, that it is equally as true of iritis, as of other syphilitic manifestations, that the administration of mercury, without regard to the condition of the patient, is quite as likely to do harm as to do good.

It is of the first importance in the treatment of iritis to maintain the pupil in a constant state of dilatation, so as to remove the iris as far as

possible from the convex surface of the lens, and prevent adhesions or closure of the pupil with lymph. For this purpose, instillations of a solution of atropine are far preferable to extract of belladonna smeared upon the brow. In addition to its power of dilating the pupil, atropine is a most valuable sedative—a rare combination in the same remedy. Two grains of the neutral sulphate to the ounce of distilled water, is the formula which I commonly employ. This solution is best applied to the inner canthus by means of an eye-pipette or a camel's-hair brush; in default of which, the patient's head may be thrown back, and a small portion of the fluid be poured upon the concavity upon the side of the nose, when some of it may readily be made to flow between the lids. If the case be seen at the outset, before the motions of the iris are impeded by an infiltration of lymph, two or three times a day will be sufficiently often to use the drops. In the acute stage of iritis, some authors advise us entirely to abstain from the use of atropine and belladonna, which have but little power of influencing the pupil after effusion has taken place, and which, it is said, may "irritate and tease the iris, and cause pain."[1] My own experience leads me to believe that these fears are groundless. Instead of aggravating, I believe that atropine greatly relieves, the pain and irritation, and although its immediate action upon the pupil is not perceptible, yet it gradually stretches or breaks down the adhesions already formed, and thus assists the iris in recovering its dilatability; hence I am in the habit of increasing the frequency of the instillations, during the acute stage, to three or four times a day, and in case the iris is still obstinate in yielding, it is advisable to increase the strength of the solution to four or five grains to the ounce of water, and to instil a drop into the eye every five minutes for twenty minutes or half an hour at a time, repeating this method of application three or four times a day. Care should be taken, however, that the atropine, some of which gains the pharynx through the lachrymal and nasal passages, does not produce its physiological effects upon the general system.

Very recently a new mydriatic, Duboisine, has come into use. It has the same effect as atropine, though it is somewhat more powerful. It is claimed that it is less apt to produce the poisoning of the circumorbital skin, and that it may be used when this has been occasioned by atropine. My own experience with it, however, does not support this claim, for, in several instances, when the poisoning had been once produced, it was maintained by Duboisine just as it is by atropine. It is well, however, in those cases which promise to be protracted, to use the drugs alternately.

Should the iris refuse to yield even after this vigorous use of atropine, the action of the drug can often be induced by decreasing the tension of the eye, through the application of leeches to the temple, or by the evacuation of the anterior chamber by paracentesis corneæ.

Venesection is never required in syphilitic iritis, though local depletion by means of cups and leeches is often advisable in those cases in robust

[1] Critchett, Lectures on Diseases of the Eye, London Lancet, Am. ed., March, 1855, p. 216.

subjects, where the pain is very severe; and when this assumes a neuralgic character, frequent fomentation of the eye and surrounding parts with water, as hot as can be borne, often gives great relief. Here, too, a subcutaneous injection of morphia in the region of the temple often stops at once a paroxysm of pain which then does not show itself again, or at least not in its former violence. After the acute stage has passed, counter-irritation may be effected by painting the brow with the strong tincture of iodine. This remedy is, however, not as much employed as formerly.

It is highly important that the patient should obtain sleep, for which purpose ten grains of Dover's powder may be given at bedtime, and repeated if necessary. In many cases, however, frictions upon the brow and temple at bedtime of mercurial ointment, with the addition of powdered opium (ung. hydrarg. ʒj, plv. opii ʒj) will suffice to allay pain and procure sleep.

In this, as in nearly all affections of the eye, the surgeon has to contend with the deeply-rooted prejudices of the masses in favor of poultices of bread and milk, tea leaves, alum curds, raw oysters, pieces of pork, *et id genus omne*. Not only should all such vile applications be put far away, but the eye should not be tied up with handkerchiefs or cloths in any manner. In women, the best protection against the strong light is a veil; in men, a pasteboard shade will answer the same purpose.

In unfavorable weather, or in unusually severe cases of iritis, the patient should be confined to the house, or even to his room, which should be shaded but not darkened. In most cases, however, when the weather is fair, it is desirable that the patient should pass a portion of the day out of doors, in the early morning or evening, if the intolerance of light be excessive, and with the eyes protected in the manner above directed, or better still, by a pair of tinted glasses of the kind which is known at the opticians' as "coquilles," the color of which should be some shade of blue or London smoke, never green. Photophobia and irritability of the eye will be aggravated by confinement to a dark room.

The diet must be proportioned to the general condition of the system. Robust subjects should take but a small quantity of light food; while the cachectic require an abundant supply of nourishment, and, it may be, stimulants. Proper attention should also be paid to the digestive organs, and a daily evacuation of the bowels secured.

The chronic form of iritis met with in tertiary syphilis most frequently occurs in persons whose constitution is enfeebled, and by whom mercury is poorly tolerated; but when properly guarded by tonics, this mineral may still, in many cases, be used with marked benefit; in others we are obliged to resort to iodide of potassium, until by every available means the general health is restored. Mercurial inunction or fumigation may often be employed, when mercury by the mouth cannot be borne. In these cases one-half or even a drachm of the oleate may be rubbed into the soles of the feet alternately, or under the armpits each night.

Such being the therapeutical remedies which experience thus far has shown us to be the most beneficial in the treatment of syphilitic iritis, two

others, belonging properly to the domain of surgery, ought to be briefly considered, or at least mentioned, here. I allude to paracentesis corneæ and iridectomy.

If in spite of all our efforts at medication the aqueous humor becomes very cloudy, or the pain increases, or the tension of the eyeball becomes augmented, with a corresponding decrease of the amount of vision and contraction of the visual field—or if a considerable collection of pus takes place into the anterior chamber—then a paracentesis should be performed and repeated several times, if necessary; and especially should this be done in the last mentioned condition, for of all the remedies which we possess against the formation and increase of hypopyon none is more efficacious than this.

Should, however, the disease still steadily progress, and the above symptoms increase in severity, and give evidence that the inflammatory action runs in danger of seriously involving the deeper structures of the eye, then an iridectomy should be performed at once, for it often happens that an inflammation which has resisted all other agents quickly subsides after this operation. The above is applicable to all forms of iritis.

For a more detailed description of these two operations, as well as of those intended for the relief of closure of the pupil from the effects of iritis, I must refer the reader to works upon Ophthalmic Surgery, merely remarking that these operations require considerable delicacy of manipulation, and if the general practitioner feels that he does not, from want of practice, possess the requisite technical skill, then it is his duty to obtain the services of some one who has made these matters a special study.

Infantile Iritis.—An extremely interesting form of iritis is met with in infants affected with hereditary syphilis. It is a rare disease, but probably exists in many instances in which it is overlooked.

Mr. Hutchinson deduces the following conclusions from a series of 21 cases :—[1]

1. That the subjects of infantile iritis are much more frequently of the female than the male sex.

2. That syphilitic infants are most liable to suffer from iritis at about the age of five months.

3. That syphilitic iritis in infants is often symmetrical, but quite as frequently not so.

4. That iritis, as it occurs in infants, is seldom complicated, and is attended by but few of the more severe symptoms which characterize the disease in the adult. Haziness of the cornea and photophobia, which are common in adults, are rare in infants, in whom there is also but little pain and sclerotic injection.

5. Notwithstanding the ill-characterized phenomena of acute inflammation, the effusion of lymph is usually very free, and the danger of occlusion of the pupil great.

[1] Med. Times and Gaz., July 14, 1860; also Ophthalmic Hospital Reports, vol. viii, p. 217, 1875.

6. Mercurial treatment is most signally efficacious in curing the disease, and, if recent, in procuring the complete absorption of the effused lymph.

7. Mercurial treatment previously adopted does not prevent the occurrence of this form of iritis.

8. The subjects of infantile iritis, though often puny and cachectic, are also often apparently in good health.

9. Infants suffering from iritis almost always show one or another of the well-recognized symptoms of hereditary taint.

10. Most of those who suffer from syphilitic iritis are infants born within a short period of the date of the primary disease in their parents. This accords with what is observed in the iritis of adults, which, in a great majority of instances, is a secondary and not a tertiary symptom.

I have seen only one instance of this affection in an infant at the Infirmary, who was not brought a second time, and whose case I was therefore unable to follow out. I once had under my charge a case of double chronic iritis in a boy aged 10, affected also with engorgement of the cervical ganglia, who, as reported by his father, was said, by the attending physician (Dr. G. L. Bedford), to have contracted syphilis from his wet-nurse. I may mention incidentally, that his teeth were generally misshapen, and that one of his upper incisors was completely perforated by a small hole about one-third of its length from the lower margin.

Spongy Iritis.—Under this title some ophthalmologists have of late years described a form of iritis which consists of a gelatinous, spongy exudation into the anterior chamber from the surface of the iris. This has been claimed to be due to syphilis. It has however no pathognomonic significance, and may occur in the idiopathic form, or from simple traumatism.[1] The manner in which it is formed, and the appearances which it presents, have already been described at length in speaking of episcleritis.

Affections of the Lens.

So far the lens has never been observed to be primarily the seat of any syphilitic inflammation or product. Secondary changes in the capsule and lenticular substance, in which the lens becomes either partially or wholly cataractous, are common enough. The only relief from these is surgical, and may consist either in the formation of a new pupil or in extraction, and I am inclined to believe from my own experience, that these cases of cataract with numerous adhesions, even to the extent of total synechia, do not offer so bad a prognosis as is commonly supposed.

Affections of the Ciliary Body.

Inflammations of the ciliary body, or cyclitis, which are not due to extension of the morbid process from the iris on the one hand, and the choroid

[1] Dr. Gruening, Archiv Ophth. and Otol., vol. iii, p. 1, 1873.

on the other, are extremely rare. Syphilitic cyclitis, like the non-specific, shows itself by a deep-lying, partial or total, pericorneal injection of a livid color, which is usually more intense in one particular spot, and, as a rule, at the upper portion, though it may be in any part, of the scleral zone. Sometimes more than one of these foci exist at the same time. There is usually a peculiar retraction of the iris opposite the inflammatory centre or centres, which is then useful as a diagnostic mark of the trouble being limited to the ciliary body, for, if the iris is implicated, the contraction of the pupil conceals this peculiarity in the shape of the iris. Here, as elsewhere in the areal tract, the only distinctive mark of the syphilitic taint is the characteristic gummata. The manner in which these are formed has already been detailed with a drawing of the microscopical appearances, under the subject of Episcleritis, and need not be dwelt on further in this place. The diagnosis of these troubles is oftentimes somewhat speculative, as, from the position of the ciliary body, these affections do not lie open to either direct inspection or that of the ophthalmoscope. Virchow[1] was however, fortunate enough to see a gummy tumor of the ciliary body, which ophthalmoscopically and by oblique light was seen and taken by others for a sarcoma. That syphilis was the cause of the tumor was demonstrated by the fact that it disappeared under specific treatment.

Choroiditis.

Choroidal affections, like those of the iris, have been divided into three principal classes.

(1) *Plastic* (exudativa, disseminata) *choroiditis.*

(2) *Serous choroiditis.*

(3) *Parenchymatous* (suppurative) *choroiditis.*

It must be admitted that the distinctions between these various forms cannot be drawn, either pathologically or clinically, so closely as those of iritis; still, as they are based on anatomical research, however meagre, they are preferable to any classification of a merely arbitrary character, and will, therefore, be retained here; inasmuch as they may all be the product of syphilitic infection, a short description of each will be given.

Plastic choroiditis, or more properly speaking choroiditis exudativa, is characterized by the production of an exudation upon the surface or in the substance of the choroid. This exudation manifests itself, when seen by the ophthalmoscope, by the presence at the bottom of the eye of certain circumscribed spots or patches, varying greatly as to number, shape, and size. When freshly deposited they are of a yellowish-white or pale straw color, and give the appearance of having been flecked on to the membrane, the pigment epithelium preserving, as a general rule, a perfectly normal aspect. These spots entirely conceal from view the subjacent choroid, so that the epithelial layer together with the deeper lying vascular tunics are completely hidden from sight; while, on the contrary, the retinal vessels,

[1] Jahresbericht der Ophth., 1872, p. 307.

which as a rule run over the patches unimpeded in their course, are brought strongly in view through contrast, and clearly prove the trouble to be in the deeper seated membrane.

These spots of exudation may be entirely absorbed, and leave but little or no trace of their former existence, but usually they pass to a secondary or atrophic stage, in which, although the exudation itself disappears, the underlying and surrounding tissue becomes implicated. On this account the substance of the choroid itself undergoes atrophic changes, permitting the sclera, on account of the former becoming thinned, to show through; thus giving to what were formerly straw-colored spots a glistening white appearance. These atrophic spots may be further distinguished from those due to simple exudation by the fact that single choroidal vessels or their remains may be detected on their surface, while their border, instead of being sharply defined and surrounded by normal-looking tissue, is irregular, and marked by collections of dark pigment cells which from proliferation may combine together so as to form a black zone, which then surrounds in part or in whole the denuded spots; or the pigment may lie irregularly scattered over its surface. This latter takes place, especially in the early stage of the disease, when the trouble is confined to the internal and pigmentary layers, producing a condition known as "maceration of the pigment of the choroid," in which the coloring matter is distributed irregularly, thinned in some places and aggregated in others, thus giving to the fundus of the eye a mottled or watery appearance, as if sprinkled with ink.

Serous Choroiditis.—This is characterized by the exudation from the choroidal membrane being of a serous instead of a plastic nature, and presents externally oftentimes the same appearance, both as to the dilatation of the pupil and spots upon the inner surface of the cornea, as serous iritis.

The ophthalmoscopic appearances are not well marked, and are sometimes entirely wanting. When present, however, they are such as are produced by increased intraocular pressure, and are chiefly confined to the pigment epithelium, the whole surface of which may be affected, exhibiting the changes peculiar to the condition of "maceration." Sometimes this form is also accompanied by extensive changes in the fundus, similar to those just detailed under the plastic form. This variety is exceedingly prone to fall into a glaucomatous condition, and is then accompanied by excavation of the optic nerve and the other ophthalmoscopic signs common to that disease.

Parenchymatous Choroiditis.—This is a deep-seated inflammation with a marked tendency towards an increase in the cellular tissue elements, especially in the neighborhood of the larger choroidal vessels. This hypertrophy of the cellular tissue, as in this form of iritis, sometimes forms masses which are elevated considerably above the surrounding level of the choroid, and may attain the size and appearance of a veritable tumor most probably of gummy origin, and as such project into the vitreous humor, its surface being covered by the retina which ordinarily undergoes fatty degeneration.

It is this variety of the affection which has been described by various

authors as "choroiditis circumscripta," and attributed by them particularly to a syphilitic origin.

The fact is, however, that the predominant cause of all choroidal affections is the specific virus, and the particular form under which it shows itself most frequently is certainly the plastic form (choroiditis exudativa). There are, however, even in this latter form, certain peculiarities which have been thought by some of the leading authorities (Graefe, Liebreich, Schweigger, and others) to be characteristic of the specific origin of the disease. The chief of these are:—

(1) The spots of exudation and atrophy are, as a rule, situated at the posterior pole of the eye, and in the neighborhood of the macula, instead of, as in the idiopathic variety, at the periphery. They also have a tendency to arrange themselves in groups, are less apt to coalesce with each other, while at the same time they penetrate deeper.

(2) The retina and optic nerve are more apt to be involved and sometimes to such a degree as to undergo subsequently partial or complete atrophy.

(3) The choroidal affection is very liable to be complicated with a characteristic disturbance of the vitreous, which often appears and disappears with great rapidity. Oftentimes this opacity is so delicate as to give the idea of a slight want of transparency of the retina.

I must, however, guard the reader against placing too much dependence on the above statements as to the specific origin of the disease, especially in regard to the situation and general contour of the patches, as these are often situated, even in undoubted cases of specific infection, at the very periphery instead of the posterior pole of the eye, and may assume, whatever their seat, any and all shapes. So, too, disturbance of the vitreous humor is one of the commonest complications of all choroidal affections.

It would be out of place in a work of this kind to give a detailed description of all the ophthalmoscopic appearances which this protean disease may assume. I would, therefore, since the use of the ophthalmoscope has now become so prevalent, and opportunities for its study so attainable, strongly advise the student of venereal diseases to make himself acquainted at least with the general outlines of ophthalmoscopy.

It is only in this way that he can get at all an adequate idea of a large class of diseases which are intimately connected with syphilis, and in this connection I would refer the reader to the magnificent plates of Jaeger,[1] Liebreich,[2] and Stellwag von Carion.[3]

If the connection between the iris and choroid, anatomically speaking, is an intimate one, clinically speaking it is even more so, and the diseases of the one may be considered as the analogue of the other; for this reason

[1] Jaeger, Ophthalmoskopischer Handatlas, 1868. Choroiditis Exudativa, Tafel XXII, figs. 99, 100; Taf. XXIII, figs. 101, 102, 104; Taf. XXIV, XXVIII, XXIX.

[2] Liebreich, Atlas d'Ophthalmoscopie. Choroiditis Syphilitica. Table IV, fig. 2. (See also Soelberg Wells, for copy of the same.)

[3] Stellwag von Carion. American edition.

the indications for treatment and the remedies to be employed are, as a rule, precisely the same as those laid down under iritis, only greater care and attention are, if possible, required of the physician, as the part concerned is hidden from ordinary inspection.

Choroiditis syphilitica, as a rule, belongs to the later stages of life in which the disposition to all choroidal troubles is particularly marked. Out of fifty-five cases, forty were above thirty years, and of these forty, fourteen were over fifty years of age. The appearance of the disease usually coincides with the late secondary and the early tertiary symptoms.[1]

Sufficient has been said under iritis of the necessity for, and the efficacy of the operations of iridectomy and paracentesis, and of those for the removal of the eye when the other is threatened by what is known as sympathetic ophthalmia (a contingency which should never be lost sight of), but I must refer the reader to the various text-books on ophthalmic surgery for their minute description.

The complications which are to be feared in choroiditis are extension of the inflammatory action to the neighboring tissues, to the iris (producing irido-choroiditis), to the retina and optic nerve. There is danger also of exudation from the choroidal vessels, producing subretinal effusion with subsequent separation of a part or the whole of the membrane.

Retinitis.

The natural effect of inflammation upon this transparent membrane is to give it increased vascularity, and cause effusion into its substance and render it opaque. Hence one of the earliest signs of retinitis is increased redness of the optic nerve entrance, imparting to it a pinkish hue, or the trouble may show itself simply by a slight œdema which obscures the contour of the nerve, or the vessels which emerge from the optic disk to be distributed to the retina may be abnormally enlarged, injected, and tortuous, and at certain points of their course lost to view, owing to the opacity of the retinal tissue which covers them. Their rupture may also give rise to small patches of ecchymosis. Again, effusion into the substance of the retina first impairs its transparency, and produces the appearance of a fog or haze in the fundus of the eye, and finally entirely conceals the entrance of the optic nerve, the sight of which can only be determined by the convergence of the dilated veins. The obscurity of the deeper structures may also be increased by transudation into the vitreous humor. Deposits of lymph in the retina may also give rise to light-colored patches, similar to those produced in the choroid; but the former may be recognized from the fact that they conceal the choroidal and retinal vessels, which in the latter may be seen to cross the patch.

Although the ophthalmoscopic appearances of specific retinitis do not differ as a whole from the non-specific form, still, there are certain peculiarities attending it which are supposed to be characteristic of its syphilitic origin.

[1] Förster, Handbuch der gesammten Augenheilkunde, 1876, vol. vii, part 1st, p. 191.

Thus, it has been observed that the inflammatory changes do not, as a rule, either in the vascular system or in the substance of the retina, reach the same intensity as in the idiopathic form. Sometimes, indeed, these are so slight as only to give the idea of a normal retina seen through a delicate gauze, which, however, has been proved by the microscope to be due, not to any disturbance in the vitreous, but to changes in the retina itself. The alteration in the tissue does not as a rule extend equally in all directions from the optic nerve, but is usually more developed on one side than the other, and the border of the disturbance is more sharply defined than in the simple form, while the exudations into the substance of the retina have a tendency to extend along the vessels.[1] Schweigger,[2] Von Graefe,[3] Classen,[4] and others, have also described some peculiar forms of syphilitic retinitis, which with their fine-drawn distinctions, are, however, of interest rather to the ophthalmologist than to the general physician, and I would, therefore, refer the reader who is curious about these matters to the articles themselves.

Retinitis is by no means as frequent a symptom of secondary syphilis as iritis; it is, in fact, rather a rare occurrence, and when it does take place it is usually with the later series of symptoms: thus, in one instance which came under my observation, the patient suffered from this disease fifteen months after an attack of iritis, and at a time when no other syphilitic symptoms were present.

It is certainly an interesting fact in this connection that Mooren[5] says that he has never seen specific retinitis accompanied at the same time by any other syphilitic symptoms. The same author mentions that he has often observed that the subjective phenomena of light are more marked in syphilitic than in the simple form of retinitis, and that these are often accompanied by zone-like limitations in the field of vision or Hemeralopia. These latter may also occur in that form of specific choroiditis which is attended with infiltration of pigment into the retina. When both the choroid and retina are affected, we have a combination of the symptoms of both under the name of choroido-retinitis.

Moreover, it must be borne in mind that the subjective symptoms of both retinitis and choroiditis are often so slightly marked at their commencement as to attract but little attention from the patient, and irreparable mischief may be done before their gravity is fully appreciated. I have repeatedly met with cases of syphilis in which some slight complaint from the patient has led to an ophthalmoscopic examination of the eye, disclosing the existence of a disease which threatened the loss of sight, but which was subsequently arrested by appropriate treatment. Consequently any impairment of vision in syphilitic subjects, although unattended by

[1] For more minute distinctions see Lehrbuch der Ophthalmoscopie, Mauthner, Abth. II, p. 368. For ophthalmoscopic plates of syphilitic retinitis see Liebreich's Atlas, Tab. X, Figs. 1 and 2.

[2] Augenspiegel, pag. 110.

[3] Archiv für Ophth., vii, 2, p. 211.

[4] Archiv x, 2, p. 157.

[5] Ophthalmologische Beobachtungen, p. 287.

symptoms of external inflammation, should at once put the surgeon upon his guard, and lead him to resort to specific remedies. Indeed, the latter are usually the only resource, as operative interference is very rarely, if ever, called for.

The prognosis is generally favorable when appropriate treatment is employed at an early stage of the disease, and, in this respect, syphilitic choroiditis and retinitis resemble syphilitic iritis.

Affections of the Optic Nerve.

Inflammation of the optic nerve or neuritis which is not an extension of the process from the retina or choroid, is an extremely rare result of the syphilitic infection; so rare indeed, that it has been doubted by competent authorities whether the optic nerve was ever primarily affected. Thus Hughlings Jackson says, "optic neuritis from syphilis is not syphilitic optic neuritis. The optic neuritis produced by a syphilitic tumor is just like that produced by a glioma or by any other adventitious product in the cerebrum or cerebellum."[1]

Förster, on the other hand, is of the opinion that choked disk, dependent on syphilis, may occur, not as a symptom of an intercranial trouble, but as the result of gummy infiltration of tissue between the sheaths of the nerve rather than of the nerve stem itself. He also calls attention to the fact that by far the greater quantity of cases of neuritis with syphilis are unaccompanied by any brain symptom whatever, and moreover that it is only when the trouble is due to syphilis that the most pronounced cases of choked disk run their course within a few weeks with rapid return to the normal condition under the employment of specific remedies. There have been, moreover, a few cases reported of gummy infiltration of the optic nerve itself by Graefe, Hulke, and Barber.[2]

Westphal has also reported, as an example of gummy infiltration of an individual cranial nerve, a case in which the oculomotorius had been changed into a gummy mass.[3]

I think therefore there is no doubt that the optic nerve may be affected primarily by the syphilitic taint, which may produce the symptoms of both kinds of neuritis; that is, the simple form already described in connection with retinitis, and the form known as choked disk, in which the predominant features are venous stasis with enlarged and tortuous vessels, protrusion of the papilla, œdema, and hemorrhage. That these affections, especially the latter, are more commonly the result of an intercranial trouble, such as diffused meningitis, or concrete masses (gummata), is of course incontestable; but that they may be purely intraocular I have from my own experience no reason to doubt.

There is nothing distinctive between the ophthalmoscopic appearances of syphilitic and non-syphilitic neuritis. The origin, progress, and retrogression are also the same, with the exception that the course of the dis-

[1] Ophthalmic Hospital Reports, vol. viii, p. II, p. 322.
[2] Inaug. Diss., Zurich, 1873. [3] Jahresbericht Ophthal. 1873, p. 436.

ease is shorter, and the prognosis is, as a rule, more favorable in the specific than in the non-specific form.

It should be constantly kept in mind that the amount of sight and the field of vision may be, and often is, perfectly normal in the most pronounced cases of choked disk, and that for this reason the practitioner must be doubly on his guard so as to detect the trouble at the outset. Any complaint whatever in regard to the eye, should at once demand a careful examination into all its parts and functions.

Affections of the Vitreous.

It has already been pointed out in the section on choroiditis that turbidity of the vitreous is a common accompaniment of inflammation of the choroid, but whether the vitreous is ever, under any circumstances, the seat of a primary inflammation is still a matter of discussion among ophthalmologists, and one which is hardly suitable to the character of the present work. I will say, however, that I have occasionally noticed in young adults and those in middle life who have had syphilis, a tendency towards troubles in the vitreous apparently unconnected, so far as the ophthalmoscope showed, with any trouble in the uveal tract. That such existed, but of too low a grade to be detected, is of course possible, and the disease in these cases would then be, as it is in the vast majority, a secondary, and not a primary, affection.

Paralysis of the Nerves of the Eye.

A large proportion of the cases of paralysis of these nerves is due to syphilis. Graefe[1] attributes fifty in a hundred of all the cases met with to this cause, while others have placed it as high as sixty or sixty-five per cent. And it is this predominating frequency, and especially the marked and very curious predilection which the virus would appear to have in regard to certain particular nerves of the ocular group, which must be looked upon as the essential character of the disease. Thus in most instances it is the third pair, or motor oculi, that is affected; next in order comes the sixth pair,[2] or abducens, and finally the fourth pair or patheticus.

My limited space compels me to refer the reader to special treatises upon diseases of the eye for a detailed description of the symptoms, and for the methods employed by ophthalmologists in the diagnosis of these affections.[3] These are much too technical and intricate for the present work; still the general practitioner should be aware of the most prominent symptoms, as disturbances in vision due to a want of co-ordination of the eyes are often the initial, if not the sole, symptoms of commencing cerebral syphilis—a warning which, if neglected, often leads to a disastrous result, but which,

[1] Syphilitic Affections of the Eye, Deutsch Klinik, 1858, No. 21.

[2] Dr. Beyram has related three interesting cases of paralysis of the sixth pair due to syphilis, L'Union Médicale, Feb. 23, 1860.

[3] See an able article by Dr. Wells, giving an account of Graefe's researches upon paralytic affections of the eye, Ophthalmic Hospital Reports, vol. ii, p. 44. Also Diseases of the Eye, same Author.

if seized upon at the moment, allows the application of remedies with the most beneficial effect.

The principal symptoms of all these affections are loss of power in a muscle or muscles, and consequent limitation in the motion of the eye, shown by double images and strabismus. The individual characteristics are as follows:—

3d pair. Falling of the lid, or ptosis; deviation outwards of the eye, with loss of power upwards, inwards, or downwards. Dilatation of the pupil, with loss or limitation of the accommodation.

6th pair. Deviation inwards, with loss of power outwards, and double vision on the temporal side of the median line of the affected eye.

4th pair. Double vision when looking at objects below the horizontal plane, and a peculiar inclination of the ground or floor, with an opposing inclination of the head of the patient to counterbalance the disturbance.

The paralysis instead of being complete, may be limited to single muscles, from which it would appear that different branches of the nerve only were affected; or, instead of being an actual paralysis, it may be only a paresis. This "incompleteness" has been looked upon by some as characteristic of syphilitic paralysis, and it is this condition which has led to the supposition that there was a "syphilitic vertigo." There is, however, nothing *sui generis* in this vertigo, which may occur from any cause, as it is usually only the expression of a want of co-ordination of the muscles. The latter may be so slight as not to produce any deviation of the axes, but be just sufficient to interrupt transiently the perfect co-ordination of the muscles and produce a dizzy sensation, but it may on some occasions produce for a moment actual double vision, especially when the gaze is turned in a particular direction. Still, it must be borne in mind that this want of co-ordination is not, as asserted by some, the only cause of vertigo in syphilitic patients, as it may exist and be exceedingly annoying, even when the ocular muscles are not affected in the slightest degree. It must then be referred to an intercranial cause not connected with the organs of vision, but probably due to a morbid influence upon the semicircular canals. Among these limited paralyses, one of the most striking is that of monocular mydriasis, which may occur even without any implication of the accommodation of the same eye. It has sometimes been looked upon as a precursor of severe brain trouble, but that it is often not so, is proved by a number of syphilitic cases in which it has appeared and then disappeared with no intercranial symptom.

Besides these simple paralyses affecting a single nerve or some of its branches, there may be a coincident paralysis of the other nerves; thus the third and sixth pair or the sixth and fourth pair, and so on, either in one or both eyes may be affected, or there may be a triple paralysis, when between the two eyes the third, fourth, and sixth are all affected. The paralysis of the ocular nerves may be also associated with that of other nerves, notably the facial.

Owing to the great importance of these ocular troubles and their symptoms in regard to the early diagnosis of cerebral syphilis, praiseworthy attempts have been made to put the cause of their greater frequency in

syphilitic affections upon an anatomical basis. The principal reasons for which are as follows: In the first place, the ocular nerves, before entering the orbit, run for a great distance along the base of the brain in contact with the investing membranes and bony surfaces, in a region which is the place of selection of all others for syphilitic inflammations and their products, such as neoplasms, gummata, and sclerosis, by which their delicate nerves may be surrounded and compressed; and especially does this refer to the third pair, which is even more apt to suffer than the rest, from its relation to the interpeduncular space, which has been shown to be the seat of predilection of intercranial syphilitic hyperplasia.[1] But besides these changes which lie at the base of the brain, modern investigation has shown, by clinical observation and by autopsies, that what have been called nerve centres exist in the cortical substance of the brain, so that localized lesions in the gray matter may produce a paralysis of a nerve or its branches over which the particular centre presides. And as disease of the cortex is frequently the result of syphilis, the connection between the lesion and the paralysis is a very probable one. This mode of origin would also explain the curious limitation of the paralysis to a single muscle, instead of the entire group over which the nerve presides.

The surgeon should carefully avoid confounding paralysis of the sixth pair with converging strabismus. The two may readily be distinguished by the fact that, in the former, the patient is unable, under any circumstances, to turn the eye outwards; while, in the latter, if the straight eye be covered, the squinting eye resumes its normal direction.

The treatment of paralytic strabismus, resulting as it so often does from syphilis, is one of the most difficult problems offered to the ophthalmic surgeon, not only in regard to the fact whether, after all other remedies have failed, an operation should be done, but also as to the choice of the operation—whether, in fact, advancement of the paralyzed muscle with a tenotomy of the antagonist should be done, or a simple tenotomy of the opposing muscle with the use of the suture, as proposed by Knapp, to increase the effect? I must again refer the general reader to special treatises on the subject,[2] merely remarking here that the effect of a tenotomy is often surprising, and that I have known a paralytic squint from syphilitic causes, which had resisted all the therapeutical means known to modern syphilographers, cured at once by a simple tenotomy.

Dixon[3] relates two highly interesting cases, in which examination after death revealed the existence of tumors in the substance of the nerve. The paralysis is sometimes, though rarely, due to disease of the bony passages, or their lining membrane, traversed by the nerve, and has also been traced upon post-mortem examination to softening of the nervous or cerebral tissue. Virchow[4] quotes a number of cases dependent upon the last-mentioned cause.

[1] La syphilis du cerveau, p. 372 et passim, 1879. Par A. Fournier.

[2] Among others, see a paper entitled, "The Modern Operation for Strabismus," E. G. Loring, Transactions of the New York Academy of Medicine, 1874, p. 161.

[3] Medical T. and Gaz., Lond., Oct. 23, 1858.

[4] Syphilis constitutionelle, p. 129 *et seq.*

Hereditary Syphilis of the Eye.

That the effects of acquired syphilis in one generation may be transmitted to the following, and there manifest themselves in symptoms analogous to, though perhaps not exactly identical with, those of the acquired form, there can be little or no doubt. Thus the skin of the eyelids may be the seat of eruptive diseases, and the deeper-lying tissue the site of infiltrations or destructive secondary ulcerations, with or without a coexisting adenitis of the pre-auricular and submaxillary glands. Moreover, the hereditary syphilitic taint may manifest itself, so far as the eyeball itself is concerned, in every form of inflammatory action from a muco-purulent conjunctivitis to keratitis, iritis, choroiditis, and even retinitis and neuritis, all of which have been described already under their appropriate headings. Indeed, so general and numerous are the varieties of ocular disease that the poison produces, that it has been claimed that where the result was so general the cause could not be individual and specific; and it was consequently argued that when these various manifestations occurred in broken-down and debilitated constitutions, they were due to the depraved condition of the general system, rather than the result of a particular morbific infection. And it was brought forward as a proof of this that in the vast number of troubles of the eye there were but two that had any claim to having any individual and characteristic features—specific iritis and keratitis, and that even these two forms of disease might occur, with all their so-called distinctive features, in cases in which there was not a trace of any hereditary taint whatever. The weight of evidence is, however, against such a reasoning, and in favor of a definite and distinctive cause.

In the first place, these troubles occur in the hereditary varieties at a very early age, which in the non-hereditary forms only do so at a very much later period. And especially true is this with infantile iritis and other troubles of the uveal tract; and it may be laid down as a rule, that the earlier a disease common to adult life makes its appearance, the more likely it is to be hereditary. Moreover, in favor of its hereditary nature is the frequency in which pre-existing disease of a syphilitic nature is shown to have occurred in one or both of the parents, as indeed is also the fact of coexisting manifestations in other parts of the body of the parents or child—manifestations which are peculiar to syphilis and not to struma or other diatheses, such as peculiar eruptions, erosive ulcerations, nodes, and fissures. To which may be added also the fact that it is the eldest child, or the one born next subsequent to the infection of the parents, which is markedly predisposed to be affected, the frequency of the attack and the force of the symptoms decreasing in the later-born children, and, finally, the peculiar physiognomy.

Such evidence as this, and much more of a similar character, has led syphilographers, notably Mr. Hutchinson, to believe and to declare that these ocular troubles, when occurring in young persons, are almost always the result of an hereditary taint due to a specific virus—a conclusion most important in a clinical point of view, as upon it the proper treatment depends.

CHAPTER XXV.

AFFECTIONS OF THE EAR.

Within the last few years much light has been thrown upon this subject by a number of observers, among whom may be mentioned Gruber,[1] of Vienna; Schwartze,[2] of Halle; Stöhr,[3] of Wurzburg; and Roosa,[4] Buck,[5] and Sexton,[6] of New York, and this chapter is, for the most part, a compilation of their labors.

It may be remarked at the outset, that cases of syphilitic disease of the ear, or those recognized as such, are rare. Thus Buck has met with only 30, out of a total of 3976 cases of ear affections, or a little over three-quarters of one per cent., but, as stated by him, the actual percentage is probably much larger, owing to the difficulty of recognizing the syphilitic element and the tendency of patients to conceal the fact that they have had this disease. There are, indeed, in most cases, no absolute diagnostic symptoms which enable us to distinguish an affection of the ear dependent upon syphilis from one due to a non-specific cause.

External Ear.—The only instance, so far as I am aware, of the occurrence of a chancre upon the external ear, is reported by Alb. Hulot.[7] There is no reason, however, except the less frequent exposure, why chancres should not be as frequent here as on other portions of the external integument. This region is not unfrequently the seat of secondary manifestations. Syphilitic papules are met with in the post-auricular angle and upon the lobule of the ear, while the macular syphilide is most frequent on those portions supported by cartilage, as the fossa navicularis and the concha.

With patients in the early secondary stage, we often find impacted cerumen, not directly due to the action of the syphilitic virus, but consequent upon the well-known changes in the activity of the glandular apparatus of the skin, which obtains generally at this period. This fact was mentioned by Astruc as early as 1740.

[1] Ueber Syphilis des Gehörorgans, Wien. med. Presse, 1870, 1, 3, 6, 10.

[2] Arch. f. Ohrenh., Würzb., 1870, 130, 134, 135.

[3] Arch. f. Ohrenh., Würzb., Bd. v, s. 139.

[4] Syphilitic Affections of the Ear, Am. J. Syph. and Derm., N. Y., 1871, p. 97. Also Treatise on the Ear, 4th ed., 1878, p. 521.

[5] Am. J. Otol., N. Y., vol. i, p. 25.

[6] The Sudden Deafness of Syphilis, Am. J. M. Sci., Phila., July, 1879.

[7] Ann. de derm. et syph., Paris, t. x, 1879, p. 47.

The most frequent syphilitic manifestation, however, in the external auditory canal, consists of broad condylomata (mucous patches), which here find a fertile soil for development on account of the rich supply of glands and papillæ and the vascularity of the part. In the external portion of this passage, they are usually isolated, but further inwards they are multiple and often increase to such an extent as to fill up the canal with the vegetations or papillomata springing from their surface, and they may completely hide the drum. They commence with an ill-defined swelling of the deeply reddened skin, followed by the discharge of a sero-purulent fluid which gradually uplifts the epidermis. The appearance is now that of ordinary otitis externa, and a mistake in the diagnosis may the more readily be made as the pain is usually severe. The simple form of papule such as is met with upon the body, is never seen in the external meatus, nor is any scaly eruption, although the latter is not rare on the auricle. Condylomata may also be developed on the drum and simulate acute or chronic inflammation of this membrane, especially as they may become ulcerated and give rise to perforation.

Again, in syphilitic subjects, the auricle and the walls of the external meatus may be the seat of ulcerations usually rounded in form, which are very painful and obstinate. In some cases they appear to commence as circumscribed inflammations, which do not disappear after the evacuation of the contained pus, as do ordinary abscesses, but take on the ulcerative process. Their surface becomes covered with a diphtheritic secretion; their margins may extend, and the patient be subjected for a long time to great suffering, in spite of the most energetic caustic treatment. Similar ulcerations may arise from gummy deposits in the cellular tissue, the cartilages, or bones, more frequently in the cartilages. These deposits are for a time free from pain and may be absorbed under anti-syphilitic treatment, but, in other cases, they suppurate and form ulcers of the character described.

Finally, among syphilitic affections of the external ear, we have to mention the affections of the bones, as hyperostosis and exostosis. Gruber has seen a number of such cases, coincident with nodes in other regions. They appear as circumscribed swellings with rather more elevation than is common to nodes of this size. They are often multiple and not unfrequently seated near the drum, so as to cut off the view of this membrane. They may attain such a size as to interfere with the entrance of sound waves and thus impair the hearing, but such instances are rare. They are seldom painful. Gruber states that they are sometimes associated with similar formations in the bony portion of the Eustachian tube, where they may cause marked narrowing or even complete stegnosis.

Middle Ear.—Of all portions of the auditory apparatus, this is the most frequently affected by syphilis, in consequence of its intimate connection with the nose and fauces, where syphilitic lesions are so common.

Mucous patches may form in the Eustachian tube or upon the walls of the middle ear, and either disappear under treatment or terminate in ulceration, destroying the tissues to a greater or less extent. Gruber states

that, when situated upon the membrane covering either of the fenestræ and especially when situated upon the internal aspect of the drum, they are liable to excite very severe pain, which, unlike the pain of ordinary otitis media, does not subside upon perforation of the membrana tympani, but persists until the ulceration is checked.

Although these statements with regard to mucous patches in the Eustachian tube and middle ear emanate from so distinguished an authority as Gruber, yet, when we recall the inaccessibility to observation of the parts said to be involved, their very explicitness cannot but cast a shadow of doubt upon their value in the mind of the reader.

It is stated that syphilitic disease of the middle ear is still more frequently due to the extension of inflammation and ulceration from the nose and pharynx. That inflammation may thus extend along a continuous surface, there can be no question. Whether actual ulceration may extend from the fauces to the tympanum is not improbable, but we know of no autopsy in which the fact has been established. Gruber believes in such extension of the ulceration and describes its progress as follows: The opening of the Eustachian tube is of course first attacked, but the ulceration may proceed to the destruction of the greater portion of the organ of hearing. So long as the ulceration is confined to the Eustachian tube, the patient merely suffers from hardness of hearing, abnormal sounds in the ear and a sensation of tension or fulness, but as soon as the middle ear is invaded severe pain sets in. In these cases of exulceration of the mucous membrane of the middle ear, changes may be observed in the drum itself. More or less of its brilliancy is lost; its surface becomes uneven and injected; its whole substance may become infiltrated so that the position of the handle of the malleus can only be recognized by the injected vessels overlying it. Perforation may also occur.

The sequelæ of syphilitic disease of the middle ear are apparently the same as when the origin of the trouble was not specific, but no disease of the middle ear of simple origin ever leaves the patient in such a state of absolute deafness.

Among the sequelæ are noted opacities or destruction of the drum varying in extent; loosening of the ossicula from their attachments, loss or impairment of the membranes covering the fenestræ, and caries of the temporal bone or of the ossicula. As in ordinary suppurative otitis media, the cells of the mastoid process may be invaded. This may occur without previous perforation of the drum and hence without discharge from the ear, so that the affection of the mastoid may erroneously be regarded as primary. Suppurative inflammation of the middle ear caused by syphilis is usually chronic, but the Eustachian tube may be invaded by a sudden and severe attack from the fauces, resulting in stricture or complete closure.

Gruber also ascribes certain cases of otitis media hypertrophica to syphilis, in which are found not only thickening of the lining membrane, but also membranous bands and growths (polypi), or, again, hyperplasia of the bony tissue sometimes affecting the ossicles, either wholly and symmetrically or partially. The hammer of the malleus is especially liable to

be thus attacked. Isolated outgrowths of bony tissue, varying in size, are also met with on the walls of the middle ear and in the bony portion of the tuba. The impairment of hearing which these changes may produce is evident.

We have omitted to mention one not infrequent cause of deafness, occurring in patients in the tertiary stage of syphilis, who have had gummata of the soft palate with the destruction of the soft parts that so often follows. As is well known, in these cases, the remains of the soft palate often become adherent to the posterior and lateral walls of the pharynx, whereby the pharyngeal openings of the Eustachian tubes are closed by a mechanical obstruction, and greater or less deafness ensues which is irremediable. Frequent instances of this kind have come under our observation.

Internal Ear.—We know nothing of syphilitic affections of the internal ear, although various conjectures have been advanced as absolute knowledge by some writers. It is not unreasonable to suppose that, when the tympanum is the seat of decided inflammatory action, there may be more or less hyperæmia or even extravasation of blood in the internal ear. This is asserted by Gruber, who also states that any long-continued interference with the conveyance of sound may cause atrophy of the auditory nerve, "as shown by microscopic examination after death."

Sudden Deafness produced by Syphilis.

Under this somewhat obscure heading, it is intended to include a certain class of cases, in which sudden deafness occurs apparently as the result of syphilis, but the pathology of which is not known with absolute certainty.

These cases may occur at any period of secondary syphilis, but are most common within the first three or four years. The attacks are usually preceded by a state of hyperæmia of the drums, either from cold or from sympathy with the mouth or throat, thus inviting, as it were, an invasion of the drum by the specific affection. They are characterized by their sudden occurrence and by the extreme amount of deafness. Both ears are usually affected simultaneously, but not always. The attack is not attended with pain, but there is often a feeling of fulness in the ear, and vertigo, especially on stooping or rising up suddenly, and staggering of the gait are not uncommon. Abnormal sounds in the ear are a troublesome symptom. The patient can hear his own voice and also the vibrations of the tuning fork placed upon the skull. Dr. Sexton calls attention to a phenomenon, which he says has not before been mentioned, viz., the high pitch of all sounds heard under certain conditions. Thus, a player on the cornet or violin, the latter resting the base of his instrument upon his neck beneath the jaw, will hear and play his notes higher than they are. He says that patients have told him that the heavy concussion of a loaded truck

passing over the pavement, or the rumbling of the trains of the elevated railroad, produced a painfully high-pitched sound like a whistle.

Physical examination throws but little light on these cases. There is commonly little, if any, affection of the fauces. The Eustachian tube is open as shown by inflation of the tympanum by either of the ordinary methods. There is no evidence of any collection of fluid in the middle ear. Dr. Sexton punctured the drum in several instances and found the cavity empty. Upon examination with the aural speculum, the external meatus usually contains a certain amount of a tenacious substance which does not appear to be either wax or exfoliated epidermis. It is not unreasonable to suppose that the same exudation takes place in the middle ear. The drum-head is somewhat opaque, only slightly, if at all, injected, and lustreless; and it is often wrinkled about the short process of the malleus, in the antero-superior quadrant,—changes pointing to disease of its internal layer.

This class of cases was first clearly described by Sir William Wilde,[1] under the name of "syphilitic meningitis." Some recent authorities place the seat of this disease in the labyrinth, and Dr. Roosa especially, goes still further, and locates it in the cochlea. It is difficult, however, to understand, if such be the case, how patients are able to hear their own voices. Deafness to external sounds but the preservation of autophony, would seem to point to a defect in the conductive apparatus in the ear. We are, therefore, inclined to adopt the following conclusions of Dr. Sexton as an approximation, to say the least, to the true pathology of this affection.

"1. Syphilitic affections of the ears causing sudden deafness, would seem to be induced by a pre-existing hyperæmia of the ears excited by an intercurrent attack of aural mucous catarrh.

"2. This affection speedily causes a disarrangement of the integrity of the chain of ossicles, most likely at the malleo-incudal joint, and probably in some instances at the incudo-stapedial joint, or both of these. The movements of the stapes in the oval window are also likely to be interfered with. The two first-mentioned conditions serve to explain the noises in the ears and the autophony; the last-mentioned condition will increase the anomalies of hearing.

"3. The affection does not depend on anomalies of any portion of the labyrinth, although the latter, of course, is liable to invasion from syphilis, with the nature of which we are as yet unfamiliar."

These cases of sudden deafness, in the absence of pain, are commonly seen by the surgeon some time after their occurrence, when they are usually found to be incurable. When seen early, very large doses of the iodide of potassium internally and the use of mercurial inunction give some promise of relief and perhaps of cure, and even at a later period the patient should have the benefit of a trial of these remedies.

[1] Practical Observations on Aural Surgery.

Deafness due to Syphilitic Affections of the Brain.

Syphilitic affections of the brain, occurring in such situations as are in direct or indirect relation with the auditory nerves, may, as would be expected, give rise to subjective symptoms in the auditory apparatus. The negative result on inspection of the ear, and the absence of any symptoms referrible to the ear itself, will lead us to ascribe the deafness to this cause.

Schwartze considers the following symptoms as characteristic of syphilitic affections of the ear: the trouble is always in both ears and commences several months after the outbreak of other syphilitic manifestations; nocturnal pains in the temporal bones; rapid impairment of hearing, and, finally, early impairment of the transmission of sound through the bones of the head.

Diseases of the Ear in the Subjects of Congenital Syphilis.

Mr. Jonathan Hutchinson,[1] in 1863, called attention to the frequent occurrence of deafness in the subjects of inherited syphilis, without any adequate changes in the external parts or in the membrana tympani to account for the same. Mr. Hutchinson states that the age at which deafness is most liable to come on appears to be about the same as that at which interstitial keratitis is most frequent, *i. e.*, from five years before puberty to five years after that period. In nearly all the cases reported by him, the loss of hearing affected both ears; in the majority the patients were utterly deaf, and in most of the others the loss of hearing had advanced to a very considerable degree. In most of them there had been some otorrhœa, but of only a mild character.

Mr. Hutchinson adds: "It will be seen that all of the cases in which the ears were inspected go to support the belief that the deafness of syphilitic children is due either to disease of the nerve itself, or to some changes in non-accessible parts of the auditory apparatus. Its symmetry would point to a central cause. In none were there found adequate changes in the membrana tympani, although in none was that membrane quite normal. In all the Eustachian tubes were pervious, my belief therefore is, that the deafness was due either to disease of the nerves or of their distribution in the labyrinth. The cases constitute the analogues of syphilitic retinitis and of white atrophy of the optic nerves. The prognosis is very unfavorable. From six months to a year would appear to be the usual time required for the completion of the process and the entire abolition of the function."

Dr. Dalby,[2] Aural Surgeon to St. George's Hospital, states that, next to scarlet fever, inherited syphilis may be regarded as the most fruitful cause of deaf-mutism, as it occurs in children who are born with good hearing power. The patient usually becomes deaf in early childhood—after he begins to talk—or between this period and puberty. With Mr. Hutchinson, he regards the disease as chiefly a nervous one.

[1] Clinical Memoir on certain Diseases of the Eye and Ear, consequent on inherited syphilis, London, 1863, p. 174.

[2] Lancet, Lond., Jan. 22, 1876.

CHAPTER XXVI.

HEREDITARY SYPHILIS.

The words congenital and infantile are used to designate this variety of syphilis; the former lacks precision, and the latter may be applied with equal propriety to the hereditary and the acquired forms. The term *hereditary syphilis*, therefore, seems preferable. According to Kassowitz,[1] one-third of all children procreated of syphilitic parents are dead born, and of those born living twenty-four per cent. die within the first six months of life. We may understand why the lesions of hereditary syphilis are so severe and extensive, and why its fatality is so great, when we consider how early in fœtal life the specific virus exerts its influence, and how thoroughly it must be diffused through the organism of the embryo.

In the majority of cases of hereditary syphilis, symptoms appear about the third week of life. Some authors have observed a postponement of symptoms until the end of the first year or even later, but in our experience the twelfth week has been the utmost limit.

In case of the infection of both parents, the disease is likely to be transmitted in an intense form, resulting in the death of the fœtus or in the early manifestation of symptoms.

There are few exceptions to the rule that the severity of the disease decreases with each succeeding child. The danger of the death of an infected child diminishes as it grows older, and freedom from symptoms until after the sixth month justifies a favorable prognosis. Death results most frequently in cachectic children, and from gastro-intestinal affections, which are to a great extent dependent on visceral lesions.

Syphilis is generally transmitted only to the second generation; exceptionally, in case of excessive activity of the disease in the first inheritor, it may appear even in the third generation. The course of hereditary syphilis differs in many respects from that of the acquired disease. The latter always begins by the development of a local lesion, which is followed by a definite secondary period of incubation, at the expiration of which constitutional manifestations appear, while the hereditary disease presents no initial lesion and cannot be divided into stages. Moreover, while many of the lesions of each are similar, being undoubtedly caused by the syphilitic poison, on the other hand, a large number of those in the hereditary form are merely the result of perverted nutrition, and may occur in any

[1] Die Vererbung der Syphilis, Vienna, 1876.

adynamic disease. Among such lesions[1] may be classed certain affections of the eyes, peculiar osseous malformations, impaired growth of the hair, as well as deafness and deaf-mutism, the ultimate cause of which is unknown.

The lesions of hereditary syphilis are more hyperæmic and active than those of the acquired form, and tend to involve larger surfaces. As a rule, the early lesions are more generally distributed, and are more symmetrical than those which are developed later.

Vesicular and bullous syphilides, so rare in acquired syphilis, are quite common in hereditary, while rupia is almost unknown in the latter. Affections of the nasal mucous membrane, which are infrequent and appear late in the former, are among the earliest and most reliable diagnostic symptoms of the hereditary disease. Visceral affections are much more common in the latter than in the former, frequently being multiple, and coexisting with lesions similar to those of the secondary stage of the acquired disease. Gummatous and connective tissue infiltrations are often developed before birth, and are more diffuse and symmetrical when they appear before the end of the first year of life; when seen after that period, they may present the characteristics of the acquired forms. A peculiar and constant lesion of the ossifying ends of the long bones has been observed during the early months of hereditary syphilis. Certain bone lesions may be developed at a later period which resemble those of the acquired disease. Affections of the nervous system, although more common than has been supposed, are comparatively rare in hereditary syphilis.

Evidences of hereditary taint usually disappear before puberty, although syphilitic lesions, undoubtedly hereditary, have been observed at later periods, and in some instances, after years of apparent latency. The extent to which inherted syphilis furnishes immunity to the acquired form is still undetermined.

The opinion, which has been sustained chiefly by Ricord, Maisonneuve, and Montanier, that syphilis, especially in its tertiary form, may be transmitted to offspring as scrofula, phthisis, or rickets, is utterly untenable.

Syphilis is always transmitted as syphilis, although the cachexia induced by it undoubtedly predisposes the infant to affections of this kind, just as any adynamic disease may do. The prevalence of this tendency, which is quite rare in America, seems to be very marked in Germany, where Kassowitz and Alois Monte found that nearly every syphilitic child became rachitic.

There are not enough facts upon which to base positive conclusions regarding the possible production of tuberculosis by hereditary syphilis. Thoresen, of Christiania, in a monograph on syphilis of the lungs, founded on the study of three hundred and eighteen patients, states that in every

[1] Dr. T. R. Brown, of Baltimore, Arch. of Dermatol., N. Y., July, 1877, reports four cases of hare-lip and cleft palate occurring in children with hereditary syphilis. While he does not think that these deformities are etiologically related to the inherited disease, he is disposed to regard them as more than coincidences.

case of phthisis in the child there was a history of tuberculosis in the parents. It is very probable that a child who has had a pulmonary lesion of hereditary syphilis may be more susceptible to inflammation of the lungs in after life.

Certain hereditary tubercular lesions, of late development, present features somewhat similar to those of lupus, but there is no pathological relation between the two diseases, nor is it proved that the latter is of frequent occurrence during the course of hereditary syphilis.

The Duration and Progress of Hereditary Syphilis.

The duration of hereditary syphilis depends altogether upon two conditions: the intensity of the diathesis and the treatment. It is not uncommon for children to present mild and superficial symptoms for a few months or a year, and then become blooming and healthy, never again to be affected with syphilitic lesions. Again, severe and extensive lesions may be exhibited during the early months, which relapse at irregular intervals in an equally intense but more limited form for a few years; or syphilitic lesions may be developed from time to time until the tenth or twelfth year, perfect health being established after that time. In very chronic cases symptoms may recur more or less frequently until puberty. Our observations lead us to the conclusion that they do not appear after that date. In general, the severity of hereditary syphilis is expended within the first few years, and subsequent lesions, although possibly extensive and deep, do not show the malignancy of early ones.

The course of hereditary syphilis is equally chronic as that of the acquired disease, and is even more irregular and uncertain. For this reason the lesions cannot be arranged in chronological order, and a precise division of the disease into stages is likewise impracticable. Visceral and superficial lesions frequently coexist; the interval between early and late lesions may be but a few months or even many years.

As in the acquired form, so in hereditary syphilis, the extensive superficial exanthems are peculiar to the first months of the disease. With these may coexist lesions of the mucous membranes, of the bones, or of the viscera. Relapsing syphilides are usually less extensive than the first eruption, and their lesions are less numerous. They may be composed of either papules, pustules, or vesicles, the eruption being polymorphous or made up of one variety of lesion. The course of these relapsing syphilides may be even more chronic than that of the first eruption, and the interval between the two may be a few weeks or several months. Sometimes the second rash appears before the complete disappearance of the first. It may be said that these relapses of general eruptions are, as a rule, peculiar to the first two or three years of the disease. Subsequent eruptions are of another order, more profound, more localized, and less likely to relapse. These later orders of dermal lesions may be papulo-tubercular, or perhaps pustular, but in general they are tubercular, tuberculo-ulcerous, and gummatous.

These cases of late development are rather rare, although we have seen fully two dozen in which such lesions have appeared at the third, sixth, eighth, twelfth, fifteenth, and twentieth years. In fully one-half they occurred between the fourth and twelfth years, in three-eighths between the third and fifth, and in the remainder between the twelfth and twentieth years. It is very rare to see dermal lesions extensive and superficial after the second or third year, they being usually profound and limited, and in this respect differing from those of the acquired disease.

In the majority of cases the development of visceral lesions takes place in intra-uterine life, and their course after birth is retrogressive. The principal organs attacked are the liver, the lungs, the brain, and the kidneys. Our knowledge of the frequency and extent of their development after birth is incomplete. Besides the cutaneous and visceral lesions of the first year or two, other syphilitic affections are frequently observed. In many cases the diaphyso-epiphyseal lesions of the bones appear during intra-uterine life and run their course in the early months of the disease, possibly relapsing at a later period; or they may appear for the first time during the first year of life. From the fourth up to the twentieth year the shafts of the bones may be affected by periostitis, and joint affections often occur.

The lesions of the mucous membranes are, like those of the skin, superficial and often extensive in the first years of life; at later periods they are circumscribed, profound, and destructive. Occasionally iritis, choroiditis, or retinitis occurs, generally between the third and sixth years, while we observe that keratitis may appear at any time up to the fifteenth or even twentieth year.

In the somewhat rare cases of hereditary syphilis presenting cerebral and nervous symptoms, it has been noted that such symptoms and nutritional affections of the cranium, teeth, etc., begin in the early years of life and leave more or less marked traces.

The severity of hereditary syphilis exhausts itself within the first three years of life; whatever symptoms are manifested after that time are developed in the most chronic and irregular manner. Therefore, if any division of the disease into stages were to be made, the first four years might be considered the first stage, or the period of the disease proper, the second stage extending from that time indefinitely, but not beyond the twentieth year.

The Process of Procreation.

The study of hereditary syphilis is much simplified by a clear understanding of the process of procreation, which is described by Haeckel[1] as follows: "The nature of fructification rests essentially upon the truth that the male procreative cell becomes intimately blended with the female

[1] Anthropologie oder Entwickelungsgeshichte des Menschen, Leipzig, 1875, p. 138. Quoted by Kassowitz.

amœba-like ovule. By this means, in the first place, the ovule is incited to further development, and, secondly, the transmission to the child of the hereditary qualities of both parents is effected. The male procreative cell entails upon the child the individual character of the father, and the female ovum transmits hereditarily to the new being the characteristics of the mother."

The embryo resulting from the union of these two germinating cells is nourished and matured in the womb of the mother, through the utero-placental circulation. The influence of the father upon the fœtus is limited to the supply of organic cells at the time of fecundation; that of the mother continues in a modified form through the period of gestation. Since numerous facts support the idea of the transmission to offspring of mental and physical qualities, we are warranted in assuming that diseases, among them syphilis, may be likewise inherited, the sperm cells of the male and the ovule of the female being the conveying media. Hereditary syphilis may, therefore, be derived from one or both parents, since it originates in the procreative cells of either male or female.

Influence of the father.—So many undoubted instances of the transmission of syphilis from father to child have been reported, that further evidence is scarcely needed. The risk of contagion from the father is great in proportion to the activity of his symptoms. If procreation takes place while he is in the first period of incubation, the child will escape, and may do so even during the secondary period of incubation, but infection is more probable as the latter stage advances. Probably his malign influence begins with the evolution of constitutional manifestations.

There is abundant evidence that, if the disease is not treated, the sperm-cells will retain the syphilitic virus through the first year, since temporary and spontaneous latency of the disease is observed only at a later period. On the other hand, mercurial treatment may so modify the disease, that the child will escape even within the first year. We see frequent examples of this, when men recently syphilitic and compelled to marry, are put under an active mercurial course, and within a year become fathers of children who never show the slightest evidence of syphilis. Rare instances occur, in which the disease, although unmodified by treatment, infects the system of the father so slightly, that the fœtus escapes even during the first year.

Mercurial treatment, however, is the most potent means at our command of finally eradicating the disease. Without it the danger of transmitting the disease to offspring usually persists up to the fourth year of syphilitic contagion. By faithful pursuance of a mercurial course the probability of the procreation of healthy children is increased from year to year.

The effect of mercury is not always permanent, especially if it is employed in only a single brief course during the first year. The sperm-cells of the father having as a result of treatment ceased to procreate syphilitic children, the disease may, on the cessation of treatment, again become active and the next child or children may in consequence be syphilitic.

This fact has been conclusively proved by a number of cases reported by Kassowitz,[1] and also in two cases under our own observation,[2] in one of which the father was syphilitic and the mother healthy. Seven children were born, of whom the first five were syphilitic, the sixth perfectly healthy, and the seventh markedly diseased. In this case, the mother was healthy, and the disease of the father was uninfluenced by treatment until after the birth of the fifth child, when he was under active treatment, which was abandoned after the birth of the sixth.

Our chief points of guidance in estimating the probable influence of a syphilitic father upon his offspring, are the degree to which the disease has affected his system and its amenability to treatment. It is well to add that the earlier a mercurial course is begun, the greater will be its effect upon the disease and the more complete the future immunity of the patient. When the symptoms are trifling, we should not assume that the sperm-cells are healthy, on the contrary we should insist upon an active and prolonged course of treatment.

Those rare cases, in which distinct evidences of syphilis are shown, such as gummata, nodes, palmar psoriasis, etc., without any indication of transmission of disease to offspring, have merely the local relics of an exhausted syphilis, which give them no immunity from fresh contagion.

Although the paternal influence in transmission is now generally acknowledged, there are authorities who still claim that the disease is derived exclusively from the mother. This theory, now known as that of Cullerier, who was one of its prominent advocates, is based upon observations which were rendered imperfect by failure to appreciate the facts, that syphilis may be influenced by treatment, and that the disease has periods of true latency.

In support of this view, Cullerier cites the cases of two men, who, in the early stages of syphilis undergo treatment, one even to salivation, and of many healthy women who bear, within a year of marriage, perfectly healthy children. In the light of our previous studies, the explanation is very simple. Moreover, Cullerier's articles show that he has seen syphilitic mothers produce diseased children, and has failed to learn the condition of the father, whose influence on the offspring is almost as powerful as that of the mother, and he has, therefore, reached a dangerous and false conclusion. It is useless to consider in detail the arguments and cases of those who follow in the same line, chief of whom are Follin, Notta, Charrier, and Oewre. We would advise a perusal of the criticism upon this theory, and upon the cases offered by its advocates, in the admirable work of Kassowitz.

We think we are fully warranted in adopting the conclusion that *the father may transmit syphilis to his offspring.*

The influence of the mother.—In order that syphilis may be conveyed by the mother, her disease must be constitutional. When impregnation

[1] Die Vererbung der Syphilis, Vienna, 1876.

[2] A contribution to the study of the Transmission of Syphilis. Arch. Clin. Surg., N. Y., Sept. 1877.

occurs later than within two weeks of the evolution of general manifestations, the fœtus is almost inevitably affected, and the activity of the disease in the child will be in proportion to that of its early stage in the mother, unless the disease has already been modified by active mercurial treatment.

Statistics show that such embryos rarely reach maturity, abortion occurring usually from the fifth to the seventh month, sometimes as early as the third.

In such cases, in addition to the disease of the ovule itself, the nutrition and growth of the fœtus, which depend upon the richness and purity of the mother's blood, are impaired in proportion to the severity of the disease in the mother, although her specific syphilitic influence ceases after conception.

The claim which our own experience tends to confirm is made by Fournier and others, that syphilis affects women more profoundly than men, and that it induces in them, more frequently and severely, a condition of chloro-anæmia. Women in this condition, becoming pregnant, are doubtless very likely to abort, while, on the contrary, an embryo, profoundly syphilitic, may reach maturity. Under these circumstances, treatment probably does not cure the disease of the fœtus, but may act upon it indirectly, by improving the condition of the mother.

In many women, however, as in some men, the course of syphilis is very mild, and, during the whole secondary period, an appearance of perfect health is retained.

The blood of such women is, of course, not profoundly altered, hence the nutrition of the child is relatively good. This point will be more fully considered.

Since arbitrary rules regarding the parental influence in the transmission of syphilis cannot be laid down, we shall give merely the general results reached in the experience of reliable observers, supplemented by our own.

The frequent observation that the product of conception, occurring while either parent is in the early and active stage of the disease, is intensely syphilitic or fails to reach maturity, and that healthier children are produced as the disease of the parent becomes less severe, is ground for the assertion that the severity of syphilis in offspring is in proportion to its activity in either or each parent, at the time of conception. Thus if a syphilitic woman becomes pregnant, or if the disease is derived from a man, in whom it is active, the first fœtus may live only to the third month. Without treatment, the next pregnancy may have a similar result, gestation possibly being a little longer.

As the disease becomes modified by time or by treatment, a living, but syphilitic child, may be born; in succeeding pregnancies the traces of the disease fade, until, finally, healthy children may be produced.

This gradual extinction of the disease is to be expected only when it is left to run its own course. Modified by treatment, it may offer many irregularities, a very striking instance being presented, where a third or

fourth child shows more evidences of syphilitic taint than its predecessors.

The power of hereditary transmission peculiar to the mother depends, as in the case of the father, upon the state of the syphilis in her organism, similar periods of latency, both spontaneous and due to mercurials, being met with in the female. If her system at the time of conception is temporarily free from syphilitic influence, her ovules are capable of producing healthy children.

The number of syphilitic children which a woman may produce varies. In some cases, of a mild character, healthy children may follow the birth of one or two infected ones. In other cases, particularly in those partially or entirely untreated, there may be six or more.

As a rule, after the lapse of six years, the influence of the disease has become so feeble that the risk of transmission is extremely slight.

Mercurial treatment seems to have quite as marked an effect in eradicating the disease and in diminishing its transmissibility, with women as with men.

We have seen, in the case of the father, that the disease may be temporarily so modified by treatment, that healthy children will alternate with those diseased. The same is true of the mother.

The rare occurrence of a syphilitic woman giving birth to twins, one diseased and the other healthy, seems difficult of explanation, but is doubtless due to the infection of one ovule alone.

Much light is thrown upon this apparent anomaly, by the fact that certain syphilitic cells or molecules may be temporarily confined to parenchymatous organs, while the system at large remains exempt.

We come now to an interesting question: *Can syphilis be conveyed through the utero-placental circulation?*

This mode of transmission is now pretty generally admitted, but many discrepancies are found in the statements of its advocates.

It is claimed by some that the transmission of syphilis to the child depends upon the occurrence of the mother's infection during the first half of pregnancy, while others regard the latter half as the dangerous period. It seems singular that this theory has been accepted at all, in view of the prevalence of so much uncertainty and lack of precision.

The question, however, is a very simple one, namely: Can the syphilitic virus of the mother be conveyed through her blood to the child?

The experiments of Pellizzari have conclusively proved that the essential vehicles of the specific virus are cells or albuminoid molecules derived from an active syphilitic lesion. After fecundation the embryo is not supplied with cells of any kind but simply with serum. There is, therefore, after the occurrence of conception, no possibility of the transmission of syphilis.

The literature of the subject furnishes not a single reliable case in proof of the theory. Many cases, apparently convincing, are reported, which, on careful scrutiny, show some vital defect.

The following is an illustration of this point: A pregnant woman, healthy at conception, becomes syphilitic during gestation, and brings forth a premature macerated child, or a syphilitic child may be born at full term. Of such cases certain authors say, that the former was a syphilitic embryo, and that the latter derived its syphilis from the mother. Such errors as these are the chief cause of the doubt now resting on this question.

A syphilitic woman *may* bring forth a macerated child, but, undeniable lesions of syphilis must be found on the child itself to prove its infection.

The anæmic condition of the mother, and not the specific poison in her blood, may have caused the premature expulsion of the child.

Statistics show that syphilis, contracted by the mother during pregnancy, is a very prolific cause of premature birth.

The aborted products, however, may differ, in no respect, from those met with in the case of mothers, who have passed through some severe adynamic disease, having no specific nature whatever, and cannot be called syphilitic in the absence of undoubted lesions.

A syphilitic child may be born at full term of a mother infected at some time during gestation. It has often been assumed, that, in such case, the disease is derived from the mother; on the contrary, it may be, and always is derived from the father. It is possible for a healthy woman carrying a syphilitic fœtus, to become infected herself, since the disease of her embryo imparts to her no immunity. This fact has been cited as evidence of syphilis acquired by the mother through conception, the truth being, that it was subsequently acquired directly from the father.

The importance of learning all the facts relating to father, mother, and child, before drawing conclusions, seems to have been often disregarded. As an illustration, we may mention the recent article of Hutchinson,[1] of London, in which, of six cases reported, not one bears out the theory advocated, some lacking most important details, while others are clearly instances of syphilis derived from the father.

The cases cited by Oewre, who also supports this theory, are equally unreliable for similar reasons.[2]

In order to prove this mode of transmission the following requirements must be observed: 1. It must be shown that the father was free from syphilis at the time of conception. 2. The infection of the mother during pregnancy, and her freedom from disease previously must be proved beyond doubt. 3. The child must have unmistakable syphilitic lesions, acquired without doubt before birth.

We reach the conclusion, based upon the physiological reasons already

[1] A clinical lecture on the communication of Syphilis from a mother to her fœtus. Med. Times and Gaz., Lond. Mar. 30, 1877.

[2] Among those who deny the theory in the most positive manner, and who furnish large numbers of trustworthy cases, may be mentioned Pick, Hennig, Köbner, Spath, Schaunstein, Bidenkap, Baerensprung, and Kassowitz. Baerensprung details fourteen cases, and says emphatically, that he has never seen a syphilitic child born of a mother infected during pregnancy.

The cases of Pick and Kassowitz are also especially valuable.

given, and upon the fact that satisfactory evidence to the contrary does not exist, that *the syphilis of the mother, acquired during pregnancy, cannot be conveyed to the fœtus through the utero-placental circulation.*

We now come to the question, *Can a healthy mother bear a syphilitic child?* It must be evident that the immunity of the mother depends upon the same condition as that of the child, namely, the absence of cellular elements in the fluid interchanged. Many cases have been reported of women giving birth to syphilitic children year after year, while they themselves remain free from infection. We[1] have ourselves reported two cases, and have seen many others of a similar kind.

Abundant and trustworthy evidence is found in cases reported since 1801, when Swediaur first suggested that a syphilitic fœtus could not infect the mother. Bertin, Haase, Colles, Acton, Meyer, Beduar, De Méric, Trousseau, and many others have given testimony worthy of credence. The most valuable is that of Kassowitz, who, like ourselves has followed cases from year to year, and who is an ardent advocate of this view, never having found any evidence in refutation.

He gives the carefully taken statistics of the Vienna Foundling Asylum, where, out of four hundred children with hereditary syphilis, one hundred and sixty had healthy mothers, one hundred and twenty-two had syphilitic mothers, and, in the balance of the cases, the condition of the mothers was not known. In addition, he gives seventy-six cases of his own, in forty-three of which the mothers were healthy, in twenty-three both parents were syphilitic, and in ten the mothers only were diseased.

In spite of this mass of evidence, there are still those who claim that contagion of the mother by this method is possible. Gardien, in 1826, was the first to do so, and among its recent eminent advocates is Ricord, who called this mode of infection "*choc en retour.*" The chief ground for its acceptance is found in the fact that mothers, having produced syphilitic children, during, or soon after pregnancy, themselves develop specific symptoms.

In such cases the initial lesion of the father has been overlooked, or else that of the mother has escaped notice by reason of its trifling character, or its inaccessible location, as upon the os uteri.

Moreover, in most cases, the disease is fully developed in the mother before the birth of the child, who may manifest no symptoms until several weeks after birth.

Even in the absence of infecting lesions in the father, we must bear in mind that the mother may derive her contagion from the blood of the father, arising from chafes produced during coitus.

Moreover, we must consider the difficulty of gaining correct information, in consequence of the reticence or forgetfulness of the patients. Many reported cases are based entirely on the statements of patients, which cannot be always trustworthy.

[1] A Contribution to the Study of the Transmission of Syphilis. Arch. Clin. Surg., N. Y., Sept. 1876.

Again, the active symptoms of disease in the mother may appear so late that all traces of the initial lesion have faded.

To prove this mode of contagion, its advocates have only one class of cases to offer in evidence, which we shall refer to presently.

That errors and imperfections are met with in the reports of these cases, is strikingly shown in a recent article by Diday, in which he gives twenty-six cases, most of which are utterly valueless, and the others are more or less defective.

Diday claims that the syphilis thus acquired, is similar to that resulting from regular contagion.

Hutchinson, of London, twenty years ago, held that a pregnant woman becomes infected by a syphilitic fœtus, and that at each succeeding pregnancy she receives fresh supplies of the poison, which thereby increases in volume and intensity, a view which is utterly opposed by the fact that in each succeeding pregnancy the children are less and less syphilitic.

Our only reason for referring to it is that the notion has been recently advocated by Dr. Dickinson of London.

From a recent article, we learn that Hutchinson[1] thinks that the infection, derived by the mother from the child is of a modified variety, the nature of which he does not clearly understand, but which he calls "blood to blood syphilis," in distinction from what he calls "chancre syphilis." Still he admits that he has seen mothers produce syphilitic infants and never show any evidence of disease themselves. In this connection two questions suggest themselves: Under similar circumstances, why are some women infected while others escape? Can syphilis exist without giving any manifestations?

A marked discrepancy is thus seen to exist between the views of the two chief authorities now living: Diday, who says that this form of syphilis differs in no respect from the ordinary kind, and Hutchinson, who claims that one is a slight and modified form of the other.

An interesting question, requiring further observation and study, is with regard to the immunity of mothers in fondling and nursing their own syphilitic children, while nurses often contract chancre of the nipple. This fact was first observed by Colles, and is now called by many "Colles' law." It would seem to indicate that the escape of the mother is due to some occult, undiscernible change in her system.

Cases of maternal infection by syphilitic children have been reported by Cazenave, Brizia Cocchi, and Müller, but they are not conclusive.

Von Behrend and Deutsch have given cases, which tend to prove the perfect health of women who have borne syphilitic children, by the fact that, on marrying a second, healthy husband, they produce children entirely free from disease.

For the reasons given, we conclude that, in hereditary syphilis, the disease is conveyed either by the sperm-cells or by the ovule, diseased at

[1] On Colles' Law, and on the communication of Syphilis from the fœtus to its mother. Med. Times and Gaz., Lond. Dec. 9, 1876.

the time of conception, and that infection of the mother or of the child cannot take place through the utero-placental circulation.

Infection of the Child at Birth.

The view, now accepted by few, has been upheld by some authors that the child often becomes syphilitic at birth from some lesion on the genital tract of the mother. In order to establish this idea, it must be proved that the product of conception was healthy, that the mother became syphilitic during pregnancy, and at full term had a contagious lesion on her genitals, and, moreover, on the child's body must be developed a primary lesion, and eventually secondary symptoms.

Infection by the Semen of Syphilitic Men.

Some authors hold that infection of the fœtus by the semen can occur only at the time of conception, while others maintain that it may take place at any time. The cases which seem to indicate this mode of contagion are those in which the initial lesion has escaped observation. It has been proved that the semen is not an infecting fluid, as are syphilitic blood and the secretion of specific lesions; moreover, every physician of experience has met with many instances of syphilitic men cohabiting for years with healthy women, who never show any evidence of syphilis. We, therefore, cannot admit the infectious properties of the semen as regards the female, or the fœtus subsequent to conception.

Invasion and Evolution of Hereditary Syphilis.

Before considering in detail the lesions of syphilis, its evolution and mode of invasion should be described.

The mortality of syphilitic children is very great, fully one-third dying before maturity. Abortion, resulting from the death of the fœtus, usually occurs about the sixth month, while that caused by infection of the mother during pregnancy takes place somewhat later. An aborted fœtus is usually in a macerated condition, the skin being easily detached, and the surface having a livid purple color, and various lesions will be found in some of the viscera. The integument may show nothing characteristic, or large bullæ may be found on the soles and palms.

In syphilitic children stillborn at term or dying soon after birth, frequently no lesion of the skin is found. The greater number of syphilitic children born living appear well nourished and perfectly healthy, but, generally at the end of three weeks, evidences of disease show themselves. The date of the evolution of syphilis has been noted by Kassowitz in one hundred and twenty-four cases, in eleven of which it was the first week; in twenty-one, the second; in thirty-four, the third or fourth; in forty, it was the second month; and in eighteen, the third month. The time seems to depend upon the varying intensity of fœtal infection, the early appearance of symptoms indicating a virulent type of disease.

The prognosis in the case of syphilitic children is always unfavorable, death from marasmus often ensuing within a month, but it becomes less serious the later the appearance of active symptoms.

The first indication of disease in a child, apparently healthy at birth, is the characteristic *snuffling*, which is the cause of great discomfort, and, in some cases, death ensues from the obstruction to breathing. Emaciation may progress to such an extent as to leave the skin of the body loose and wrinkled. The integument of the face seems to be drawn tight over the bones, and assumes an earthy sallowness. The eyes become prominent, and the juvenile expression is lost, until these children come to look like little old men and women. In some cases, however, even of children intensely diseased, excessive emaciation is not observed, so that there seems to be no special relation between this condition and the activity of the disease. Simultaneous with these changes, the child's nutrition suffers, gastro-intestinal and pulmonary lesions may be developed, and various skin eruptions make their appearance.

Eruptions of Hereditary Syphilis.

The principal eruptions are: the erythematous syphilide, or roseola; the papular syphilide; the vesicular, the pustular, the bullous, and the tubercular syphilides; and a form of furuncle.

With certain modifications, the features of syphilitic eruptions in infants are similar to those in adults. In both cases they appear in crops, but, in the hereditary disease, the later rashes are less symmetrical and are likely to be limited to particular regions, and the fever accompanying an eruption in the acquired disease is frequently absent. Although their general course is subacute, yet, on account of the activity of cell-growth and circulation in the integument of infants, the eruptions are developed rapidly, and tend to involve extensive surfaces. It may also be noticed that such lesions as papules and condylomata are less firm and solid than similar ones in adults.

The Erythematous Syphilide, or Roseola.

This is the most frequent and the earliest hereditary eruption, appearing about the third week, and often preceded or accompanied by coryza. It begins on the lower part of the abdomen as minute round or oval pink spots, which at first disappear on pressure. It rapidly invades the trunk, face, and extremities, and is generally fully developed within a week. The spots then vary from a third to a half inch in diameter, assume a dull red coppery hue, and no longer disappear on pressure, owing to pigmentation of the skin. In some cases, as in adults, punctæ of a deeper color are seen on the surface of the roseolous patches, denoting the situation of follicles, around which the hyperæmia is more intense.

The patches are not usually elevated, and desquamation is generally absent, except in severe cases about the hands, feet, and nates, where it may be limited to the margins of the patches, or it may be so extensive

as to resemble psoriasis. Sometimes the spots run together, and fissures form, either superficial or of sufficient depth to cause much pain.

The early change of color to a coppery hue, seen in irregular patches upon the chin, in the folds of the neck, and on the nates, where other lesions frequently coexist, is an important diagnostic feature.

The tendency to a circular form, so common in acquired syphilis, is observed in later hereditary eruptions more frequently than in roseola.

The eruption is sometimes so evanescent, and its color so faint, that it passes unobserved. By attention to the characteristics mentioned, and to the history of the patient, the diagnosis will generally be sufficiently easy.

The Papular Syphilide and Condylomata Lata.

These lesions will be described together, on account of their pathological similarity.

The papular syphilide may be the first eruption, and not infrequently it is intermingled with a roseola, or three or four different syphilides may be seen at the same time on one child. The small acuminated papule of acquired syphilis is scarcely ever seen, except in a relapse, or late in the course of the disease. Flat papules, small and large, scattered symmetrically over the body, are the common forms. Crescentic grouping is seldom seen except at a late period, and then only about the joints and on the extremities. The papules, at first dull red, and then coppery, may have a smooth surface, or the epidermis may exfoliate, especially on the soles and palms.

In this connection may be mentioned certain diffuse infiltrations, sometimes observed, which have not yet been carefully described. When papules are copiously distributed upon the palms and soles, it may be noted that they increase rapidly in size and number, and fuse together. The skin is of a dull red color, much thickened, and scaly. An entire foot or hand, or the gluteal region, from the thighs to the top of the sacrum, may be thus involved.

Irritation from active movements or from pressure, often excites fissures and ulceration, which are the cause of much suffering. This condition may accompany any lesion of hereditary syphilis; its course is chronic, and it is not, as a rule, affected by internal medication. The duration of the hereditary papular syphilide depends upon treatment, to which it promptly yields.

Condylomata lata are simply modifications of the papular syphilides, due to their situation between folds of skin, or at its junction with mucous membranes, or wherever there is moisture. The change in the papule is chiefly hypertrophic, there being no decided histological difference between the two forms of eruption. In size condylomata vary; their shape is governed by the conformation of the parts upon which they grow, and in color they are usually grayish-pink to dark brown. Their surface is generally flat, sometimes fissured and ulcerated, when a scanty offensive secretion exudes, which may form a thin dirty-colored crust. Particularly

in cachectic infants, a false membrane may form, which is slightly adherent, and leaves a raw, bleeding surface on removal.

When condylomata reach a diameter of more than an inch, an unusual size, the margins become elevated and rounded, and end abruptly in the surrounding skin. The latter may be of its natural tint or hyperæmic, or it may be the seat of the diffuse infiltration already spoken of.

Condylomata are among the early and most obstinate of hereditary lesions, local measures appearing to have more effect upon them than internal medication. They vary greatly in number, and, in infants, are most frequently seen about the anus. A characteristic symptom is exhibited when they exist at each angle of the mouth, associated with mucous patches in the buccal cavity. They are much aggravated by neglect and want of cleanliness, but with proper care and treatment they shrink and disappear, leaving a copper-colored stain.

The Vesicular Syphilide.

This rare form of eruption occurs among the early symptoms in severe cases of hereditary syphilis. It is never general, but is usually associated with a pustular or bullous eruption, and appears in groups of vesicles, closely and irregularly packed together, upon the chin and about the mouth, upon the forearms, the nates, the hypogastrium, or the thighs. It rarely shows a tendency to relapse.

The size of the individual vesicles varies. The smallest are about two lines in diameter, and elevated about one-quarter of a line above the general surface, are conical, contain transparent serum, and are situated upon a firm infiltrated base, which has a brownish-red color. Larger vesicles seem to be situated upon papules, and their contents are sero-purulent. Unlike eczema, the distinct vesicles show a tendency to remain isolated and to involve deeper portions of the skin, and rarely coalesce to form superficial, weeping patches. Though chronic in its course, this eruption generally yields to internal or topical treatment.

The Pustular Syphilide.

This eruption usually appears before the eighth week in children profoundly syphilitic, but is not infrequently seen in those whose nutrition is fair. The later it appears, the more likely are the pustules to be small, few, and superficial. It may invade the entire body, but is usually more abundant on the thighs, buttocks, and face, while elsewhere the pustules are thinly scattered and irregular.

The pustules vary from a third of a line to a line in diameter at their bases, and from a third to half of a line in elevation. The deep red color of their thickened bases ends abruptly at their margins. They may remain intact for many days, and, after rupture, the ulcerated surface may or may not become incrusted. Especially about the mouth, there is a tendency to grouping and the formation of quite extensive patches, or the whole head and face may be thus involved. The crusts are generally darker than those

of eczema and contagious impetigo, and the ulceration beneath is deeper. Itching and burning are usually slight, but much uneasiness and even suffering may be caused in certain locations, as when pustules form on the scrotum, the buttocks, or the face. Groups of pustules, attended by much redness and thickening of the surrounding skin, may form on the palms and soles, and the nails may be destroyed by pustules developed around them or beneath their free extremities.

This eruption usually leaves no permanent trace, but, in some cases marked loss of tissue and scarring result, which become less noticeable as the child grows older. Sometimes alopecia results from cicatrices on the scalp or the alæ nasi; the free border of the lips, or the angles of the mouth may be partially destroyed.

The pustular eruption may or may not be associated with some other form, the vesicular being seen with it most frequently. When a second pustular eruption is developed within the first three or four years of the disease, it is apt to be much more limited in extent than the first, but, in other respects, is precisely similar.

Furuncular Eruptions.

As early as the sixth month or as late as the third year, crops of furuncles may appear, constituting the sole symptom of hereditary syphilis or associated with other lesions. If symmetrically arranged, as they usually are, they are quite numerous; if irregularly distributed, they are few. They differ, in some respects, from ordinary furuncles.

Their bases are usually compact, well-defined, and of a dull coppery-red color. Their formation is slow and without signs of active inflammation. They begin as a small nodule in the corium, and gradually increase to the size of half a nutmeg. A superficial ulcer forms at the summit of the nodule, and a mass of slough comes away, leaving a deep cavity, with irregular, unhealthy walls and everted discolored margins, which may remain in a sluggish condition for many weeks or may increase in dimensions. The discharge is scanty and offensive. Their duration is from one to several months, and repair is often followed by permanent cicatrices.

Several older writers have referred to certain ulcers about the heel and ankles as being diagnostic of hereditary syphilis. These ulcers are simply the results of pustules or bullæ, which are often developed in those situations and are liable to irritation, which renders them very persistent.

The Bullous Syphilide—Pemphigus.

This eruption, sometimes seen at birth, and sometimes a month or six weeks after birth, is always indicative of a severe form of hereditary syphilis and is frequently a precursor of death. As regards its situation, it resembles the pustular syphilide, but the palms of the hands and the soles of the feet are most frequently involved, the lower extremities being most extensively involved, while upon the trunk the bullæ are sparsely scattered.

Diffuse infiltration, ulceration and the formation of fissures may attend

the development of this eruption upon the thighs and buttocks and upon the extremities. It may accompany pustules, and, less frequently, one or more of the other syphilides, is generally copious and is always symmetrical. The bullæ are developed rapidly, and their sero-purulent contents soon become purulent. They are surrounded by a rim of thickened integument of a coppery color, and, unlike other forms of pemphigus in children, lack uniformity of shape, some being conical, others rounded, and still others flattened.

Although they are developed rapidly, the subsequent course of bullæ is chronic. After having been ruptured their progress is similar to that of pustules. It differs from every other form of eruption in being limited to a single outburst, rarely or never relapsing.

The Tubercular Syphilide.

This lesion, much rarer in hereditary than in acquired syphilis, may occur as early as the sixth month, or a second attack may be met with several years after birth. The tubercles begin as deeply-seated papules, or as small movable nodules, in the latter case greater depth of tissue being involved. The skin soon becomes implicated, and a sharply defined tumor, from a quarter of an inch to an inch or more in diameter, results, which may disappear leaving no trace, or it may break down into an ulcer which is very persistent and demands local as well as constitutional treatment.

Regions where the connective tissue is loose and abundant are the favorite seat of tubercles of the largest size. Their surface sometimes becomes scaly and the eruption then resembles psoriasis. Similar eruptions are also seen in scrofulous children, but the greater surrounding hyperæmia, which is of a bluish rather than a coppery color in the scrofulous affection, and the points already given in the description of ulcerations of acquired syphilis, may aid in the diagnosis.

Gummata, and Gummatous Ulcers.

These lesions sometimes appear as early as the third year but generally later, even as late as the twentieth year. After this period, it is not usual for ulcerations to have the features of hereditary syphilis, typical gummata having been observed by us in only one instance.

The course of these lesions in hereditary syphilis is similar to that in acquired, and therefore needs no additional description.

Affections of the Mucous Membranes.

One of the earliest and most constant symptoms of hereditary syphilis is coryza, which is due to structural changes in the mucous membrane of the nasal passages. A few days before the appearance of general manifestations there may appear a serous discharge from the nostrils, sometimes trifling, sometimes so excessive as to impede respiration, especially during

sleep and in the act of nursing. This discharge is accompanied by the characteristic "snuffling."

The nasal secretion soon becomes purulent, bloody and very offensive, and causes swelling and excoriation of the alæ nasi and upper lip. Tenacious crusts composed of the dried secretions form on the inflamed surfaces, causing much discomfort. In its mildest and rarest form, this affection is a simple erythema. Generally, ulceration of the mucous membrane ensues, and not infrequently the disease progresses to the bony structures, producing necrosis with perforation or even entire destruction of the septum, followed by striking deformity.

The intensity and chronicity of specific coryza, the limitation of the disease to the nasal passages, and the coexistence of other syphilitic manifestations are sufficient to establish the differential diagnosis.

Mucous Patches of the Mouth.

In the infant these lesions often lose their characteristic appearance quite early. At first they consist of slightly elevated portions of mucous membrane with whitish surfaces and surrounded by erythematous areolæ. The pearly epithelial covering may be soon cast off, leaving a smooth red surface, slightly depressed, which may ulcerate. The regular outline of the round or oval patches may be lost and a number coalesce, thus involving a considerable extent of surface, which may be superficially ulcerated and in cachectic subjects is often partially covered by an extremely adherent false membrane of a pale brown color. The patches frequently become hypertrophied and resemble condylomata lata.

In the early course of hereditary syphilis as many as twelve distinct mucous patches may be counted; at a later period they are less numerous but they show a decided tendency to relapse, having been seen by us as late as the sixth year.

The most common situations of this lesion are the angles of the mouth, the mucous membrane lining the cheeks, the pillars of the fauces and the tonsils, the sides, and frequently the dorsum of the tongue, and also very often the portions of the gums adjacent to the teeth. On account of the difficulty of pharyngeal examination in young infants, we cannot state positively the frequency of the invasion of this region. There is certainly less tendency to extensive ulceration of the pharynx and tonsils in infants than in adults. At the angles of the mouth the ulceration is often extensive and painful.

The serous secretion of mucous patches is rather free, and quite as infectious as that of the initial lesion. Hence the necessity of their early recognition, and of measures to prevent contagion. Nursing at the breast of any one but the mother, kissing and fondling must be prohibited, and great care and cleanliness must be observed in the use of bottles, cups, etc. The infection of the nurse by a child having mucous patches of the mouth is particularly liable to occur in hospitals and in lying-in asylums. An

instance of this mode of contagion has been reported by us in a paper,[1] in which this question is fully considered.

Only when ulceration exists, or when the mucous patches are complicated with diphtheritic membrane, is their diagnosis from stomatitis, simple or parasitic, attended by difficulty. In the absence of distinctive features in the history and on the body of the child, our decision must be based on the local appearances. In simple stomatitis the inflammation is generally more diffuse, the whole tongue, in particular, being intensely affected and often covered with vesicles, which are not seen in the specific disease. The tendency of mucous patches to development at the angles of the mouth is a valuable point in diagnosis. In parasitic stomatitis the inflammation is less localized than in the specific; the general hyperæmia is greater, and the false membrane has a whiter color and a more patchy appearance. In both forms of non-specific stomatitis, the sulci between the gums and cheeks, and the gums themselves, are often involved, rarely in the specific.

The history of the case, therefore, and the comparatively circumscribed character and limited distribution of mucous patches, will enable us to make a diagnosis.

Gummatous Infiltrations.

These lesions, consisting of cellular infiltration of the mucous membrane, are usually developed upon the hard palate, or upon the posterior pharyngeal wall, when they may be mistaken for retro-pharyngeal abscess. They are rarely seen before the third year of life, and generally occur from the sixth to the twelfth. The first indication of their formation is a reddish elevation of the mucous membrane, forming a round or oval patch, from half an inch to an inch and a half in diameter, which increases in size and in prominence until a well-defined tumor results. Necrotic changes almost invariably occur in the tumor, leaving an ulcer with sharply cut, undermined edges and tenacious greenish secretion, involving the mucous membrane even to the subjacent bone.

Their course is chronic, with slight tendency to invade surrounding parts. Upon the hard palate they give little trouble, but upon the wall of the pharynx they are the source of much suffering and inconvenience in swallowing. The health may be further impaired by the copious secretions and the noxious gases developed. Repair of the ulceration is followed by cicatricial contractions, which, on the hard palate, may affect phonation, and, on the wall of the pharynx, may interfere with deglutition. The diagnosis is generally easy.

In strumous ulceration of the hard palate, the process is more active and less sharply limited, while other evidences of struma exist. Retro-pharyngeal abscess is much more acute in its invasion and progress than

[1] The Dangers of the Transmission of Syphilis between Nursing Children and Nurses in Infant Asylums and in Private Practice. Am. J. Obst., N. Y., Nov. 1875.

a gummy tumor, and, in the latter case, signs of pre-existing syphilitic lesions may be found. In all cases the previous history of the patient must be learned.

Affections of the Larynx.

In the early periods of hereditary syphilis, the larynx and upper air passages may be the seat of simple hyperæmia, of mucous patches, or of ulceration involving the mucous membrane or even the cartilages, to such an extent as to result in stenosis.

Franke[1] reports the case of an infant, in whose larynx there was deep ulceration and perichondritis.

Coincident with, or following gummatous infiltrations into the pharynx, similar lesions may attack the larynx. In six cases, as yet not published, observed by our friend, Dr. Geo. M. Lefferts, destruction of this organ in varying extent was found. In three cases the disease was limited to the epiglottis, which in two was totally destroyed, and in one there was loss of half of its free border. In one of the two cases of total destruction, the ulceration had extended to the right arytenoid epiglottic fold. In the remaining three cases, there was general destruction of the superior laryngeal tissues with resulting stenosis.

In all of these cases there was greater or less destruction of the pharynx, and the laryngeal affection was probably an extension of the morbid process from that region. Our knowledge being as yet so limited, we cannot of course state that the laryngeal affections are always secondary to those of the pharynx, though the histories of these cases warrant that view. It remains for future observation to determine whether, in the course of hereditary syphilis, the larynx is primarily attacked, with or without attendant lesions of the pharynx. The ages of the affected children varied between ten and eighteen years, and the histories of all of them gave evidence of inherited syphilis.

Like gummatous affections of the pharynx, those of the larynx belong to the late manifestations of the disease. Like them, also, their course is quite rapid, and unless promptly checked they produce great deformity. Their symptoms are a varying degree of hoarseness and even total loss of voice, with difficulty of respiration in the more severe cases. Iodide of potassium in full doses should be given. These affections are quite rare, and their existence is not even mentioned in most text-books.

Affections of the Lungs.

In 1851, Depaul called the attention of the profession to peculiar indurated masses, found in the lungs of infants affected with hereditary syphilis.

[1] Syph. Geschwüre u. Verengerung der Larynx. Wien. med. Wchnschr., no. xviii, 1868.

He furnished specimens of this lesion to the Anatomical Society of Paris, who submitted them to Lebert for examination, whose report was as follows: "There is no trace of pus in the indurated masses. The tissue presents a peculiar yellow color, and is elastic and resistant. In the midst of a network of normal pulmonary tissue is found, mingled with fibro-plastic elements, a soft, pulpy and diffused substance, containing small cells, which differ from those of cancer and tubercle, and which resemble in every respect those seen in syphilitic gummata. These specimens may therefore be regarded as an early stage of pulmonary gummata, which first appear as indurated masses, afterwards assume a yellow and pulpy appearance, and finally soften, so as to resemble purulent infiltration or an abscess."[1] In his treatise on Pathological Anatomy, Lebert gives a plate of one of these masses, which he compares with certain pneumonic products.[2]

Within the past ten years, much has been contributed by various observers to our knowledge of pulmonary changes. Interstitial cell proliferation, sometimes complicated with gummatous infiltration, seems to be the principal change.

When the lesions are extensive and fully developed, the lung is reduced in size, increased in consistency, and, when cut, is found to be firmer and less vascular than normal. Scattered upon the surface of the lung and through its substance, on the smaller vessels and bronchi, which are much thickened and look like yellow cords, are numerous nodules of various sizes. The more recent are small and of a grayish-pink color; the older ones may be the size of a filbert, are light yellow, and, when incised, exude a thin milky fluid, while serum escapes from the lung substance. The former appear to be homogeneous, while the latter are granular and may contain pus. The pulmonary pleura, especially in the vicinity of the nodules, is thickened and opaque.

The entire lung is usually more or less involved in the morbid processes, though, in some cases, the nodules may be few and confined to a portion of a single lobe.

The first step in the process is evidently active congestion, followed by cell proliferation around the bronchioles, and, in a less degree, in the walls of the capillaries, resulting in partial or complete obstruction of their lumen and consequent destruction of the function of the lung.

The nodules, which represent one or more plugged and distended alveoli, consist of a mass of connective tissue cells, fibrous tissue, granular debris and perhaps some gummatous tissue. Like all new growths, they are liable to degeneration, fatty or caseous, and may contain pus in their centres. The pleural changes are due to hyperæmia and increase of fibrous tissue. True gummatous nodules have been found by some observers. While two forms of nodules, the gummatous and the connective tissue, may exist, their gross and microscopical appearances are, in some cases, so very similar,

[1] Bull. Soc. anat. de Paris, 1852, p. 23.

[2] Traité d'anatomie pathol. Pl. viii, figs. 3 and 4.

that it is impossible to distinguish them. The gray hepatization of pneumonia resembles syphilitic induration, but may be recognized by the greater succulence and less resistance of the lining tissue and by the escape of true pus on pressure. Owing to the nature and extent of these pulmonary lesions, life is, in most cases, destroyed. They may, however, exist in a moderate and localized form, without such a result.

A child, five months old, who had passed through the early period of its disease, having had a papular and pustular eruption, developed bronchopneumonia, with dulness on percussion, imperfect expansion, and harsh respiratory sounds, with slight crepitation at the right apex and over the lower lobe of the left lung. Although there was excessive cough, the increase in pulse rate and in temperature was very slight and no acute symptoms of any kind were exhibited. This condition lasted fully six weeks, and finally yielded to the mixed treatment in gradually increasing doses. We examined this infant six months later, and there were no perceptible traces of the lesion in either lung. We have seen two cases essentially similar both in course and in method of cure, in which lesions of the bones, joints, eyes and integument were also present.

While these changes usually take place in intra-uterine life, we may find them at any time when the syphilitic diathesis is active, but most frequently within the first eighteen months of life. They are not attended by much systemic reaction, and may be developed in any portion of the lung either symmetrically or unilaterally.

Affections of the Peritoneum.

Primary morbid changes are rarely, if ever, seen in the peritoneum. Thirty-one cases, in which general or partial uncomplicated inflammation of this membrane was distinguished, have indeed been reported by Simpson,[1] who claims the existence of true peritonitis.

The syphilitic origin of many of these cases was, however, doubtful, and in some the exact condition of the viscera was not observed. Chronic adhesive peritonitis, more or less localized and unattended by marked symptoms, often occurs, originating in some syphilitic visceral change particularly of the liver.

Affections of the Alimentary Canal.

The mild chronic diarrhœas observed in syphilitic children, other causes being eliminated, seem to indicate the presence in the gastro-intestinal tract of erythematous affections similar to those seen in the mouth and pharynx. Structural changes have been found by various observers.

Förster[2] has described a fibroid degeneration of Peyer's patches in a

[1] Edinb. M. and S. J. no. 37.

[2] Würzb. med. Ztschr., Band iv, part 1, 1863.

syphilitic infant who died six days after birth, with lobular pneumonia and purulent bronchitis. The glandular structure of the patches had been replaced by elevated grayish-red masses, with smooth surface and yellowish centre, composed of nuclei, cells and fibres of connective tissue. Similar observations have been made by Eberth,[1] Roth,[2] and Oser,[3] who have described an affection consisting of multiple circumscribed indurations, varying in size and generally circular, situated on a level with Peyer's patches and the solitary glands, the surrounding mucous membrane being smooth and slate-colored, or more or less ulcerated. The latter condition resembles that of a dry eschar, but leaves an ulcer with a bright lardaceous base. This lesion, consisting of an infiltration of cells similar to those of lymphatic glands and of connective tissue, is usually limited to the submucous stratum.

Affections of the Liver.

The functional activity of the liver in infancy renders it subject to profound structural changes, which consist chiefly of connective tissue infiltration. The credit of first calling attention to this important lesion belongs to Gubler,[4] from whose writings, mainly, Diday was enabled to give the following clear and complete description, of which we avail ourselves:—

"When the lesion has reached its maximum, the liver is sensibly hypertrophied, globular, and hard. It is resistant to pressure, and even when torn by the fingers its surface receives no indentation from them. The elasticity of the organ is such, that if a wedge-shaped piece taken from its thin edge be pressed, it escapes like a cherry-stone, and rebounds from the ground. When cut into, it creaks slightly under the scalpel. The distinct nature of its two substances has completely vanished. On a uniform yellowish ground, a more or less close layer of small, white, opaque grains is seen, having the appearance of grains of semola, with delicate arborescences, formed of empty bloodvessels. On pressure no blood is forced out, but only a slightly yellow serum, which is derived from the albumen. Gubler has only three times seen the change carried to this extent. It is most frequently much less marked. Thus, the tissue of the organ is firm, without having that extreme hardness and yellow color, which might admit of comparison to some kinds of flint. The interior of the organ presents rather an indefinite color, shaded with yellow or brownish-red, more or less diluted; but in no part is the parenchyma quite healthy in appearance.

[1] Ueber syph. Enteritis. Arch. f. path. Anat., etc., Berlin, Band xl, page 326, 1867. Quoted by Lancereaux.

[2] Enteritis syphilitica. Ibid., Band xliii, p. 298.

[3] Fälle von Enteritis syphilitica. Arch. f. Dermat. u. Syph., Prag., Band iii, 1870.

[4] Mémoire sur une nouvelle affection du foie, liée à la syphilis héréditaire chez les enfants du premier âge. Gaz. méd. de Paris, 1852.

"Again, the change may be found in circumscribed parts only. Gubler has seen it confined to the left lobe, to the thin edge of the right lobe, and to the *lobulus Spigelii*. He ascertained by injections that, in the indurated tissue, the vascular network is almost impermeable; that the capillary vessels are obliterated, and that even the calibre of the larger vessels is considerably diminished. Microscopical examination enabled him to discover the cause of this disposition by revealing in the altered tissue of the organ, in every degree of change, the presence of fibro-plastic matter, sometimes in considerable, sometimes in enormous, quantity. In the portions intervening between the diseased parts, the cells of the hepatic parenchyma maintain all the characteristics of their normal condition. The physical consequences of the deposit of these elements are an increase in the volume of the liver, the compression of the cells of the *acini*, the obliteration of the vessels, and the consequent cessation of the secretion of bile. In all the subjects examined after death by Gubler, he always found the bile in the gall-bladder of a pale yellow color and very sticky; that is to say, very rich in mucus and very poor in coloring matter."

Later observations confirm the results obtained by Gubler, and add much to our knowledge of the microscopic changes found in the liver. The primary changes are vascular. The walls of the vessels are much thickened, and around the tunica adventitia numerous nuclei and cells, with an abundance of fine fibrillar connective tissue, are found. The calibre of some of the vessels is diminished, and that of others is entirely obliterated. Moreover, various stages of fatty degeneration of the hepatic cells are found. Increase of connective tissue is observed in the parenchymatous network of the organ and in the capsule, which may be thickened either in its entire extent or especially on its upper surface. Adhesions may form between the convex surface and the diaphragm or the peritoneum of the anterior abdominal wall. Certain changes in the veins have been described by Schüppel, under the title "peripyle phlebitis syphilitica," which will be spoken of in the section on affections of the circulatory organs.

Gummous hepatitis in hereditary syphilis is admitted by several authors. There are two forms, one consisting of numerous minute tumors scattered through the liver, called by Wagner miliary syphilome; and the other consisting of one or more large circumscribed tumors, such as are found in the adult. Either of these lesions may be accompanied by the fibro-plastic infiltration of Gubler.

The clinical history and microscopic anatomy of this affection have been carefully studied by Rochebonne, a former student of Prof. Gubler. This observer thinks that a diagnosis may be made from the following symptoms: A deep wine-colored venous stasis and œdema of the lower extremities, often accompanied by pemphigus; ascites, due to mechanical obstruction of the circulation, as in cirrhosis; a more or less pronounced chloro-anæmic appearance of the face; and the presence in the urine of albumen and hæmato-globulin. Vomiting may occur, and constipation, alternating with diarrhœa, has been observed. Icterus, symptomatic of

this affection, has not been noticed. A fatal result commonly ensues in the early weeks of the child's existence.

Affections of the Spleen.

In cachectic children and in those in whom the disease assumes a severe form, more or less hypertrophy of the spleen is sometimes observed, usually during the early stages of syphilis. The enlargement is rapid, the size of the organ often being quadrupled in two or three weeks. This condition may persist, according to Barlow, even for a year, while on the other hand, mercurial treatment induces its rapid subsidence.

Although we are ignorant of the pathology of this affection, the acuteness of its invasion and its rapid involution suggest hyperæmia rather than permanent cell-growth. Still it is quite possible that cellular hyperplasia may take place in the spleen, as it does in the liver. Lancereaux says that the hypertrophied spleen is firm and smooth, that it sometimes becomes adherent to other organs, that the condition is often a simple multiplication of cell-elements, and that affections of the liver and perhaps of the lymphatic glands generally coexist.

Gee, who first described the affection in 1867, stated that it occurs in at least one-half the cases of hereditary syphilis, and in one-fourth hypertrophy is excessive and accompanied by a similar condition of the liver and the lymphatics. In two post-mortem examinations he found enlargement and induration, without evidence of gummatous infiltration or of amyloid degeneration.

In view of its gradual diminution as the general condition of the child improves, splenic hypertrophy is regarded by Gee and Barlow as an evidence of the severity of the syphilitic cachexia.

According to Parrot[1] there are two forms of splenic lesion caused by hereditary syphilis. The first is an hypertrophy, in which the organ may become three times its natural size, which, he thinks, is a secondary result of portal obstruction, caused by diffuse infiltration of the liver, the spleen then being compelled to serve as a reservoir of the blood.

The second form is an inflammation resulting in the formation of false membranes around the capsule of the organ. Parrot is not positive regarding the future course of these lesions, but is inclined to attribute to them certain lardaceous degenerations found later in the life of children, who suffered from hereditary syphilis at their birth. He thinks that these lesions were the cause of rupture of the spleen in the case of a new-born child with hereditary syphilis, the details of which were reported by Charcot in 1865.

Affections of the spleen have been studied also by Birch Hirschfeld[2] in thirty-two cases of hereditary syphilis. He found the organ much enlarged,

[1] Mouvement méd., Paris, 23 nov., 1872.

[2] Zur pathologischen Anatomie der hered. Syphilis. Arch. d. Heilk., Leipz., Feb. 1875.

but was unable with the microscope to discover any abnormality. The spleen of a fœtus, born in a macerated condition, was soft and of a dirty-violet color. In case of still-birth or of death soon after birth, the density of the organ was increased and its color was dark-brown. Two forms of lesion of the spleen are therefore recognized by Hirschfeld: in one the organ is indurated and of a dark-brown color: in the other it is soft and pale.

Lesions of the Pancreas.

The changes in the pancreas, caused by hereditary syphilis have been recently studied by Osterloh,[1] Oedmansson,[2] Wegner,[3] and most extensively by Birch Hirschfeld.[4] The last-mentioned observer found in thirteen syphilitic children, who died during or soon after birth, varying degrees of morbid change. In the most marked cases the organ was much enlarged, its weight was doubled, its tissue firm, and, on section, it presented a glistening white appearance, somewhat like that of scirrhus, the glandular substance being very indistinct. Under the microscope, the interstitial connective tissue, especially between the larger lobules, was found greatly increased. Portions of lobules were compressed, and their epithelium was atrophied and in a state of fatty degeneration. The vessels of the interstitial tissue were few, and their walls were thickened. This extreme degree of the process was observed in seven cases; in six the changes were less perceptible, and the lobules could be distinctly seen, although the organ was enlarged and rather denser than normal. The head of the organ was more altered than the tail.

Hirschfeld thinks that this marked change begins late in intra-uterine life, since it is rarely found in macerated fœtuses prematurely born. The most marked case was that of a child who died five months after birth.

It is not improbable that this degeneration of the pancreas is one of the chief causes of gastro-intestinal disturbances in hereditary syphilis.

Affections of the Kidney.

Our knowledge of the condition of the kidney in hereditary syphilis is very limited. Lancereaux[5] states that he has found connective tissue proliferation with fatty degeneration of the epithelium lining the tubuli uriniferi. The organs were firm and of a yellow color. Bradley[6] reports

[1] Mitth. a. d. Kgl. Sächs. Entbindungsinst. zu Dresden. Quoted by Birch Hirschfeld.

[2] Jahresb. ü. d. Leistung. u. Fortschr. 1869, 2 Abth., 561.

[3] Arch. f. path. Anat etc., Berl. Band 50, Heft 2, 1870.

[4] Beitr. zur path. Anat. der. hered. Syph. Neugeborren. Arch. d. Heilk., Leipz., Feb., 1875.

[5] Op. cit., page 420.

[6] Syphilitic Dropsy of the Kidneys, Brit. M. J., Lond., Feb. 4, 1871.

the case of a syphilitic child four months old, with dropsy and albuminuria, who was cured by mercurial treatment.

The most recent studies of the pathological anatomy of the kidney affected by syphilis are by Parrot. On section, he found these organs studded with numerous small tumors, varying in size from a pin's head to a cherry-stone. The smallest were white, and the larger were yellow at their periphery and reddish in their centre. In some spots there was partial destruction of the renal tissue, and there were also infarctions. The lesion consists of a circumscribed or diffuse infiltration of round embryonic cells, with others of fusiform shape, into the connective tissue framework, followed by compression or destruction of the tubules and colloid degeneration of their epithelium. In the early stages of this affection, the organs become much enlarged, and Molliere reports a case in which they were found to be twice their normal size. Gradual atrophy follows degenerations of the new cells, and the organs may finally become much reduced in size.

Affections of the Suprarenal Capsules.

Lancereaux has noted enlargement of these organs in a large number of cases. Virchow has also observed it, and speaks of a case in which complete fatty degeneration was found, a condition met with also by Hulke. According to Lancereaux, proliferation of young connective-tissue cells in the cortical substance has been found by Baerensprung. In a case in which the left suprarenal capsule was enlarged and adherent to the diaphragm, Hennig found its contents gelatinous.

Affections of the Testicles.

Observation has convinced us that Zeissl, Hill, and other authors are incorrect in their opinion that the testicles are not affected in hereditary syphilis. In a recent paper, we gave the histories of five cases of disease of the testis in young children, with marked lesions of hereditary syphilis. The details of seven cases have been given by Henoch,[1] and others have been reported by North,[2] Bryant,[3] and Obédenciere.[4]

The disease consists of a chronic, painless enlargement of one or both testicles, usually accompanied by hyperæmia of the scrotum and a moderate amount of hydrocele, the morbid process sometimes involving the epididymis and the cord. In recent cases, mercurial treatment speedily effects a cure; in cases of long standing atrophy may occur, or degeneration of the organ, with abscess of the scrotal wall, followed by fungous protrusion. Microscopic examination has shown connective tissue prolife-

[1] Ueber Syphilis der Hoden bei Kleineren Kindern. Deutsche Ztschr. f. prakt. Med., Leipz., No. 11, 1877.

[2] Med. Times and Gaz., Lond., 1862, vol. i. p. 403.

[3] Ibid., Dec. 1863.

[4] Bull. Soc. de chir. de Paris, 1875, p. 140.

ration, usually involving the whole organ and sometimes the tunica vaginalis, especially if the disease has invaded the epididymis. The history of the child, the presence of syphilitic lesions elsewhere on its body and the slow development of the disease, as compared with a form of cancer sometimes seen in the testicles of children, assist in diagnosis.

Morbid Anatomy.—The histology of the diseased testicle in hereditary syphilis has been studied by Parrot and Hutinel.[1] The lesion is a proliferation, interstitial or diffuse, of round embryonic cells resembling white blood-corpuscles. In the interstitial form, in which the gland may or not be perceptibly altered, the cell-growth results in small tumors of various sizes, irregularly placed around the arterioles, which traverse the trabeculæ. In the diffuse form, in which the organ is much enlarged, a similar cell growth is found permeating the meshes of its connective tissue generally. The process begins at the mediastinum testis, follows the vessels of the trabeculæ, penetrates between the seminiferous tubules, and finally results in hypertrophy and sclerosis of the organ with partial or entire obliteration of the tubules, whose lining epithelium undergoes granulo-fatty degeneration. Fatty degeneration and final absorption of the new growth take place, resulting in atrophy and, in rare cases, in complete destruction of the organ. Probably, the cases which are attributed to arrest of development, in which the testis is small or entirely absent, are those in which the organ has been attacked in early life by the lesions of hereditary syphilis. Our knowledge of the lesions of the ovaries is limited to the statement of Parrot that in two cases he found in the substance of these organs bluish spots with small whitish grains. It is probable that they may be affected in a similar manner as the testis.

Affections of the Synovial Sheaths.

In two cases of hereditary syphilis under our observation the extensor tendons of the hands were involved, as indicated by marked fusiform swelling over the metacarpal bones, of doughy consistence and freely movable under the skin which was slightly distended and reddened. Its development was rapid and associated with other lesions particularly osseous, its subsequent course indolent and not appreciably affected by mercurial treatment. In one case, cure resulted from the application of a compress over a piece of mercurial plaster, after withdrawal of the fluid with the hypodermic needle. Other tendinous sheaths than those of the hands may be affected.

Affections of the Nails—Onychia.

The nails are more frequently involved in hereditary than in acquired syphilis. There are two varieties of onychia; the ulcerative, which is the more frequent, and the nutritive, due to impairment of nutrition.

[1] Étude sur les lésions syphilitiques du testicule chez les jeunes enfants. Rev. mens. de méd. et de chir., Paris, fev., 1878.

Ulcerative onychia begins at the side or base of the nail, as a papule or pustule which soon ulcerates, the process extending along the concave base of the nail being limited indefinitely to that location, or along the lateral margins and finally involving the matrix of the nail, which, in the latter case, is soon cast off. The distal phalanx becomes very painful and enlarged, the finger resembling in shape an Indian club. The thickened everted edges of the ulcer, its sloughy base and sanious discharge, and the coppery hue of the surrounding skin are characteristic.

This form of onychia may be met with alone or associated with general papular or ulcerative eruptions and is most frequently seen during the first year or two of the child's disease. In cases improperly treated it may be developed later, and though its course is generally chronic, it may be decidedly shortened by appropriate treatment. The nails of the hands seem to be more often affected than those of the feet.

The growth of a deformed and useless nail or cicatrization without a new nail may be expected in severe and protracted cases not subjected to treatment. In such cases, osteitis of the phalanx may indicate amputation. The second form of onychia is even more chronic than the preceding, and a much later manifestation of the disease. It begins as a swelling at the base or around the margins of the nail, of a coppery hue, which shades off into the surrounding parts. At the same time the nail loses its smoothness and gloss and becomes thickened, fissured and brittle. The nail has a dirty white color, and there is always hyperæmia of the matrix and the surrounding parts with much deformity of the phalanx which may not be permanent. The nail may be finally restored in a perfectly healthy condition, and the bone is usually not involved.

Affections of the Hair.

The features of alopecia areata in hereditary syphilis are similar to those of the acquired form. It occurs in connection with dermal lesions of the scalp, particularly pustular, where in consequence of its failure to be controlled by mercurial treatment we have been disposed to consider it an intercurrent affection. In other cases the dry condition of the hair seems to be a result of the adynamic influence of syphilis, rather than any specific effect. We are, therefore, inclined to doubt the existence of an alopecia symptomatic of hereditary syphilis, and to regard the effect upon the nutrition of the hair similar to that of any debilitating disease.

Affection of the Thymus Gland.

Paul Dubois,[1] in 1850, first called attention to certain pathological changes which are found in the thymus glands of infants who are born dead, or who die a few days after birth from inherited syphilis. Externally, the gland appears to be normal in size, color, and consistency; but if an

[1] Gaz. méd. de Paris, 1850, p. 392.

incision be made into its substance, pressure will cause to exude from the cut surface a few drops of yellowish fluid, which, under the microscope, is found to consist of pus. In the cases observed by Dubois, the purulent matter was uniformly diffused throughout the glandular tissue; but Depaul,[1] Weber,[2] and Hecker,[3] have met with abscesses of the thymus. The thymus gland naturally contains a whitish, viscid fluid, which may, with a little care, be distinguished from the suppuration dependent upon syphilis. Of five cases of this lesion observed by Dubois and Depaul, an eruption of pemphigus was present in four; and in the same number the syphilitic antecedents of the parents were clearly established.

The more recent observations of Weisflag[4] and Wiederhofen[5] have confirmed the views of Dubois, which were at one time rejected by several German authors, who claimed that Dubois had mistaken the normal secretion of the gland for pus, and that the possible changes were not necessarily due to hereditary syphilis. Having studied the literature of the subject, as well as the lesion itself, Weisflag arrives at the following conclusions: 1. It is certain that the thymus abscess described by Dubois exists and although not a constant symptom of hereditary syphilis, it is sometimes met with. 2. This lesion, associated with other signs of congenital syphilis indicates that the father or mother of the infant suffers or has suffered from syphilis. 3. It is possible, but not proved, that this affection may exist in children in whom there are no symptoms of syphilis, but its existence renders the diagnosis of hereditary syphilis probable, even if the disease of the parents is not proved. 4. Such is the great similarity in the appearance of pus and of the secretion of the thymus that they cannot always be distinguished.

There are no facts to prove the theory of Lancereaux that this fluid is due to the breaking down of gummy material. It seems to us more probable that it is due to a degeneration of connective tissue which has been newly formed in the parenchyma of the organ.

Affections of the Lymphatic Ganglia.

General subacute adenitis, invariably present in the early stages of the acquired, is always absent in hereditary syphilis, and is an important feature in the differential diagnosis. Swelling of the cervical ganglia, which often accompanies active lesions in the mouth and throat and upon the scalp frequently results in abscess, particularly in cachectic children, when the condition can be distinguished from struma only by the history of the case and by concomitant symptoms.

[1] Gaz. méd. de Paris, 1851.

[2] Beitr. z. path. Anat. d. Neugeborenen, Kiel, 1852, Band ii., p. 75.

[3] Verhandl. d. Gesellsch. f. Geburtsh, in Berl., Band viii., p. 117.

[4] Ein Beitrag zur Kenntniss der Dubois'schen Thymus Abscesse bei angeborener Syphilis. Inaug. Dissertation, Zürich, 1860.

[5] Ueber Syphilis. Ueber Thymus Abscesse bei hereditärer Syphilis. Separat-Abdruck aus dem J. d. Kinderheilk. Wien, 1852.

On post-mortem examination, Hutchinson found the bronchial ganglia of a syphilitic child, five months old, infiltrated with fibrinous deposits, and cases of infiltration of cell elements, sometimes in the form of small circumscribed tumors, have been reported by Baerensprung. The ganglia of the gastro-hepatic omentum and mesentery were found most frequently involved, being symptomatic perhaps of visceral lesions.

The Condition of the Blood.

No microscopical observations of the blood in the various stages of hereditary syphilis have yet been made. Lancereaux, one of the first to call attention to the subject, remarks that, considering the number of visceral affections, alteration in the composition of the blood is probable. Increase in its consistency, and effusions, both parenchymatous and into cavities, have been noticed, especially by Hutchinson and Baerensprung. In the case of an infant who died six hours after birth, Lancereaux found ecchymoses under the pericranium, in the cellular tissue, upon the surface of the lungs and in the pericardium.

Affections of the Circulatory Organs.

The condition of the arteries has not been studied, and our knowledge of that of the veins is imperfect. Schüppel[1] has described profuse cell-infiltration into and about the wall of the portal vein under the name syphilitic periphlebitis. The larger veins also were surrounded by gummatous nodules, their lumen contracted, and their walls so thickened that they felt like cords. These lesions were found in three out of thirty cases seen during a period of two and a half years.

Lancereaux states that the cardiac affections of hereditary and acquired syphilis are similar. Rosen found a gummy tumor in the wall of the left ventricle. Förster[2] alludes to a case of syphilitic endocarditis, whose origin Lancereaux considers doubtful; while Wagner[3] discovered fibrous myocarditis in a syphilitic stillborn infant. According to Lancereaux,[4] interstitial myocarditis and muscular hyperplasia were found in one case by Kantzon.

Lesions of the Umbilical Vein.

Oedmansson[5] and Winckel[6] found stenosis of the umbilical vein in the cord of certain macerated fœtuses whose death was attributed to syphilis.

[1] Arch. d. Heilk., Leipzig, Band xi, 1870.

[2] Behrend's Syphilidologie, t. iii, p. 249. 1860.

[3] Würzb. med. Ztschr., Band iv, 1863.

[4] Arch. f. path. Anat., etc., Berlin, Band xxxv, 1866.

[5] Jahresb. ü. d. Leistung. u. Fortschr. d. ges. Med., Berlin, 1869, ii Bd., S. 561, from Nord. med., Arch. i, 4. Quoted by Hirschfeld.

[6] Ber. a. d. k. Sächs. Entbind.-Inst. in Dresden, Leipz., S. 307. Quoted by Hirschfeld.

The former thought that it was caused by the atheromatous process. Birch Hirschfeld,[1] who has also observed this condition, thinks that it is due to changes similar to those occurring in the arteries of the brain, as described by Heubner; he also says that it rarely coexists with osteo-chondritis, which Wegner considers an absolutely constant lesion in hereditary syphilis. If the lesion of the vein is actually caused by syphilis, then Wegner's belief in the constancy of the bone lesion must be erroneous. Should future investigation confirm the view of Hirschfeld, this lesion of the umbilical vein must be considered an important element in causing the death of the syphilitic embryo.

Hemorrhagic Syphilis in Newborn Children.

Sixteen cases of a somewhat rare condition which has been described under this head have been reported, and we have ourselves met with two well-marked instances. The condition exists at birth or appears soon after, commonly not later than a month, and is frequently the only syphilitic symptom presented. In such cases our suspicions of its origin are suggested by the syphilitic history of one or both parents. In other cases undoubted syphilitic lesions coexist.

The affection is due to a condition of hydræmia caused by syphilis, in which, after withdrawal of blood from a vessel, coagulation takes place imperfectly or not at all. It is usually observed in children of profoundly syphilitic parents. The hemorrhages vary in extent and severity. In some instances there is merely a limited subcutaneous effusion, especially where the connective tissue is loose and abundant, and in parts exposed to pressure. In other cases the process takes place in the substance or on the surface of mucous membranes, and may result even fatally. In such cases trifling injuries and slight bruises induce effusion of blood. A fatal termination may be expected when the hemorrhage occurs beneath the serous membrane and into the substance of the viscera. Although the prognosis is not absolutely good in any case, recovery has been known to follow the use of proper treatment.

Affections of the Bones.

Our knowledge of the affections of the bones in hereditary syphilis has been acquired chiefly within the past ten years. Previously, the majority of bone lesions were attributed to rickets or scrofula. In 1870 an important contribution to this subject was published by Wegner,[2] of Berlin, in which he described certain changes found at the junctions of the diaphyses and epiphyses of the long bones of infants with hereditary syphilis.

[1] Beitr. zur path. Anat. der hered. Syphilis Neugeborenen. Arch. d. Heilk., Feb. 1875.

[2] Ueber hereditäre Knockensyphilis bei jungen Kindern. Arch. f. path. Anat., etc., Berlin, Band l, 1870.

Two years later Waldeyer and Köbner[1] published a paper in which they confirmed Wegner's discovery, although they differed with him in their interpretation of the pathological appearances. Following these German observers, Parrot,[2] of Paris, published in 1872 an elaborate paper, in which he gave many histological facts and brought out one important symptom of these affections. In 1875 we published a work containing a full description of these affections, their pathology, and a *résumé* of previous contributions concerning them.[3]

The bones are affected in various ways by hereditary syphilis. In the early months of infancy the morbid change is peculiarly frequent in long bones at the junction of the epiphysis with the diaphysis. In the first years of hereditary syphilis the small bones of the fingers and toes are also quite frequently affected, while later on a tendency to invasion of the shafts of long bones and of the surfaces of flat ones is noticed. We shall therefore describe the diaphyso-epiphysal lesion under the name *osteo-chondritis syphilitica* and the affection of the long bones under *periostitis*. The lesions of the bones of the fingers and toes are somewhat peculiar and require a separate description.

Osteo-chondritis.—This affection is claimed to be one of the most constant manifestations of hereditary syphilis. It is often the only one, and frequently its presence decides the syphilitic nature of coexisting lesions. A knowledge of the fact that this affection is caused exclusively by syphilis has been of great service in the study of hereditary syphilis.

If we remember that the growth of the bone in length takes place at the extremity of the shaft, where the epiphysis is joined to it by a layer of cartilage, and that here syphilitic changes are most often found, we shall see how the normal development of the bone may be greatly perverted or interfered with.

The bones most commonly attacked are those of the forearm, the leg, the arm, and the thigh. The clavicle, sternum and ribs are also attacked, as well as the metacarpal and metatarsal bones. The number of bones involved varies. It has been noticed that in still-born infants and in those dying soon after birth the majority or even all of the long bones are affected. It is very exceptional for the victims of multiple bone lesions to survive, and it is fair to assume that the number of bones attacked varies with the intensity of the syphilitic diathesis.

In these cases of osteo-chondritis we find at the diaphyso-epiphysal junction a swelling, which may be visible, but in fat children is often imperceptible. On palpation the bone is found to be encircled by an abruptly limited collar or ring, which usually extends completely around. In some cases the entire epiphysis may be expanded, with or without a distinct ring,

[1] Beiträge zur Kenntniss der hereditären Knochensyphilis. Arch. f. path. Anat., etc., Berlin, Band lv, 1872.

[2] Arch. de physiol. norm. et path., Paris, 4 année, 1872.

[3] R. W. Taylor. Syphilitic Lesions of the Osseous System in Infants and Young Children, New York, 1875.

at its junction with the shaft. The surface of these swellings and rings is generally smooth ; it may be slightly irregular but is seldom very much ridged. When two contiguous bones are affected they often seem to be fused together. In living children the distal more often than the proximal extremities have been found affected, and the affection is generally symmetrical, especially in very young subjects. In some cases, particularly at the lower end of the humerus and at the upper end of the tibia the lesion does not surround the bone, but is limited to a segment of the diaphyso-epiphysal junction.

The swellings on the clavicle are usually found at its sternal end, and are sometimes of large size. Those of the sternum are not common in very young children ; lesions of the ribs, which occur at their junction with the costal cartilages, are also infrequent, and are generally not as numerous or symmetrical as those of rickets.

These swellings may be developed slowly or quite rapidly. After reaching their full size, they usually remain in an indolent condition, causing little if any pain, and interfering but slightly with the motion of the joint. Under appropriate treatment they promptly subside. The integument undergoes very little if any change, and becomes tense and thin only when the tumors are exceptionally large. The joints may be secondarily involved and become the seat of subacute synovitis, the effusion being slight or extreme. Those most commonly attacked are the elbow and knee ; as a rule the joints with short epiphyses are most liable to hyperæmia and effusion. Pressure, accompanied by internal treatment, speedily disperses these joint swellings, which usually give rise to but slight inconvenience.

Degenerative changes sometimes take place in these osseous lesions. In their mildest form they consist simply of a superficial breaking-down at one part of the swelling. We first observe fluctuation, soon followed by ulceration of the skin, resembling in appearance that which occurs in gummy tumors. These necrotic changes, however, may be much more active and extensive in the bone than in the cutaneous ulcer, which shows very little tendency to increase in size. The epiphysis may be entirely separated from the shaft, and, if the superficial ulcer is large, it may be extruded. In most cases where the destructive process is extensive, the syphilitic diathesis is intense, and a fatal termination ensues. In others, however, reparative changes of an interesting and peculiar character occur.

The intervening cartilage having been destroyed, the diaphysis is united to the shaft only by fibres of periosteum. This membrane becomes much thickened and forms a more or less complete cylinder uniting the two fragments with considerable firmness. Bony spiculæ shoot from its inner surface between the two osseous surfaces, and eventually bony union is formed. The periosteum continues thickened for a long time, but gradually resumes its normal proportions as the union between the bones grows firmer.

The effect of these swellings upon the ultimate shape of the bone depends on the intensity of the morbid process. When resolution takes place the

nutrition of the bone is afterwards fully restored; but in case of destruction of the intermediate layer of cartilage the bone is usually shortened. These lesions are usually found at birth or within the first month of life. They may appear later, even as late as the twelfth year, when they are developed very slowly, are few in number, and are unsymmetrical. The occurrence of ossification between the segments of a bone no doubt has much influence upon the development of the lesions; we may, therefore, expect to see them at the time when bony union occurs. Identical changes have been observed in children with acquired syphilis, but the affection in such cases was limited to a few bones or even to one.

This affection results from interference with the nutrition of the bone, and presents three stages. In the first the intermediate layer of cartilage is thickened, uneven and irregular, and under the microscope we find simple increase of the cartilage cells. In the second stage the cartilage is still thicker, and is nodulated on its epiphysal surface, and warty or papillaform processes of calcified cartilage project into the hyaline matrix. Wegner compares them with the papillæ of the cutis, on account of their broad bases and tapering ends. Deposits of lime are also found in the hyaline matrix between these projections. On the periphery, the infiltration encroaches further into the cartilage than at its centre. We find when examining the relations of this calcified line to the spongy bone that there are corresponding depressions into which the spongy tissue passes. Under the microscope we find the longitudinal rows of cartilage more abundant than in the first stage, and there is very little intercellular substance. The vessels are numerous, and at the line of ossification are surrounded by a considerable quantity of connective tissue. The walls of the cavities are broader at their bases and are sclerotic. In many places an osteoid substance is developed from the cartilage and from the medulla which enters with the vessels. This substance is found to be in some places true bone which passes into the spongoid layer. Beyond the *couche chondroide* we find irregularly distributed spots of calcified cartilage forming a zone of considerable breadth. The principal points in the second stage, therefore, are greater proliferation of the cartilage cells, premature sclerosis of the intercellular substance, formation of bony projections beyond the normal layer and delay in bone formation elsewhere; in other words, irregular osteo-genesis, premature in some regions and retarded in others. In the third stage there is a general enlargement of the epiphyses, with thickening of the periosteum and perichondrium. Under the microscope the following conditions are seen: The lowermost layer of hyaline cartilage is bluish and transparent; this layer is succeeded by an irregular and wavy layer with serrated processes and having a grayish-white color and of homogeneous formation. This layer is brittle and can be readily removed. Next to this is placed a layer of grayish-red or yellow substance, soft, and sometimes viscid, which is gradually lost in the spongy substance of the diaphysis. The medullary tissue of the latter continues for some distance, and instead of being normally red, is gray or grayish-red. This layer seems to destroy the firm cohesion of the epiphysis to the shaft. In

this stage the proliferation of cartilage cells and the lime infiltration is excessive. In the layer next to the bone we see nucleated cells, spindle-shaped cells, and granular detritus. Waldeyer and Köbner consider this to be granulation tissue growing into the cartilage from the medulla. Wegner, on the contrary, denies that it is true granulation tissue.

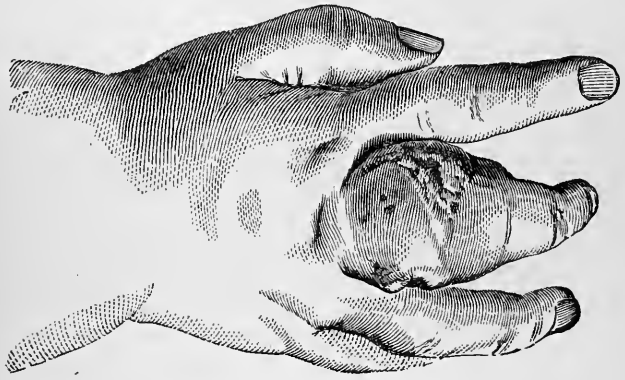
Periostitis.—While osteo-chrondritis occurs in early infancy, periostitis is a later affection, attacking the bones of syphilitic children who have already begun to walk. Whether the active use of the bones has any influence in developing periosteal inflammation we cannot say positively, although its occurrence in the bones of the leg renders this view probable. In the majority of cases the femur and tibia are first attacked, sometimes as early as the second year, but generally at the fourth or fifth. When long bones are involved thus early, the greater part of the shaft usually suffers. The bone becomes very tender, and soon is seen to be much enlarged, even to twice or thrice its normal thickness. It seems bent anteriorly, producing marked deformity. The fibula is also sometimes affected and generally both legs are attacked. The bones of the forearm are, next to the tibia, most prone to this disease. The earlier it appears, the more likely is the affection to involve both limbs symmetrically: at later periods it may be unilateral and more localized, perhaps forming circumscribed nodes. The skull-bones are sometimes the seat of these nodes, which are apt to be quite large and multiple. In very severe cases they sometimes break down and form troublesome abscesses. Although periostitis usually occurs before the twelfth year, we have seen it as late as the fifteenth and even the nineteenth year.

Dactylitis Syphilitica.—In the early months of hereditary syphilis, children are often attacked by swelling of the phalanges and of the metacarpal and metatarsal bones. These lesions are of the same character as those of acquired syphilis. The proximal phalanges are most often attacked, and the distal least commonly; sometimes all three phalanges are involved at the same time. The bones may be enlarged to twice or thrice their natural size, the deformity, of course, differing with the phalanx involved. One or more bones of one or of each hand may be involved; in one instance, we have seen every phalanx of each hand swollen. Sometimes the metacarpal bones are enlarged; the lesion is less frequently seen in the toes and metatarsal bones. The swellings progress slowly or with surprising rapidity. In their early stages the integument is unchanged; at a later period the overlying parts become inflamed and an abscess is formed. The condition is well shown in Fig. 133, taken from a cast of one of our own patients.

If uninfluenced by treatment, these swellings run a very chronic course, but when treated early they gradually subside. In some cases exsection of the bones is required, but generally the destructive changes are more extensive in the skin than in the bones. Apparently hopeless cases often yield to persevering internal and local treatment, without the necessity of

an operation. At the termination of the disease the shape of the phalanx may be restored, or it may be lengthened or even very much thinned and shortened.

Fig. 133.



Dactylitis is usually observed in very young children; it may also occur as late as the twentieth year. In the latter case it is usually preceded by other osseous and articular lesions. This late form of hereditary dactylitis is well shown in a case reported by Volkmann, and included in our monograph on the subject.[1] The patient, a girl, having suffered from various lesions of hereditary syphilis, at the age of fourteen was attacked by numerous osseous and articular lesions. In her sixteenth year the

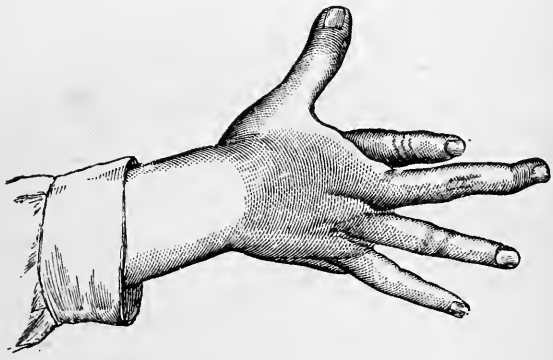
Fig. 134.

bones of the hands were attacked, and she suffered from relapses in them for fully fifteen years. Fig. 134 represents the appearance of the left hand. On the dorsum was a large smooth movable cicatrix, adjoining a small retracted spot at the base of the first metacarpal bone, which was atrophied, and produced a marked shortening of the thumb. The first phalanx of the middle finger was much swollen and obliquely perforated by a sinus, and the bone was completely divided by a newly-formed tissue. The two

[1] R. W. Taylor, on Dactylitis Syphilitica. Am. J. Syph. and Derm., Jan. 1871.

phalanges of the thumb, and the first phalanx of the index finger, and the first phalanx of the right middle toe were swollen, but there was no sinus nor solution of continuity of the bone. The right hand (see Fig. 135)

Fig. 135.



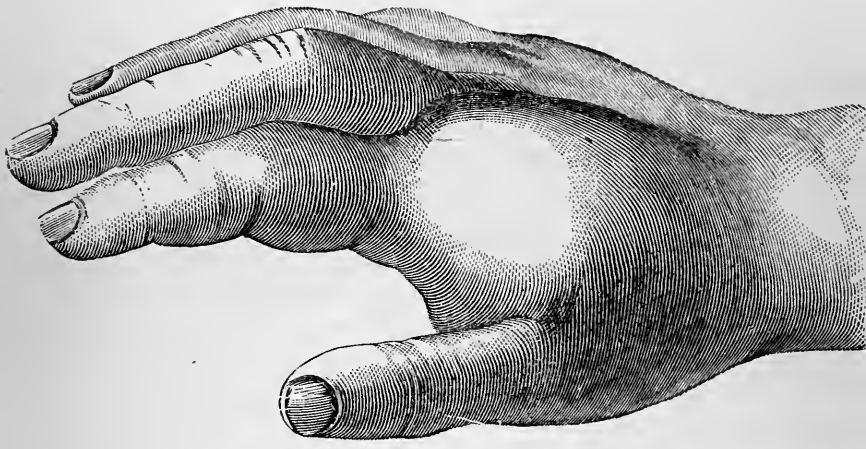
showed the progress of destructive changes in the bones. The first phalanx of the index finger was shortened and seemed to be divided into two pieces, so that the patient had to wear a glove to counteract the mobility of the finger. The other two phalanges were normal. The middle finger was much attenuated; the second phalanx was in a position of super-extension, while the first was slightly flexed. The bones, unchanged in form, were atrophied, and the integument, joints and tendons were normal. The early form of dactylitis is more purely inflammatory, while the later forms are due to gummatous infiltration and resemble the bone lesions of acquired syphilis in their course and results.

Swellings of the Metacarpal and Metatarsal Bones.—These lesions usually occur quite early in hereditary syphilis, and may or may not coexist with dactylitic enlargements. They may appear even as late as the twentieth year. A single bone only is sometimes affected, but in one instance we have found all of the metacarpal and metatarsal bones involved. The accompanying figure (Fig. 136) shows the appearances presented in one of our cases, in which the first metacarpal bone of the right hand was swollen. These swellings usually form rapidly and attain considerable size. They may or may not be attended by pain. In the early years of hereditary syphilis they commonly involve the entire bone, in later years the swellings are often circumscribed. They do not occur as early or as frequently as the dactylitic swellings, nor have we observed the necrotic tendency sometimes seen in swellings of the phalanges. When the tumors reach a large size the integument becomes tense, inflamed, and may ulcerate. Such cases are very protracted.

These lesions have different results in various cases, and according to the age of the patient. In very young children the bones may be left in a normal condition; sometimes they are a little thinned or shortened. In

later stages of hereditary syphilis we find destruction of a segment of the bone, which is thus divided into two parts, joined finally by a band of fibrous tissue.

Fig. 136.



The treatment of all bone swellings should combine mercury with iodide of potassium. We have used in many cases, with great benefit, the following:—

℞.	Hydrarg. Biniodidi, gr. j	06
	Potass. Iodid., ʒiv	15
	Syr. Sars. Co.,	
	Aquæ, āā ʒij	60
M.		

Of this mixture, a child one month old may take five drops thrice daily, increasing the dose by a drop every five days. To a subject over five years of age, one-half of a teaspoonful may be given, and the dose gradually increased to one or one and a half teaspoonfuls. Externally, a mild mercurial ointment may be used, or, better still, the following ointment may be kept in contact with the affected parts under pressure:—

℞.	Ung. Hydrarg. Fort.,	
	Ung. Zinci Oxid., āā ʒss	15
	Bals. Peru., ʒj	4
M.		

Ulcerations of the skin require appropriate treatment. The advantages of graduated pressure should not be forgotten.

Affections of the Joints.

In some cases of diaphyso-epiphysial inflammation (osteo-chondritis) occurring in hereditary syphilis, particularly when the epiphyses are very short, as in the humerus and tibia, the neighboring joint becomes the seat

of effusion. In the few cases of this complication which we have observed, the hydrarthrosis has taken place quite rapidly, decided evidences of effusion existing in a week or two. The symptoms are subacute. There is but little pain and not much heat, though there may be much swelling and tension of the parts. The absorption of the fluid coincides with the subsidence of the bone lesion, and finally the function of the joint may be fully restored. While the effusion exists the use of the joint is more or less impaired, but degenerative changes are uncommon in early years, and permanent disability of the joint is rare. Late affections, on the contrary, are sometimes attended by destructive changes. The elbow, knee, wrist, shoulder and ankle-joints are those most commonly affected. In some cases the metatarso- or metacarpo-phalangeal, or the carpal and tarsal joints are the seat of hydrarthrosis.

In later years the larger joints are sometimes attacked, the affection in some cases being secondary to bone lesions, in others beginning in the joint. In such instances we find most decided change in the synovial membrane, probably originating in the subsynovial connective tissue, and frequently thickening of the fibrous capsule of the joint. The affection is slow and subacute, but the swelling of the joint is often very great. Heat and redness of the integument are absent; pain is slight, although the joint may be sensitive to pressure and on motion. It differs from the so-called scrofulous affections in its freedom from degenerative changes. In the latter, moreover, the morbid process is chiefly intra-articular. These joint affections are amenable to treatment in their early stages; later, they are more rebellious. They undergo slow involution, leaving only slight disorganization of the joint. They are usually associated with some other manifestation of hereditary syphilis, usually a form of bone lesion, or some affection of the eye, teeth or skin. They may be unilateral or symmetrical, and may occur as early as the first year of life or as late as the twentieth. The infra-articular infiltration sometimes breaks down and a sinus is formed, which discharges for a time, but finally closes under treatment. The treatment of syphilitic synovitis includes internal and local remedies. Externally, friction with mild mercurial ointment should be used, and the joint should be kept at rest by means of mercurial plaster, or the plaster-of-Paris or starch bandage. The general treatment consists of a mercurial salt combined with iodide of potassium.

Affections of the Nervous System.

Until recently our knowledge of the affections of the nervous system caused by hereditary syphilis was very fragmentary and incomplete. Within the past ten years, however, much has been added by the observations of English physicians, and it is to Hughlings Jackson,[1] Jonathan

[1] The most important articles are two by Jackson, the first entitled, Cases of Disease of the Nervous System in Patients the Subjects of Hereditary Syphilis, reprint, London, 1868; and second, Nervous Symptoms in Cases of Hereditary Syphilis, *Journal of Mental Science*, Jan. 1875. The views of Hutchinson are given

Hutchinson, T. Barlow, and T. S. Dowse that we owe nearly all of the facts concerning this most important subject. It is due beyond doubt largely to the fact that nearly all affections of the brain in infants and young children have been for so long considered to be of tubercular origin that so little attention has been paid to the influence of hereditary syphilis in their causation, and though the pathological facts which have been learned concerning the effect of this diathesis are far from complete, their suggestions are so comprehensive that their importance is greatly increased. This statement is borne out by the fact that we now positively know that in hereditary syphilis there have been found the results of meningeal inflammation, such as thickening and adhesion of the membranes by the development of fibrous tissue and gummy material, and that the endoarteritis so frequently found in the acquired form has also been observed in hereditary syphilis. Gummata on the membranes have also been found. This knowledge is most important and far-reaching, since it suggests strongly the probability that there may occur during the course of hereditary syphilis the same numerous and complex affections as are known to occur in the acquired form. As our present knowledge of the clinical history and of the pathology of the several hereditary affections is not complete, we can only give a general sketch of them. The observations of Jackson and others have conclusively shown that hereditarily syphilitic infants and young children are liable to chorea. This may be of a mild and ephemeral form, or it may be severe. In several cases it has coexisted with hemiplegia, and in others there has been superadded epilepsy. In such cases, Jackson thinks that the hemiplegia is caused by the plugging up of the middle cerebral artery, that the chorea is due to occlusion of its small distal branches, while the epilepsy is due either to thickening of the meninges or a gummous growth in or near the corpus striatum. The occurrence of epilepsy alone, without hemiplegia, is very frequently observed in hereditary syphilis, either within the years of infancy or later on in childhood. Indeed, its evolution has been observed as late as the twelfth or fifteenth year. So impressed is Jackson with the relation of hereditary syphilis to epilepsy that he says: "When a child is brought to us for an affection so painfully obscure as general epilepsy, it is well to examine the patient's brothers and sisters for signs of syphilis." We would add even more, that the child should be thoroughly examined to determine whether it is syphilitic. The eye must be examined superficially and deep. In such cases we often find evidences of an antecedent keratitis, of choroiditis and retinitis; sometimes of optic neuritis. Then, again, we may find evidence in the notched state of the teeth, in certain small white linear scars at the angles of the mouth, in falling of the nose, and in a bow-shaped condition of the tibiæ. All or some of these symp-

throughout his papers published within ten years. The cases of Barlow are published in the Transactions of the Pathological Society of London, vol. xxviii, 1877; and the observations of Dowse are to be found in his recent work on the Brain and its Diseases, London, 1879.

toms may be found also in cases of epileptic hemiplegia, or of hemiplegia alone. Though palsies of the cranial nerves do not occur as frequently in hereditary as in acquired syphilis, the observations of Barlow and Dowse have positively proved that several of them may be attacked by syphilis. One of the most suggestive cases published is that of Barlow, of an hereditarily syphilitic child four months old, who presented well-marked lesions which were improved by mercury. Then she began to run down, had carpo-pedal contractions, was attacked by convulsions and died. At the autopsy the membranes were found to be slightly thickened, and at the base at the optic commissure was a small patch of greenish lymph, while the fissures of Sylvius were glued by old exudation. In many places on the vertex, and on the inferior surface of the temporo-sphenoidal lobes, there was thickening of the membrane from fibrous tissue, while on the upper surface of the left parietal lobe was a thin patch of calcification. The small vessels of the cortex were markedly altered, being at first natural, they became of a dirty-white color, without dilatation or narrowing, and looked like threads. There was no granulation of the pia mater as in tubercle. There were also a few patches of superficial softening. The choroid and retina were infiltrated in a circumscribed manner by corpuscles as large as those of pus. The most important point found by Barlow was in the thickened membranes, which contained an excess of fibrous tissue with cells, not mere nuclei, but well-formed lymphoid cells, each containing a nucleus and sometimes a nucleolus. These seemed to have no arrangement around the vessels, and retained their individuality, with no massing into heaps and central degeneration, thus differing from tubercle. In the vessels there was a new growth of the inner coat, which narrowed and even occluded their calibre. This change was intra-vascular also, differing from what occurs in tubercle. In its minute anatomy it presented the appearance described by Heubner (see page 646, chapter on Nervous Affections).

Barlow's second case is fully as important in its bearings. It was a boy fifteen months old, suffering from paresis of the facial muscles, general but not equal in amount. Occasionally there was a frown on the left half of the forehead, less on the right. The right eyelid was found to be shut sometimes while the other remained open. When the child cried its left cheek remained flat but there was no distortion when at rest. There were frequent fine tremors of the facial muscles of the right side at the corner of the mouth and of the orbicularis palpebrarum and decidedly less on the left side. The child had frequent laryngeal spasms but no convulsions. It was thought that the reaction of the muscles of both sides to the constant current was increased while that to the faradic current was diminished. During life the case was wrongly diagnosticated as of tubercular origin. At the autopsy four stellate patches of thin cicatricial tissue were found on the liver and a similar patch on the spleen. In the brain, the pia mater at the base was slightly opaque; both *third nerves were swollen out into small conical tumors*. There was also swelling of the 4th, 5th, 6th, 7th, and 8th, pairs causing a broadening there at their superficial origin. Microscopic examination showed atrophy of the nerve cylinders and here and there in

certain sections were found round bodies resembling corpora amylacea. There was also a most abundant infiltration of new cells with very fine stroma. This latter was not abundant in the interfunicular spaces, though it was noted that in the substance of the funiculi themselves there was more at the periphery than at the centre. The appearances resembled somewhat those of the nerves in anæsthetic leprosy. In this case also changes were found in the arteries which were typically like those described by Heubner. Barlow calls attention to the important fact that the new growths were symmetrical. The second of the two cases of gummata or cranial nerves is reported by Dowse, who observed the fact at the autopsy of a girl twelve years old who had suffered from serpiginous ulceration and destruction of the nasal bones. Two years before her death she had a fit and thereafter suffered from dull aching pain in the head continuous and paroxysmal. She then became thoroughly epileptic and suffered from mental and visual derangements. Ophthalmoscopic examination showed advanced changes in the tissues. There was anæsthesia of the left side of the face and hyperæsthesia of the right. The sixth and seventh nerves were paralyzed and the extremities were very weak. "For days together she would lie in a state of partial stupor apparently careless of all about her. At other times she was so giddy that she was unable to walk across the ward without reeling, and then again she would have a series of epileptic seizures," which were followed by screaming and violence. During the fits, which followed an aura beginning in the left arm and ending in the tongue, there was rigid muscular spasm, more of the right than of the left. She continued to get worse, became aphasic and partially hemiplegic and died. In this case Heubner's endo-arteritis was found, together with gummous pachymeningitis and gummata on the fifth and seventh nerves.

The affections of the nervous system of hereditary syphilis resemble in their evolution and course those of the acquired disease, in the complex and disorderly association of symptoms and in the frequent coexistence of eye affections, such as optic neuritis, and paralyses of one or more cranial nerves. In the hereditary form the ocular lesions are in general more complex and numerous than in the acquired form.

Dowse remarks with much pertinence that: "probably before long, thanks to the investigations of Heubner, it will be found that many of the conditions which are now recognized as scrofulous are really due to albuminoid or protoplasmic nutritive changes the result of arterio-capillary constriction which originated in syphilis. In due time evidence will be forthcoming to show that these changes also occur in the lymphatic system, and that they are coexistent with the primitive states of fœtal life. If pathology is not leading us astray, our deductions at the present time are of the greatest value and importance."

Treatment.

The propriety of treating a pregnant woman for syphilis has been the subject of much discussion, and has, at times, been denied on the ground

that mercury was a powerful cause of abortion, and that the death and expulsion of the fœtus was more frequently due to the administration of this mineral than to syphilis itself. It would serve no useful purpose to enter into the arguments which have been advanced for and against this supposition; suffice it to say that modern surgeons, with but few exceptions, regard the fear referred to as chimerical, and believe that specific treatment of the mother is the surest means of prolonging gestation to its full term and of affording security to the infant after birth. Ricord's views upon this subject are very explicit and decided. He says: "The period of gestation in women, far from contra-indicating energetic treatment, demands increased attention and promptitude within the bounds of prudence. I have seen very many more abortions among syphilitic women who had not been treated, than among those who, taken in time, had been subjected to methodical medication."

There is strong ground for believing that in those cases in which mercurials have appeared to favor abortion, they have done so only in consequence of their irritant effect upon the intestinal canal, and not from any abortive power inherent in the remedy itself. Thus, six cases reported by Colson[1] of abortion in pregnant women who were subjected to mercurial treatment, were analyzed by Bertin,[2] who showed that in four there was violent vomiting, and in a fifth convulsions at the sixth month of pregnancy; while in the remaining case treatment had been commenced only a fortnight before, and sufficient time had not elapsed to obtain its full effect; hence, that in none was there reason to ascribe the death of the fœtus to the judicious employment of mercury.

The sympathy existing between the intestinal canal and the uterus is well known, and in the treatment of pregnant women affected with syphilis, we should carefully guard against any irritant action upon the stomach or bowels. Fortunately, this end may be accomplished, and at the same time the full action of the remedy be obtained by mercurial inunction, which is by far the best method of treatment in such cases. The same opinion was expressed a long time ago by Bell, who said: "During pregnancy, mercury ought in every instance to be used in the form of unction, as we thereby with most certainty prevent it from acting upon the stomach and bowels, and thus avoid the hazard of abortion taking place as the effect of irritation upon these parts. Nothing, indeed, more readily excites abortion than purgatives when severe in their operation upon the bowels, or when they even only produce any considerable degree of tenesmus; and as the internal exhibition of mercury is frequently the cause of this, it cannot but with much hazard be given in any considerable quantity during pregnancy."[3]

When the father is known to have been the subject of syphilitic manifestations at the time of impregnation, or when previous abortions afford

[1] Arch. gén. de méd., 4e série, t. xviii, p. 24.

[2] Compte rendu des travaux de la Soc. de méd. de Brux. 1858, p. 82 (as quoted by Emile Vidal, op. cit., p. 84).

[3] A Treatise on Gonorrhœa Virulenta, &c., Edinb., 1793, vol. ii, p. 435.

reason for supposing that the disease, although apparently latent in him, has still been active enough to infect the ovum, it is the part of prudence to subject the mother to treatment during pregnancy, in the same manner as if she herself had presented syphilitic symptoms.

The same method of treatment above recommended for the mother, viz., mercurial inunction, is no less appropriate for an infant affected with congenital syphilis. The internal administration of mercury, as in one of the accompanying formulæ, will sometimes succeed, but too frequently irritates the bowels, and, in my own experience, affords far less satisfactory results than the method by inunction.

℞. Hydrarg. cum Cretâ, gr. ij–vj . | 12— | 36
Sacchari Albi, gr. xij . . . . | 75 |
M. et div. in ch. No. xii. One three times a day.

℞. Hydrarg. Chloridi Corrosivi, gr. ss–j . . . | 03— | 06
Ammoniæ Muriatis, gr. iij . | 20 |
Syrupi Papaveris, ʒij . . . 65 |
Aquæ, ʒiv . . . . . 120 |
M. A teaspoonful three times a day.

Van Swieten's solution and Plenck's gummy mercury[1] are often used by the French, who also employ baths containing from half a drachm to a drachm of the bichloride of mercury. My own preferences are in favor of the gray powder for internal administration.

The advantages of mercurial inunction and the method of employing it are thus set forth by Sir Benjamin Brodie:[2] "The mode in which I have treated these cases for some years past has been this: I have spread mercurial ointment made in the proportion of a drachm to an ounce over a flannel roller, and bound it round the child once a day. The child kicks about, and the cuticle being thin, the mercury is absorbed. It does not either gripe or purge, nor does it make the gums sore, but it cures the disease. I have adopted this practice in a great many cases with the most signal success. Very few children recover to whom mercury is given internally, but I have not seen a case where this method has failed."

Treatment should by no means be laid aside as soon as all syphilitic manifestations have disappeared, but should be continued as a prophylactic for several months afterwards.

Indirect treatment by means of remedies administered to the child's nurse is not to be depended upon in a disease which makes such rapid progress, and is so destructive in its tendency as congenital syphilis. MM. Lutz and Personne have carefully analyzed the milk of nurses who were subjected to mercurial treatment, pushed in some instances to salivation, without being able to discover the slightest trace of this mineral. Experiments upon animals, however, have shown that a very minute quantity

[1] "Plenck's gummy mercury" contains mercury gr. xv, powdered gum Arabic gr. xiv, and syrup of diacode (an electuary containing a small quantity of extract of poppies) ʒj. Triturate in a porcelain mortar until the mercury disappears. *Dose.*—ʒss in an appropriate vehicle. (Diday.)

[2] Clinical Lectures on Surgery. Phil. ed., 1846, p. 230.

of mercury may be detected in the milk of a goat that has been salivated by mercurial inunction, and cases have been reported in which infants have been cured of syphilis by being fed upon milk derived from such a source; but this method, for obvious reasons, could not be generally adopted even if its efficacy were fully established.

In the treatment of osseous lesions, the use of mercury with iodide of potassium is much more efficacious than mercury alone. The combination on which we place most reliance is that of the iodide of potassium with the biniodide of mercury, commonly called the "mixed treatment." To children under six months of age, it is well to give three times daily ten drops, well diluted, of the mixture, the formula of which is given on page 773. This may be increased by five drops each week, until a dose of nearly a teaspoonful is reached. Gastric disturbance is seldom caused by prolonged use of this remedy. In some cases, when the mixed treatment seems to have lost its power, we have used, with marked benefit, the iodide of potassium internally in connection with mercurial inunction.

The local treatment of syphilitic lesions is the same in the child as in the adult, particular attention being given to cleanliness.

CHAPTER XXVII.

AFFECTIONS OF THE PLACENTA.

Our knowledge of the effects of syphilis upon the placenta is still incomplete in many particulars. Previous to the publication of Virchow's lectures on tumors, the subject was little understood, and its literature consisted only of a number of papers by various authors, in none of which was there any approach to full and scientific investigation. In 1873, however, Ernst Fränkel[1] published an elaborate article, reviewing the cases which had already appeared, and giving the results of his own careful studies. An abstract of his paper will give a better idea of the subject than it is possible to offer in any other manner.

Fränkel believes that our want of knowledge of plancental syphilis has been due in a measure to the attempt to include all cases under a single form, and that the portion of the placenta first affected must vary, according as the father is alone syphilitic, and according as the mother contracted syphilis before conception or shortly after;[2] and finally, that the fœtus can be but little, if at all, affected if the mother contracts the disease late in pregnancy.

Virchow admits two forms of placental affection:—

Endometritis decidualis.

Endometritis placentaris.

To these Fränkel adds a third—

Disease of the villous portion of the fœtal placenta.

Fränkel founds his conclusions on the examination of over one hundred placentæ, including those of still-births, those of abortion and those of mothers having recent or old syphilis. The histories of the father and mother were obtained whenever possible, and a record of the macroscopic and microscopic appearances was kept. The post-mortem examinations of the fœtus were made by Prof. Waldeyer and his assistant.

He groups his cases into the following classes:—

A. Disease of the villi of the fœtal placenta.

B. Mixed form of placental disease, the disease of the villi encroaching upon the adjacent portions of the placenta materna.

C. Disease of the fœtus only, without involvement of the placenta.

[1] Ueber Placentar-Syphilis; Arch. f. Gynæk., Berl., B. V., ss. 1–54, 1873.

[2] It will be seen that Fränkel believes in the transmission of syphilis from the mother to the fœtus through the placental circulation, the possibility of which we have denied. We, however, leave Fränkel's views unchanged.

D. Primary disease of the placenta materna (endometritis placentaris gummosa).

The characteristic lesions of the placenta are changes in volume, weight and consistency, and, microscopically, the thick, plump form of the fœtal villosities, which is due to the filling up of the villous spaces with an abundant proliferation of moderately-sized cells proceeding from the blood-vessels, complicated with a proliferation of the cell-contents of the villi. Obliteration of the bloodvessels, and, finally, complete destruction of the villi ensue. This affection may appropriately be called "Deforming Proliferation of Granulation Cells of the Placental Villi."

The following is a more detailed description of the above changes:—

Macroscopic Appearances.—Increased size and weight (up to 1000 grammes) of the placenta in strong contrast to the slight development of the fœtus.

Closer and *firmer* texture of the placental tissue, yet differing from that of old extravasations of blood and fibrinous nodules. Color pale yellowish-gray, resembling gray nerve matter; this color was uniformly diffused in some cases; in others, it was circumscribed in larger or smaller wedge-shaped processes, extending from the uterine surface towards the fœtus. A point of special importance was the constant marked opacity of this abnormally colored portion of the placenta, especially noticeable in the circumscribed form. In this latter case the healthy villous tissue which lay between these portions was markedly hyperæmic and livid in its color near the transitional portion. Old and recent extravasations of blood in all stages, from organized fibrin to cysts of dark grumous blood, were also found.

The *uterine surface of the placenta* had indistinct, faded, patchwork appearances, which was due to opacity and thickening of the decidual covering. The color was often yellowish-gray. Immediately beneath these spots lay the wedge-shaped processes or areas above referred to, and when the latter extended to the fœtal surface they also appeared of a yellowish color through the chorial covering.

The *amnion* and *chorion* were thickened and rendered opaque by deposits of finely granular masses, and they were adherent to each other in spots, which were occasionally the seat of extravasated blood. The umbilical arteries were only once atheromatous to any extent; their intima was colored yellow, fatty, and thickened; this change, however, extended but a short distance from the placenta towards the fœtus. On the fœtal surface of the placenta, in many cases, were numerous miliary whitish nodules about the size of a hemp-seed, which closely followed the course of the vessels and were simple hyperplasia of the connective tissue of the chorion.

Microscopic Appearances.—In preparing specimens for the microscope, it was first noticed that the villi of the changed placenta required much more teasing and pulling apart than usual. They appeared thickened and opaque even to the naked eye, and, under a low power of the microscope, it was evident that they were swollen, plump-looking, irregular in their

form and bulbous. Their ends were enlarged into knob-like processes, and the branches were irregularly formed. Their normal transparency had entirely disappeared. They were filled with round and spindle-shaped, occasionally polygonal, small and moderate sized cells, which were finely granular and contained one or two, and sometimes three nuclei. These cells were especially abundant in the centre of the villous spaces, along the axis where the vessels usually take their course. In the villous trunks and branches the spindle-shaped cells predominated; in the ends of the villi the round cells. Many of these cells were undergoing fatty degeneration, and the villous space was often filled by fatty and molecular detritus. The bloodvessels of the villi were sometimes completely obliterated, often circularly compressed, while again no traces of them could be found.

The epithelium of these villi was often wholly wanting; when present, it was denser than usual, its cells strongly granular and opaque. In one case the change was confined to the epithelium alone, while the villous space was swollen by œdematous transudation from the dilated villous bloodvessels.

When healthy places still existed in these placentæ, the normal villi were usually found near the fœtal surface; but even these had a stroma rich in cells, which at the same time exhibited numerous connective tissue fibres. Their vessels were dilated, tortuous, very full and ruptured in spots.

The most frequent complication of this change in the villi, was extravasation of blood, which was either superficial or deep-seated, and which occurred in streaks along the borders of the vessels or oftener still in the form of sharply-defined, firm nodules which extended to one of the placental surfaces. The exuded blood exhibited the most varied transitional stages; the inclosed villi were atrophied and fatty, and degenerated into fibrous tissue.

In explanation of the origin and course of these changes, Fränkel states: Owing to the irritation caused by syphilis, proliferation, in a greater or less number of villi, begins in the cells, which, in the normal stroma of the villi, are only sparingly found. Their nuclei, and still later the cells themselves, undergo manifold division; and the increase in number of the cells is attended by an increase in their size. This proliferation is chiefly seated about the vessels of the villi, and about the deeper ones of the parenchyma, as well as around the more superficial and also about the fine capillary network lying directly beneath the epithelium.

Homologous products arise in every tissue of the villus in consequence of this hyperplasia,—cell-proliferation of connective tissue in the stroma, epithelial proliferation in the epithelial covering. The cell-proliferation causes compression of the vessels, interferes with the circulation, and finally leads to thickening of their walls and obliteration of the vessels themselves. The villi themselves are filled up with cells, become hyper-distended, plump and thickened. The vascular spaces into which they dip, become filled up and narrowed, and in the most advanced stage they entirely disappear. By this means and by the proliferation and thickening of the

epithelial covering, the interchange between the maternal and fœtal blood is interfered with, and finally is wholly obstructed. The villi, having thus lost their function, undergo fatty degeneration. The cells of the stroma and epithelium become filled with fat granules and finally break down into granular matter.

If the process is diffuse and continuous over the whole placenta, the fœtus has in the mean time perished; if limited to circumscribed foci, it may have continued to live. In the latter case, the degeneration frequently appears to have advanced from the uterine toward the fœtal surface; the contrary, however, has been noted. The relatively healthy portions of the placenta between the diseased parts are the seat of deep congestion; their bloodvessels are dilated and gorged with blood. Extravasations of blood in all stages of retrograde change occur, and now and then connective tissue formation in the interstitial tissue is superadded. Thickening of the intima of the umbilical vessels has been found but once by Fränkel, who considers it the result of the resistance met with by the circulation in the deformed and compressed villi, and not a truly syphilitic lesion. Although this process might be considered a chronic inflammation or one due to new formation of granulation tissue, yet, on the whole, it must be conceded that it begins as, and runs the course of, a chronic inflammatory process.

The reasons for calling this lesion syphilitic are:—

1. It was found in all of Fränkel's cases, in which autopsies showed the existence of syphilitic lesions of the bones in the fœtus.

2. The proof of the existence of syphilis in the parents in many cases.

3. That the lesion was not due to the death of the fœtus, is shown by its existence in several cases in which the fœtus was living.

4. Absence of this lesion in every other case of diseased placenta ever examined by Fränkel.

5. Club-shaped hypertrophy and cell-infiltration is a constant accompaniment of syphilis.

Predisposing causes.—It appears that this condition of the villi is developed, even if the health of the mother is in a fair condition at the time of conception, and that it is certainly due to a direct transfer of the paternal syphilis to the fœtus, as shown by the fact that its almost exclusive seat is in the fœtal portion of the placenta, the maternal portion not always presenting the characteristic appearances.

It may be objected that the ovum may have been infected through diseased ovaries on the part of the mother without any lesion of the remainder of the genital tract. To this it is to be said:—

1. Syphilitic disease of the ovaries rarely occurs.

2. In Fränkel's case V, the disease existed in the fœtal placenta, yet post-mortem examination of the mother failed to reveal any ovarian disease.

3. In case XVI, that of a markedly syphilitic child, villous degeneration was present, together with gummous degeneration of the adjoining maternal tissues, and yet the decidual covering of the convex surface of the placenta was not involved, a portion which by Winkler is considered

"the great highway" from the mother to the fœtus through the placenta.

Fränkel next inquires whether the origin, progress, and course of the disease can be inferred by reasoning from the exclusive seat of the syphilitic affection in the fœtus and fœtal portion of the placenta, taken in connection with the history of the case. Of 17 mothers, 14 were free from disease at and before their confinement; 1 died, the autopsy revealing no syphilitic lesion; 2 mothers became diseased, one on the fifth day, the other during the fourth week after confinement. The lesions in the mothers before confinement were: in 1, condylomata lata; in 1, psoriasis at time of confinement, the chancre having been acquired in the second month of pregnancy; in one, syphilis denied, but glandular lesions afforded strong suspicion.

Fränkel relates one case in which the maternal portion of the placenta was primarily affected. This he calls "primary disease of the placenta materna." (Endometritis placentaris gummosa). The case reads as follows—

Bertha B. has suffered since youth with eruptions and suppurating glandular enlargements. Has marked leucorrhœa; was never under syphilitic treatment. Husband not syphilitic. Now has swollen post-cervical glands and pigment spots on forehead. Has had five children in five years; one macerated fœtus at eight months; one born living which died at the age of five weeks with ulcers, etc.; third and fourth, abortions in early months; fifth, child born at eight months, breathed feebly and died in half an hour. Autopsy of fifth child showed infant atrophic, general induration especially of lungs, liver, and spleen. Spleen very large. Osteochondritis syphilitica present. Placenta weighed 480 grammes, of a brownish-red color; its diameters 16 and 15 cms.; thickness 1.3 cm.; cord normal. Convex surface of placenta covered by coagula; markings of lobuli obliterated through thickening of placenta materna. Vertical section showed yellowish-gray spots or nodules of the placenta materna, which seemed continuous and inseparable from the fœtal placenta.

Under the microscope, decidua showed slight and localized fatty degeneration, while the thickened portions were the seat of cell proliferation. The nodules were composed of connective tissue, studded with granulation cells, and their interior contained finely granular detritus but no normal villi. The villi are found between them and compressed by them; they are atrophied, devoid of bloodvessels, very fatty, and calcified. The fœtus had visceral and bone syphilis, and the mother suffered with syphilis before conception; the direct influence of the disease in the mother upon the placenta is apparent. In the previous cases referred to, the villi were the seat of the disease, while here it was the maternal placenta.

In all the seven cases reported up to the present time of endometritis placentaris gummosa, the mothers presented well-marked symptoms of syphilis, but Fränkel states that he has met with cases in which the syphilitic mother had a healthy placenta. He thinks that in these latter cases the disease circulates through the blood without leaving any trace of it at

any point, while in other instances it is localized in the endometrium and is then transmitted to the fœtus.

That syphilitic endometritis occurs is beyond question, it only remains to prove that this endometritis decidua or placenta gummosa recurs every time that an abortion takes place in the same woman. In this case the fact of local transmission would be established, and local treatment of the uterine cavity would be demanded as well as general constitutional treatment.

The influence upon the fœtus of placental disease is of course prejudicial. In all seven cases, the infants were premature; six were already macerated, and one, though born alive, was so atrophic that it died soon after birth.

CHAPTER XXVIII.

TREATMENT OF SYPHILIS.

The expectant treatment of syphilis has been thoroughly tried by Diday, Zeissl, and others, as it was extremely desirable it should be, in order to ascertain what the natural course of the disease would be uninfluenced by medication. Patients with the early manifestations of secondary symptoms have been placed under the best hygienic conditions and rules of diet, and have received only a placebo internally or some bland inunction, as of cod-liver oil, externally, to lead them to suppose that active treatment was employed, while, in fact, only the natural course of their symptoms was watched. In some of these cases, especially those in which the symptoms were very persistent, the iodide of potassium was administered, but all forms of mercury were carefully excluded. The result of these trials has been, as already stated, that in very many cases the disease tends to a spontaneous cure. The syphilitic eruption and other symptoms disappear after a while, to return again very likely, but this is no more than we see after decided medication continued only for a short period. Still, under this purely expectant treatment the final result *may be* most satisfactory and the patient be left without permanent injury to the health or impairment of any organ. It is only in a few instances at this early stage that the administration of iodide of potassium has appeared to contribute to this favorable result. But while the above was true of many cases, others were met with in which both patient and surgeon were forced to renounce mere expectancy, and were only too glad to have recourse to their only sheet-anchor, *mercury*.

The expectant treatment of syphilis will commend itself chiefly to those who are imbued with the vulgar and unfounded prejudice against mercury, even when most judiciously administered. Under the expectant treatment, the existing symptoms persist for a much longer time than when mercury is used, and the patient continues to be a focus of contagion to the members of his family and his intimate associates. If thus treated unwillingly, he is, moreover, rendered impatient and despondent as he sees some comrade rapidly improving under mercurials, and is very likely to abandon his surgeon. Still further, he is exposed to the outbreak of serious manifestations of the disease, which may leave indelible marks upon him; and we question whether his chances of immunity in future years from tertiary lesions are not greatly lessened.[1]

[1] It may here be remarked that Zeissl, within the last few years, has given in his adhesion to the expectant treatment, while Fournier (Leçons sur la syphilis, Paris, 1873) most ably and eloquently advocates the use of mercury, prolonged for several years. (See chapter on the Prognosis of Syphilis.)

The treatment of syphilis which we recommend consists in attention to the general hygienic condition of the patient, and, as the case demands, the use of tonics, mercurials, and the iodides.

Hygiene and Tonics.—The successful management of any case of syphilis undoubtedly depends in a great measure upon attention to hygiene. The most careful administration of specific remedies will be of little avail, unless the patient be willing to submit to the necessary restrictions with regard to diet, exercise, exposure, etc. Many syphilitic patients who enter our hospitals begin to improve at once, simply from the fact that they are brought under better hygienic influences, and are obliged to lead a regular course of life and abstain from excesses which have hitherto depressed the vital powers and thwarted all attempts of nature or of art to eliminate the virus from the system.

The essential features of the hygienic plan which is adapted with slight variation to nearly every case of syphilis, are general regularity of life, simple but nourishing diet, abstinence from the free use of stimulants and tobacco, attention to the functions of the skin and bowels, and, last but not least, a cheerful disposition. The habits of the patient should be systematic and regular, especially as regards his hours of eating, his sleep and exercise. Irregularity in these respects exercises a drain upon the vital powers, the whole force of which is requisite to eliminate the poison from the system. The diet should be plain but nourishing; *plain*, in order that digestion may not be too much taxed; sufficiently *nourishing*, that nature may be sustained in the work it has to accomplish, and that the depressing influence of the virus may be counteracted. It is impossible, however, to give minute directions which will be applicable to all cases, when the condition of different persons is so various, and when so much must necessarily be left to the judgment of the surgeon. The abstemiousness recommended in certain methodical modes of treatment, as in that by Zittmann's decoction and the dry treatment of the Arabians,[1] is adapted for patients who devote their whole time to treatment and who lead an inactive life, confined for the most part to the house, but will not answer for those who are engaged in labor or the active calls of business. Abundant testimony proves that any dietetic course which weakens the system affords to syphilis a stronger hold upon the constitution. When a patient, the victim of dissipation, has for a long series of years been accustomed to artificial stimulus until it has become a second nature to him, it may not be best to cut him off entirely from his daily potations, but they should

[1] The dry treatment of the Arabians, as communicated by an Arab physician who visited Marseilles, is described by M. Benoit, who has tried it with very satisfactory results, as have also Lallemand, Broussonnet, L. Boyer, Tribes, Jaumes, and Malinowski. The patient is directed to abstain from his usual articles of food; lives on biscuit, dried almonds, figs, and raisins; drinks only in the twenty-four hours a glass or two of a decoction of sarsaparilla; and takes a mercurial pill morning and evening.—Gaz. hebdomadaire, 4 mai, 1860, from the Montpellier médical, 1860, Nos. 1 et 2.

be given methodically under the special supervision of the surgeon, and at meal times rather than on an empty stomach. In such cases, it is often safer to administer stimulants in the form of medicine, as the compound tincture of gentian; since in this way the necessary moderation can best be secured. On the other hand, habitual high-livers require to be restricted in the quantity and quality of their food and drink, and between these two extremes every shade of variation may be met with.

The secretions should also receive attention. That of the skin should be promoted by regular exercise not carried to fatigue, by bathing and friction. The season of the year, and the habits and condition of the patient will determine whether a cold bath every morning, or a hot bath two or three times a week, should be preferred. Flannel or merino underclothes should be worn and changed frequently; and the bowels should be opened at least once a day. Absolute continence in men accustomed to frequent sexual indulgence may induce nocturnal pollutions and consequently be objectionable, but coitus should be practised only as a relief to the system and never be carried to excess.

Tobacco exercises a depressing influence upon the vital powers, and is moreover objectionable in consequence of its irritant effect upon the mucous membrane of the mouth and fauces. Mucous patches of this region in smokers and chewers are especially obstinate, and will often persist in spite of remedies, unless the irritating cause be removed. Total abstinence from the "weed" should peremptorily be insisted upon with all syphilitic patients.

The influence of the mind upon the body is rarely exhibited in a more striking manner than in syphilitic subjects; those cases commonly proving most intractable, in which patients are anxious and despondent, and constantly watching and examining themselves to discover some new symptom. The surgeon is not always blameless in this matter, for promises of a cure within a fixed time or after a certain course of treatment are almost sure to be falsified, and to be followed by disappointment and depression of spirits. It is therefore desirable to be frank at the outset, and to tell patients that no treatment, however thorough or prolonged, will afford certain immunity for the future; that it is the nature of syphilis to manifest itself by repeated outbreaks; that consequently the reappearance of symptoms is not necessarily to be regarded as a relapse; that the work of cure may still be going on; and that with proper care the chances are strongly in favor of ultimate recovery and complete restoration to health. *There is a disease worse than syphilis*, viz., *syphilophobia*, which has no tendency to self-limitation, over which remedies have no control, and which can only be cured by the exercise of a strong and manly will.[1] The syphilitic subject who would avoid this greater evil and place himself in the most favorable condition for recovery from his actual

[1] I have met with three sad cases in which syphilomania has led patients under my charge to commit suicide several months after all syphilitic manifestations had disappeared.

disease, must shun gloomy thoughts, give his mind and body healthy occupation, and cultivate a cheerful disposition.

Examination of the blood of persons in the early stage of syphilis shows a diminution of blood-corpuscles and an increase in the proportion of serum. This "chloro-anæmia," as it is very properly called, is chiefly confined to the primary and early stage of secondary symptoms—hence the special value of tonics at this period of syphilis; but they are hardly less desirable in the later stages to counteract the depressing influence of the disease and to assist the action of specific remedies. Unless decidedly contra-indicated by a plethoric condition of the patient, they should be included in the therapeutic means employed in all stages of syphilis, and they may commonly be administered with advantage for several months after specific remedies have been suspended. Nearly all of the mineral and vegetable tonics may in turn prove serviceable. The most useful are quinine, the preparations of iron, and gentian.

The chief remedies in the treatment of syphilis are mercurials, and iodine and its compounds. The former exert their therapeutic action mainly upon secondary and the latter upon tertiary symptoms, so that the susceptibility of a given lesion to one or the other may in some but not in all cases indicate to which stage of syphilis it belongs. This rule, however, is not so invariable as the above statement would make it appear, and requires explanation.

There is no distinct line of demarcation in respect to treatment between secondary and tertiary lesions, but a gradual transition from one to the other. By far the most powerful agent in the treatment of the chancre and the earlier general symptoms is mercury; as the disease progresses, iodine gradually begins to exercise a therapeutic influence; those symptoms which border upon the boundary line between secondary and tertiary manifestations, and which constitute the stage of transition—so called by Ricord—require a combination of mercury and iodine; finally tertiary symptoms yield with great facility to iodine and with difficulty to mercury, though it is very doubtful whether the former agent without the assistance of the latter, can effect their permanent removal.

The iodides cause tertiary lesions rapidly to disappear, but do little if anything towards the cure of the syphilis.

Mercurials.—Mercury came into general use in the treatment of syphilis within fifty years after the appearance of the Italian epidemic,[1] and, in spite of the many attempts which have been made to supplant it by other remedies, still holds its ground as the only reliable agent for combating secondary lesions. At the present day its efficacy is admitted both by regular and irregular practitioners, though the latter generally administer it furtively and under the guise of some other name. It is the

[1] Hæser (historisch-pathologische Untersuchungen, vol. i. p. 230), according to Virchow, quotes a satirical poem composed by Georgius Summarpia, of Verona, in 1496, in which the use of mercury in syphilis is mentioned.

active ingredient of most of the "life-balsams" and "essences of sarsaparilla," the marvellous virtues of which for the cure of "private diseases" are proclaimed in our daily and weekly journals (religious as well as secular). Even the Homœopaths use it, in pretty full doses too, and kindly give us their approval. Says Yeldham:[1] "It is an interesting fact that the practitioners of the old school have arrived nearer to the truth in the treatment of venereal than of any other class of diseases."

When speaking of the treatment of the chancre or initial lesion of syphilis (p. 469), the ground was taken that it is better, unless under certain circumstances, to defer the administration of mercury until the appearance of secondary symptoms. This course is now advocated by a number of authorities, among whom are Zeissl[2] and Sigmund.[3]

No one form of mercury can be used exclusively in all cases and in all stages of the disease. A preparation which agrees with one person will not unfrequently disagree with another, and it is sometimes necessary to make a trial of several before the one best adapted to the case can be selected. Again, after employing one form for a time, when the system has become accustomed to it, it is often desirable to change to another; in this manner the therapeutic action may be increased without resorting to large doses, which are liable to disarrange the bowels.

In general, my own experience leads me to give a decided preference to mercury in the metallic form, as the blue mass or mercury with chalk, above any of its salts or combinations. At the outset, it should be given with some degree of caution, since the patient's susceptibility is generally not known before trial, and salivation is to be avoided. Contrary to a very general but mistaken idea, at least as applied to the treatment of syphilis, the mouth is most readily affected by the first mercurial course; hence special care should be exercised at this time. The condition of the blood in early secondary syphilis, already referred to, renders it desirable to associate a tonic with the mercurial, as in the following formulæ:—

℞. Pilulæ Hydrargyri, ℈ij . . . . . 2|50
Ferri Sulphatis Exsiccati, ℈j . . . . 1|25
Extracti Opii, gr. v . . . . . |30
Mix and divide into twenty pills.

℞. Hydrargyri cum Cretâ, ℈ij . . . . . 2|50
Quiniæ Sulphatis, ℈j . . . . . 1|25
Mix and divide into twenty pills.

One of either of these pills may be given from two to four times a day.

When there is special reason for desiring speedy mercurial action, a combination of several preparations may effect the purpose sooner than one alone.

[1] Homœopathy in Venereal Diseases, London, 3d ed., p. 10.
[2] Allg. Wein. med. Ztg., Nos. 1, 2, 3, 4, 1879.
[3] Wiener Klinik, Oct. 1876.

℞.	Pilulæ Hydrargyri, ℈j	1	25
	Hydrargyri Chloridi Mitis, gr. x . .		60
	Hydrargyri cum Cretâ, ℈j	1	25
	Ext. Opii, gr. v.		30
M.	In twenty pills.		

It is best to commence with one of the above pills morning and night, and, if no effect be perceptible by the fourth or fifth day, to increase to three a day. So soon as the chancre begins to assume a more healthy aspect, or the secondary symptoms to subside, no further change in the treatment is required, unless, on the one hand, the mouth become tender, or, on the other, the symptoms cease to improve; in the former case the remedy must be suspended, and in the latter given more frequently.

The dose of the protiodide is from one-sixth of a grain (0.01) to half a grain (0.03), given in a pilular form two or three times a day. No benefit will be derived from exceeding the latter quantity, which alone is apt to produce diarrhœa. Indeed, the chief objection to this preparation is the abdominal pain and intestinal irritation which it often occasions; but these may in most cases be avoided by directing the patient to take his pill about an hour after meals, when the stomach is not entirely empty, or, if necessary, by the addition of opium; if these measures fail, some other form of the mineral must be employed. The sugar-coated granules of the protiodide, each of which contains one-fifth of a grain, afford a very convenient and elegant mode of administration, and, by their minute division, enable the surgeon to graduate the dose from day to day according to the exigencies of the case. The first decimal trituration, *i. e.*, one part to nine parts of sugar of milk, as prepared by the homœopaths, is also to be recommended on account of the thoroughness of the trituration and the fineness of the powder, which renders it less irritating. Two grains (0.12) contain, of course, one-fifth of a grain (0.012) of the iodide.

A convenient mode of exhibiting the biniodide of mercury is by decomposing the bichloride by means of the iodide of potassium, and dissolving the precipitated biniodide with an excess of the iodide of potassium, as in the following formula:—

℞.	Hydrargyri Bichloridi, gr. ij . . .		12
	Potassii Iodidi, ℥ss	2	00
	Aquæ, ℥viij	250	00
M.			

Dose.—A dessertspoonful (10.00) an hour after eating, two or three times a day.

Gibert's favorite formula, which is much employed at the Saint Louis and other hospitals of Paris, where it is known as the "syrup of the iodureted biniodide of mercury," is as follows:—

℞.	Hydrargyri Biniodidi, gr. j	0	06
	Potassii Iodidi, ℥j	4	00
	Aquæ, ℥j	4	00
	Filter through paper and add—		
	Syrupi, ℥v	150	00
M.			

Dose.—A tablespoonful (15.00).

Mr. Langston Parker recommends the following:—

℞.	Hydrargyri Biniodidi, gr. iij .	0.20
	Potassii Iodidi, ʒj–iij . . .	4.00—12.00
	Spiritûs Vini, ʒj	4.00
	Syrupi Zingiberis, ʒiij . . .	12.00
	Aquæ, ℥iss	45.00
M.		

Dose.—Twenty to thirty drops (1.50–2.00) three times a day in half a tumblerful of fluid.

Such combinations of mercury and iodide of potassium are the more valuable, the longer the time which has elapsed since contagion. In late secondary lesions, we often administer half a grain (0.03) or less of the protiodide of mercury at noon and the iodide of potassium morning and night. Duncan's compressed pills of the bichloride of mercury and the iodide of potassium are also of value. They are prepared of three different strengths, containing, $\frac{1}{20}$, $\frac{1}{10}$, and $\frac{1}{10}$ of a grain of the bichloride, with 3, 4, or 5 grains of the iodide.

The bichloride has for a long time been a favorite preparation with many. It has certain advantages; in small doses it rarely salivates, and its administration does not require to be so closely watched as that of the more active forms of mercury. It is, therefore, worthy of employment in those patients who tolerate it, and who live at a distance from their surgical attendant; in those who are peculiarly susceptible to the morbid action of mercury, and in persons of a broken-down constitution. Its taste, however, is very repulsive, and it is not well borne by delicate and sensitive stomachs, often occasioning gastric pain, cramps, and colic. For the latter reason, it is better tolerated by men than women. But there are much better preparations of mercury than this, and we desire to protest against the indiscriminate use of the bichloride, which is the routine practice of many practitioners. It has little effect in subduing syphilitic symptoms, especially in obstinate cases, and patients are constantly brought to us by their attending physicians in consultation, with the report that "the disease will not yield to mercury," when the only fault has been the choice of a comparatively, and frequently intolerable, preparation of this mineral.

The bichloride of mercury may be administered in solution or in a pill. It is very liable to undergo decomposition, and, with the intention of preventing this, is usually associated with muriate of ammonia. The average dose for an adult is one-sixteenth of a grain, but is sometimes raised to a fourth or even half a grain; in the treatment of syphilis, however, I have rarely found it beneficial to exceed one-tenth of a grain, given three times a day upon a stomach not entirely empty; even in this quantity it is difficult to prevent intestinal pain and irritation.

This preparation of mercury was extensively used by Van Swieten,[1] and is the active ingredient of the "liquid" known by his name, the formula for which is as follows:—

[1] Commentaries, xvii, 292.

℞. Hydrargyri Bichloridi, 1 pt.
Aquæ, 900 pts.
Spiritus rect., 100 pts.

The average dose of Van Swieten's liquid is a tablespoonful (15.00), which is given in a glass of sweetened water.

The solubility of the bichloride of mercury in alcohol and water facilitates its administration in any of the vegetable tinctures and infusions which are often required in anæmic subjects. When given in this form, it doubtless undergoes partial decomposition, but does not appear to lose its therapeutic effect. I sometimes employ as a menstruum the tincture of the chloride of iron.

℞.	Hydrargyri Bichloridi,	
	Ammoniæ Muriatis, āā gr. iij . . .	20
	Tinct. Cinchonæ Comp., ʒiij	90 00
	Aquæ ʒiij	90 00
	M.	

From a teaspoonful (5.00) to a tablespoonful (15.00) two or three times a day.

℞.	Hydrargyri Bichloridi, gr. iv . . .	25
	Tinct. Ferri Chloridi, ʒiv	15 00
	M.	

Eight drops (0.50) contain very nearly one-sixteenth (0.004) of a grain of the bichloride.

The pilular form is more convenient for many persons. Equal parts of the bichloride of mercury and the muriate of ammonia may be dissolved in a very small amount of pure water, with which finely-powdered cracker is to be mixed in sufficient quantity to absorb it; syrup of gum acacia is added to give it consistency, and the mass rolled into pills containing the desired quantity of the bichloride. Extract of dandelion is also a convenient vehicle, but is more liable to decompose the mercurial.

It is a fact but little known that the bichloride may be administered in cod-liver oil by first dissolving it in a few drops of sulphuric ether. If the bottle be kept tightly corked it may be retained in solution for an indefinite time; but if the ether be allowed to evaporate by exposure to the air, the bichloride will be precipitated and cannot be redissolved by the addition of more ether.

℞.	Hydrargyri Bichloridi, gr. ij	12
	Etheris Sulphurici, ʒj	4 00
	Dissolve and add—	
	Olei Morrhuæ, ʒvj	200
	M.	

A dessertspoonful (10.00) contains one-twelfth of a grain (0.005) of the bichloride.

The preparations of mercury above mentioned are those which are found to be the most serviceable in the treatment of syphilis, though others, as, for instance, Plummer's pill, may sometimes be employed to advantage.

Increased experience in the treatment of syphilis, however, has led me to give a decided preference to the external over the internal use of mercury, in any outbreak of general symptoms subsequent to the first. In the

earliest attack of general manifestations, small doses of the blue mass, or mercury with chalk are commonly sufficient to subdue the symptoms without unpleasant action upon the gums or bowels; but at a subsequent period tolerance of the remedy has often been acquired and the administration of doses sufficient to accomplish the desired end will very frequently induce diarrhœa, salivation or general cachexia; while the use of mercury by fumigation or inunction rarely salivates or causes diarrhœa, does not disarrange the stomach, and it has appeared to me, has a much more decided effect upon the disease than mercury by the mouth. I frequently see symptoms which have persisted for many months under the internal use of mercury, rapidly subside and disappear as the effect of its external application.

Fumigation.—Mercurial fumigation was employed at a very early period in the treatment of syphilis, but fell into almost complete disuse until revived by Mr. Langston Parker, of Birmingham, England. In Mr. Parker's method, the vapor of water is combined with that of mercury, constituting a "moist mercurial vapor bath," which is regarded by its author as a means of treating syphilis "safer, quicker, more certain, less frequently followed by relapses, and more efficient in obstinate cases than any other."

The mercurial vapor may be generated from metallic mercury, calomel, mercury with chalk, the bisulphuret, the gray oxide or the binoxide, from a scruple (1.25) to three drachms (12.00) of which are required for each bath, the quantity being proportioned to the effect desired. Mr. Parker states that in skin diseases, and especially in rupia, the bisulphuret is to be preferred; in diseases of the throat and nose, the gray oxide, binoxide or calomel is better, because the patient can bear the head immersed without sneezing or coughing, which he cannot do when the bisulphuret is used.

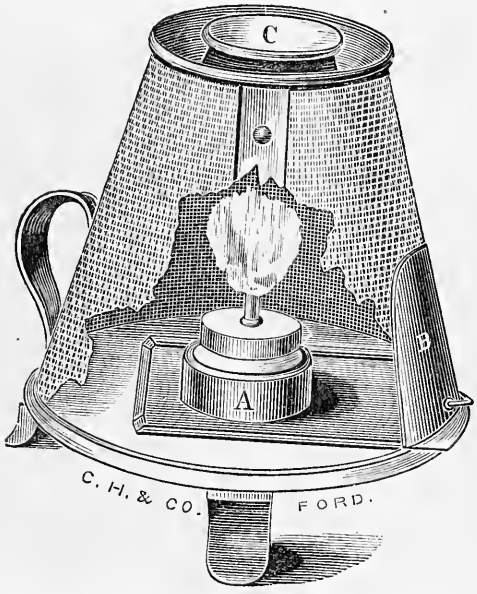
I commonly employ calomel, as recommended by Mr. Henry Lee, and also the lamp (Fig. 137) introduced by the same surgeon, which is a great improvement over the more elaborate and costly apparatus formerly in use.

The purest calomel only should be used, and it is better to have it resublimed and then washed, so as to rid it entirely of its free hydrochloric acid, the fumes of which are very irritating to the lungs.

The best time for taking the bath is just before going to bed. The circular groove on the top is to be filled one-third full of boiling water, the alcohol lamp beneath lighted, and, at the last moment, about half a drachm (2.00) of calomel to be deposited upon the plate C. The patient stripped of his clothing and enveloped in one or more blankets drawn closely round the neck, sits upon a cane-bottomed chair with the lamp beneath. In the course of five to ten minutes, profuse perspiration is induced; the calomel is wholly evaporated within fifteen to twenty minutes, when the lamp may be blown out, and the patient, after waiting five or ten minutes longer exposed to the moist vapor, may retire to bed. I commonly advise, as recommended by Mr. Lee, that the use of a towel after the bath should be avoided, so that the thin layer of mercury deposited upon the surface of the body may remain and be further absorbed. In order to prevent too

sudden a change of temperature, it is well for the patient to remain enveloped in the blanket on going to bed, or, before immersion, he may put on a long flannel night-gown which can be drawn up around the neck until

Fig. 137.



Lee's lamp for fumigation. This lamp is now made of wire gauze, and resembles the safety lamp of the miners, thereby guarding against sudden explosions of the alcoholic vapor.

he is ready to retire. I have never, however, seen any ill effects from "taking cold," nor found it necessary to restrict patients with regard to exposure to the weather any more than when giving mercury by the mouth. When put to bed it is well to give the patient a tumblerful of the compound decoction of guaiacum or sarsaparilla, as hot as he can drink it.

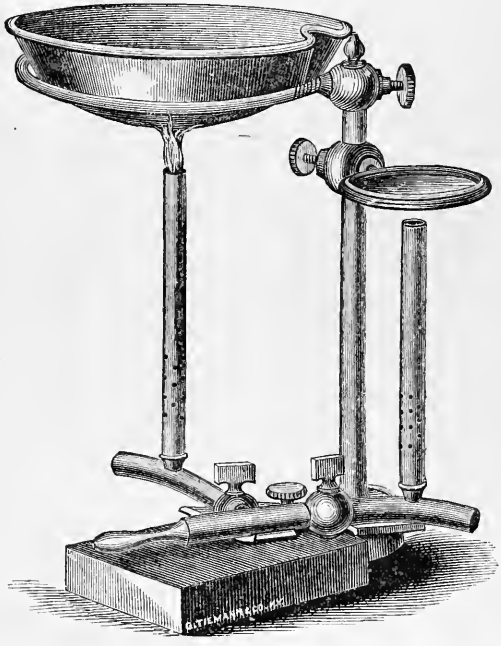
My friend, the late Prof. F. F. Maury, M.D., of Philadelphia, invented an apparatus for the same purpose, which may be attached to any ordinary gas fixture; and which avoids the danger of using a lamp containing alcohol. (Fig. 138.)

In the absence of these contrivances, an excellent plan is to dissolve any soluble compound of mercury, as corrosive sublimate, in water, and subject the same to ebullition by any ordinary process: or, a simple apparatus may be extemporized by heating a brick and sprinkling the calomel upon its surface, at the same time placing a pail of boiling water by its side beneath the chair.[1]

[1] Prof. David W. Yandell, M.D., has published an excellent lecture on the Mercurial Vapor-Bath, which is worth reading.—Am. Pract., Louisville, Sept., 1877.

The frequency of the baths should be determined by the strength of the patient and the degree of mercurial action desired. In cases of secondary syphilis, when the strength of the patient is fair, every night is not too

Fig. 138.



Prof. Maury's apparatus for moist mercurial fumigations. It consists of two Bunsen's burners, one of which is surmounted by a pan to contain the water, and the other by a small shallow dish for the preparation of mercury. The apparatus is attached by means of a flexible tube to any ordinary gas fixture.

frequent; in debilitated subjects and in cases of tertiary syphilis when only a slight effect from mercury is desired, from one to three times a week is sufficient. During the period of their administration, the patient should wear flannel next the skin and observe the hygienic rules heretofore laid down; and mercury in minute doses, iodide of potassium, or tonics may be given internally. The syphilitic symptoms often exhibit an improvement after the first or second bath and generally disappear in the course of from one to three weeks, but the treatment should be continued for at least some weeks longer.

The most frequent complaint made by patients against this mode of treatment is a feeling of debility, and sometimes headache: effects which I believe to be due to too great an amount of steam. The difficulty may be obviated by diminishing the amount of water, and shortening the duration of the bath. If necessary, so little water may be used that the whole of it will be evaporated in the course of ten minutes, after which the force of the flame is expended upon the mercury. The gums frequently become

tender, but decided salivation is very rare. In some instances the physiological effect of the mercury is manifested by severe diarrhœa, such as often takes place after the prolonged internal use of the mineral.

We are inclined to think that the absorption through the skin is very slight, and that the effect is proportioned to the amount of the mercurial vapor inhaled by the patient. Certainly the effect is not constant: and while some patients bear the baths not only with impunity but with benefit, others are obliged to abandon them from the occurrence of salivation, headache, weakness, etc.

Mercurial fumigation unfortunately requires an amount of time and attention which few patients are willing to devote to it, or recourse must be had to professional bath-givers, whose inherent tendency would seem to be to absorb the patient at the same time that he absorbs the mercurial fumes.

Inunction.—Inunction is a less cleanly and, therefore, more disagreeable external mode of using mercury than fumigation; but it is more convenient for most patients, and its effect is even more satisfactory. Sigmund, who used mercurial inunctions in 9379 cases, occurring at the Vienna Hospital between the years 1842 and 1855, regards this as the simplest and most efficacious mode of treating the various forms of syphilis.[1]

My own preference for inunction is very strong, and I resort to it in most of the old cases of syphilis which come under my care, while administering at the same time internally large doses of the iodide of potassium. Some of the most gratifying results that I have met with in practice have been obtained in this way, as I shall have occasion to notice hereafter.

The chief objection against this mode of treatment, viz., the staining of the linen by the dark-colored "blue ointment" and the consequent risk of exposure, has been obviated by the introduction of the oleates of mercury. The latter, which are liquid up to the ten per cent. oleate at least, may be used pure. I prefer, however, the twenty per cent. preparation combined with an equal weight of simple cerate.

℞. Hydrarg. Oleinici,
Cerati Simpl., āā, ʒj . . . . . 30|00
M.

This forms a consistent mass, of a light fawn color, which is free from the above-mentioned objection. The oleates, however, are more apt to irritate the skin than the ung. hyd. They should therefore be used with greater caution and they require less friction in their application.

In making the applications, it is better to avoid the more delicate portions of the skin, and also those portions which are exposed to friction or motion or are usually covered with hair. For the sake of cleanliness, the application may be suspended and a bath of hot water with soap be taken

[1] Medical Times and Gazette, May 5, 1857: from the Wien Wochenschrift, 1856, No. 36. Sigmund has published a pamphlet on this subject, entitled Die Einreibungscur bei syphilisformen, Wien, 1878.

once a week. For the sake of convenience, I usually furnish patients with a copy of the following directions:—

Before commencing the treatment, take a hot bath and cleanse the skin thoroughly with soap.

The evening, before retiring, is the most favorable time for the application, when a piece of the ointment, about the size of the terminal joint of the forefinger, is to be rubbed, with the palm of the hand, into some portion of the surface of the body or extremities for about fifteen minutes.

At each application, a fresh surface should be selected, so as to avoid irritation from excessive friction of any one portion.

Any of the ointment which remains after the rubbing should be left upon the skin and not be washed off; and the patient should wear the same flannel or merino underclothes constantly night and day. The following order may be followed in the applications:—

1st evening, to the buttocks.
2d " to the thighs, but not near the groins or scrotum.
3d " to the sides of the chest, but not in the armpits.
4th " to the internal surfaces of the arm and forearm.
5th " to the back or belly. The former application is best made by an assistant, whose hand is protected by a glove.
6th " omit the application.
7th day, take a bath in the morning, change underclothes, and in the evening resume the applications as above.

Keep the mouth and teeth clean by the use of a brush and an astringent lotion, and the bowels open. If any symptoms of salivation occur, such as increased flow of saliva, tenderness or swelling of the gums, fetor of the breath, etc., the applications should be suspended, and the body cleansed with soap and water.

If the oleate of mercury, instead of the mercurial ointment, be employed, less friction is required, and little more is necessary than to smear the remedy over the surface.

When only a mild effect from mercury is desired, the extent of the application may be limited. Thus, the ointment may be rubbed into the soles of the feet every night, or some of it may be spread upon pieces of chamois leather, which are to be stitched to the drawers at points corresponding to the hams and the calves of the legs.

Mercurial Suppositories.—Suppositories, composed of about a drachm (4.00) of mercurial ointment and a sufficient quantity of butter of cocoa, one of which is introduced into the rectum every night, have been tried in the treatment of syphilis, with unfavorable results. They can seldom be borne for any length of time, on account of the tenesmus, colic, rectal catarrh, and frequent desire to go to stool which they soon occasion. The syphilitic lesions appear to be little benefited by them, and they often salivate.

Hypodermic Injection.—The hypodermic injection of preparations of mercury has of late years attracted attention, and deserves to be regarded as a valuable addition to our means of treatment in certain cases. Its general adoption, however, as a means of treatment is not, we think, to

be recommended, since the injections are followed by considerable pain lasting often for several hours, and there is always a possibility of causing troublesome abscesses at the points of insertion. We find it of value in those cases in which a very speedy action of mercury is desired, and are in the habit of using it especially in cases of early malignant syphilis, in which, within a few months after infection, the patient exhibits deep ulcerations of the fauces or ecthymatous ulcers scattered more or less generally over the integument. In such instances, we know of no better treatment than the internal administation of the potassium iodide in large doses, combined with hypodermic injections of corrosive sublimate.

The preparation of mercury recommended by Scarenzio, of Pavia, and first used for this purpose, was calomel, of which about three grains (0.20) were rubbed up with about a quarter of a drachm (1.00) of glycerine for each injection, which was repeated at intervals of a week. These injections were found, however, very frequently to produce troublesome abscesses, and smaller quantities of calomel, from a grain and a half (0.09) to a grain (0.06), were employed at shorter intervals, as every third or fourth day. The danger of abscesses was diminished with the small doses, but was not entirely removed, so that injections of calomel have been pretty much abandoned.

Subsequently, Lewin,[1] of Berlin, resorted largely to injections of corrosive sublimate, of the strength of four grains (0.25) to the ounce (30.00) of distilled water, and of this fifteen minims (1.00) were employed at each injection. The pain following the injection was found to be alleviated by adding one-tenth to one-eighth of a grain (0.006–0.008) of acetate of morphia. Lewin made his injections daily, or sometimes even twice a day, so that one-fourth of a grain (0.015) of the sublimate was inserted within twenty-four hours, and he stated that about fifteen injections would usually suffice for a cure, although forty to fifty were sometimes required. So great frequency appears to us both undesirable and dangerous at the outset, as we have found salivation produced by one or two injections, and we prefer, until the patient's susceptibility has been tested, to wait some two or three days after each insertion before repeating it, meantime watching the effect. Lewin found the different parts of the body equally available, so far as the power of absorption is concerned; but it is important to select a portion presenting the least sensibility in the integument, and the least tendency to the occurrence of inflammation and the formation of abscesses, and the infrascapular regions, the loins, and the upper portions of the nates possess these requisites in the highest degree. The arms had better be avoided. There is reason, however, to believe that mercury causes the lesions of syphilis to disappear, quite as much by its direct local action upon the lesion itself as by any alteration in the constitution of the blood which it effects. Consequently we prefer, if possible, to make the injection in the neighborhood of the lesion we hope to cure. The same rules as to the avoidance of veins, injecting only into the derma, wounding the hair

[1] Behandlung der Syphilis mit subcutaner Sublimat-injection. Berlin, 1869.

bulbs, etc., obtain as with all hypodermic injections. The same syringe should never be used on syphilitic and non-syphilitic subjects. After injecting corrosive sublimate the point of the syringe should be carefully washed and dried, and sharpened, if necessary. This will not, however, entirely prevent its being corroded by the sublimate, and points used for this purpose must be frequently renewed. The pain following the injection is often severe, lasting for several hours. If sufficient care be used, the recurrence of abscesses will not be frequent. Salivation should be carefully guarded against.

Our experience with hypodermic injections in the treatment of syphilis has been chiefly confined to solutions of corrosive sublimate, with which we have had every reason to be satisfied. A formula which we have used in very many cases is the following:—

℞.	Hydrarg. Chloridi Corr., gr. xl . . .	2|60
	Glycerinæ, ʒj	5|00
	Aquæ Destill., ʒvj	24|00
M.		

Twelve drops (0.80) of this solution contain about one-eighth of a grain (0.008) of the sublimate, and are used for each injection.

Mr. Stern[1] has recently proposed a solution of the double chloride of mercury and sodium, which, he states, will not produce abscesses, and causes only very slight stomatitis, if any. His formula is as follows:—

℞.	Hydrarg. Chloridi Corr., gr. iv . . .	0|25
	Sodii Chloridi Puri, ℈ij	2|50
	Aquæ Destill., ʒxiij	55|00
M.		

Half a drachm (2.00) of this mixture is daily injected, thus giving a dose of one-sixth of a grain (0.01) of the sublimate.

But there is scarcely any end to the other solutions of mercury which have been recommended, chiefly on the ground that they were less likely than corrosive sublimate to produce abscesses or occasion stomatitis. Having had no experience with most of them, and being well satisfied with the mercuric chloride, we shall do little more than enumerate some of them.

The substitute for corrosive sublimate which has attracted most attention has been the albuminate of mercury, first proposed by Staub,[2] of Strasburg, in 1871, and afterwards adopted and popularized by Prof. H. von Bamberger, of Vienna, who states that its action is most rapid; that all syphilitic symptoms disappear after ten to twenty injections; that suppuration and infiltration of the skin are avoided; and that salivation never occurs. For the mode of preparing this solution, which is somewhat complicated, we must refer to the original.[3] We had several bottles put up one summer by the eminent chemist, Dr. Squibb, of Brooklyn, but the

[1] Progrés méd., Paris, déc. 21, 1878.

[2] Traitement de la syph. par les injections hypodermiques de sublimé à l'état de solution chloro-albumineuse, Paris, 1872.

[3] Zeit. d. öest. Ap. Ver., 1876, 147, 177. Also, New Remedies, N. Y , 1876, p. 167, 175.

fluid became so soon decomposed that we were unable to give it a fair trial, and were discouraged from testing it further.[1]

Dr. Squibb says that the solution is pretty accurately as follows:—

Egg albumen,	20 per cent.	=	Dry albumen,	2.5 per cent.
Mercuric chloride,	1 " "	=		1.0 " "
Sodium chloride,	4 " "	=		4.0 " "
Distilled Water,	75 " "	=		92.5 " "
	100			100

The amount to be used at each injection is a cubic centimetre, or about fifteen minims, which contain one-seventh of a grain (0.01) of the mercuric salt. It does not seem to be a true definite chemical compound, but merely a solution of the very irritant chloride of mercury in a saline albuminous fluid, the chloride being unchanged, but guarded by the blandness of the solvent vehicle.

In a later communication we learn that the difficulty of preparing a stable and clear solution of the albuminate, has led Bamberger to replace the albumen by peptone. Injections of the albuminate of mercury have been favorably reported upon by Neumann in a paper before the Imperial Academy of Medicine, of Vienna, and by Grünfeld.[2]

Daily injections of seven to fifteen drops (0.50–1.00) of four to five grains (0.22–0.30) of the bicyanide of mercury to an ounce and four scruples (40.00) of distilled water were employed by Sigmund,[3] who states that within a period of ten years he has made injections upon six hundred and thirty-one persons, and has met with only five cases of abscess. He prefers, however, his favorite mode of treatment by inunction. The bicyanide has also been used by Kroworzynski.[4]

Gambarini, of Bologna, employed a solution of the biniodide of mercury, to which Ragazzoni[5] added a little iodide of potassium, to insure the complete dissolution of the salt. His formula was this:—

℞. Hydrarg. Biniodidi, gr. ss . . . . 0|03
Potass. Iodidi, q. s.
Aquæ Destill., ℥ss . . . . . 2|00
M.

Dr. Weisfolg uses injections of the nitrate of mercury according to the following formula:—

℞. Hydrag. Oxid. Nit. Crystall., gr. viij . 0|50
Aquæ Destill., ℥xiv. . . . . 56|00
M.

He states that they are less harmful than injections of the mercury perchloride, do not cause abscesses, and supply the system with a much larger

[1] Prof. Bamberger, on the contrary, states that this solution may be kept in a (German) heated room all winter without undergoing change.

[2] Wien. Med. Presse, No. 38, 1876.

[3] Wien. Klinik, Oct. 1876.

[3] Vrtljschr. f. Dermat., Wien, Heft 2, 1876.

[4] Gior. ital. d. mal. ven., Milano, anno viii, 1873, p. 65. Also Lancet, London, Nov. 1, 1873.

quantity of soluble mercury without causing salivation, than can be done in any other way.[1]

It is claimed by Lewin that the results of the hypodermic injection of mercury are always satisfactory, except in cases of bone or brain syphilis, and that relapses are less frequent than after the internal administration of mercury or its external use by fumigation or inunction. Sigmund, on the other hand, believes that the field for its employment is limited, and that it is adapted only for the milder eruptions of the secondary stage. For obvious reasons, it is not to be employed on pregnant women nor on young children.

EFFECTS OF MERCURY.—Before commencing treatment for general syphilis, a patient is often weighed down with languor and general malaise, which are the effect of his disease; under the use of mercury, his strength and spirits improve, and he becomes light, active, and buoyant; mercury thus far has indirectly acted as a tonic; after continuing treatment for some time, however, it is frequently the case, that although his symptoms have constantly improved, he is again subject to depression, but if questioned as to the cause or nature of his feelings, can give no satisfactory reply; his low spirits and uncomfortable sensations cannot be defined or explained, but are none the less real. This condition is unquestionably due to the prolonged influence of mercury, since it yields to a suspension of specific remedies, whether aided or not by a cathartic, and a change of air and scene for a few days, when this is practicable. These conclusions from clinical experience are borne out by analyses of the blood and by actual counting of the red corpuscles in a given quantity of the blood of healthy men and animals, while under the influence of small and large, or long-continued, doses of mercury. Liégeois[2] was the first to announce that small doses of the sublimate, under the above circumstances, would cause an increase of weight, while large doses diminished it. In 1874, Wilbouchewitch[3] drew the conclusion from careful experimentation, that small doses of mercury, when given to a syphilitic patient, at first increase the number of red corpuscles, and slightly diminish the number of the white globules.

But, for further light on this subject, we are indebted to a very valuable paper[4] by Prof. E. L. Keyes, who, by means of the hématimètre, made countings of the number of red corpuscles of the blood of syphilities while

[1] Arch. f. path. Anat. etc. (Virchow), Berl. B. 66, S. 3111, and Practitioner, Lond., Mch. 1879, p. 216.

[2] Des résultats cliniques et scientifiques obtenus avec les injections sous-cutanées de sublimé à petites doses dans l'étude de la syphilis, Gaz. d. hôp., Paris, 88, p. 347; 89, p. 350, 1869.

[3] De l'influence des préparations mercurielles sur la richesse du sang en globules rouges et en globules blancs. Arch. de physiol. norm. et path., Par., 1874, p. 508.

[4] The effect of small doses of mercury in modifying the number of the red blood-corpuscles in syphilis; a study of blood-counting with the hématimètre. Am. J. M. Sc., Phila., Jan. 1876.

taking small doses of mercury, and who arrived at the following conclusions :—

1. Mercury decreases the number of the red cells when given in excess, especially in hospitals (Wilbouchewitch).

2. Syphilis diminishes the number of red corpuscles below the healthy standard.

3. Mercury in small doses continued for a short or for a long period in syphilis, alone or with the iodide of potassium, increases the number of the red corpuscles in the blood and maintains a high standard of the same.

4. Mercury in small doses acts as a tonic upon healthy animals, increasing their weight (Liègeois). In larger doses it is debilitating or fatal.

5. Mercury in small doses is a tonic (for a time at least) to individuals in fair health, not syphilitic. In such individuals, it increases the number of the red corpuscles.

In whatever way mercury is introduced into the system, its presence in the normal secretions and excretions of the body may be demonstrated by our improved modern methods of analysis, as shown by Byasson,[1] Betelli,[2] and Ludwig.[3] The bichloride taken by the mouth has been recognized in the urine two hours, and in the salivation four hours after its ingestion; still later it is found in the sweat, and in the milk of nursing women. A considerable portion is elimitated by the bile, and is found in the stools, and traces of it may be discovered in the various tissues for a considerable time after the cessation of treatment.

How mercury acts in the cure of syphilis, is a question still under discussion; whether directly upon the syphilitic diathesis, or simply as an antiplastic agent upon the neoplasm which characterizes the lesions of this disease, or, in other words, will mercury so attenuate and even exterminate the syphilitic influence as to protect the patient for the future—in fact, cure him, or does it simply cause the disappearance of existing lesions? In our opinion, it acts in both these ways. No one can question its influence upon the lesions themselves, which it accomplishes by controlling the hyperæmia of the various tissues invaded, and by causing the fatty degeneration and death of the specific cells which characterize syphilitic manifestations. But we go further than this, we believe it capable of removing the diathesis, and, in fact, of curing the disease. Without this belief, our continuance of mercury after the disappearance of the lesions would be illogical, and the advantages of such continuance are demonstrated by daily observation.

Many practitioners are very averse to the use of mercury with patients who show any tendency to pulmonary disease. We believe that this fear is groundless, provided this agent be used in the small doses which are now employed, at the same time that the proper rules of hygiene are observed,

[1] Recherche du mercure dans les sécrétions ; J. de l'anat. et de la physiol., Par. 1872.

[2] Merc. vinvenuto nelle urine di quattro malati sif. ; Gior. ital. d. mal. ven., Milano, 1876, p. 149.

[3] Sigmund, Wien. Klinik, Oct., 1876.

and that tonics, cod-liver oil, etc., adapted to the lung-trouble, be not neglected. Surely no sadder cases are met with than those of persons who have both syphilis and tubercular disease to contend against. Let them be relieved of the former, if, as we believe, it can be done with safety.

Salivation.—The most frequent unpleasant effect of the administration of mercurials, and the one which it is especially necessary to guard against, is salivation, though this formerly was thought to be a desirable result of treatment and to favor the cure of syphilis. The therapeutic effect of mercury undoubtedly precedes its morbid action, although the two are often separated by a short interval only, and sometimes appear to be synchronous. If we carefully observe the phenomena which ensue after commencing a mercurial course, selecting by preference a case which has as yet received no treatment, and in which the effects of mercury are generally most clearly marked, they are usually found to be as follows: for the first few days, no improvement is perceptible in the symptoms, which may even become aggravated; the chancre may spread over a larger extent of surface, or new secondary lesions may appear; suddenly, however, the primary sore begins to assume a more healthy aspect, and the process of cicatrization to advance from its circumference towards the centre; the indurated base and neighboring lymphatic ganglia lose somewhat of their hard and cartilaginous feel; or the syphilitic eruption commences to fade away. If now the mercurial be continued, even though the quantity administered be not increased, tenderness of the mouth appears in the course of a very few days, sometimes as soon as the second or third day after the first improvement was noticed in the symptoms. In a few instances only does an amelioration in the symptoms appear to coincide with decided salivation, and in such cases the action of the mercurial has generally been so rapid, that an interval between the two may readily have been overlooked. Again, if mercury be continued after salivation has taken place, its therapeutic action is not increased, but in most cases, on the contrary, the symptoms are aggravated. The practical inference from the above remarks is, that the specific treatment of syphilis may be carried to tenderness of the gums, if we wish to be assured that its full therapeutic effect has been obtained, but that it should not intentionally be pushed to complete salivation, and never in any case be continued beyond this point. A patient is much more liable to be salivated by the first than by any subsequent course of mercury; the system becoming tolerant of its presence by repeated use. Patients who have supposed themselves extremely sensitive to the action of mercury, founding their opinion upon past experience, are often surprised at the large amount which they are able to take, not only with impunity, but with decided benefit to their symptoms and their general condition, while under treatment for syphilis.

The earliest indication of the morbid action of mercury upon the mouth, which is likely to attract the patient's notice, is tenderness of the gums; this is soonest felt just back of the superior incisor teeth, and, in the lower jaw, posterior to the last molars. Patients should be warned of these

symptoms at the commencement of a mercurial course, and directed immediately upon their appearance to suspend treatment. This precaution is desirable, though it sometimes leads timid persons to imagine the mouth affected long before this result has actually taken place. The soreness attendant upon the development of a wisdom tooth is often mistaken for mercurial salivation, and various other causes, as decayed teeth, may also produce tenderness of the gums, and a fetid breath. It is, therefore, always desirable for the surgeon carefully to inspect the mouth before commencing treatment, in order that he may be able to determine, at a subsequent period, how far to attribute its unhealthy condition to the influence of mercury.

Other prominent symptoms of mercurial stomatitis are a metallic taste in the mouth; a fetid odor of the breath—which, however, is not characteristic, since it may be perfectly simulated by the offensive smell proceeding from a want of cleanliness, or gums diseased from other causes; an increased flow of saliva; a sensation as if the teeth were elongated, and tenderness when they are struck together; swelling of the tongue, which bears the impress of the teeth upon its sides; tumefaction of the mucous membrane of the gums, cheeks, and lips; difficulty in talking and swallowing; enlargement of the neighboring ganglia; sometimes general febrile disturbance and great nervous irritability; in extreme cases ulceration of the soft parts, which may perforate the cheeks; loosening and detachment of the teeth; and even caries of the alveoli and of the maxillary bones.

Under the cautious method of administering mercury which is now adopted, excessive salivation is rarely induced, and even when left to itself, usually subsides in the course of a week or ten days after the suspension of treatment. Much, however, may be done to shorten its duration and alleviate the sufferings of the patient. The bowels, if confined, should be freely purged, and the action of the skin promoted by warm baths and underclothes of flannel. The most distressing symptoms are the great difficulty in swallowing, nervous excitability, and inability to sleep. Nourishment should, therefore, be administered in a liquid and concentrated form, as strong beef-tea; and rest be secured by the exhibition of Dover's powder, aided by a hot mustard pediluvium at night, which will also act as a derivative from the head. Half an ounce or an ounce of Labarraque's solution of chlorinated soda in half a pint of water forms an excellent gargle for such cases.

Although the above measures should by no means be neglected, the most direct and effectual treatment of salivation consists in the administration of the chlorate of potash. We usually order an ounce of this salt in powder, and direct the patient to dissolve from one to two teaspoonfuls in a pint of water, milk and water, flaxseed tea, decoction of marshmallow, or in whatever other vehicle may be most agreeable. This solution is to be used warm, and is to be kept constantly within reach of the patient, so that he may frequently rinse his mouth with it, and afterwards swallow a portion. From one to two pints are sufficient for the twenty-four hours;

and about half of this quantity, containing one or two drachms (4.00–8.00) of the chlorate, should be swallowed.

It cannot be doubted that the amelioration in the symptoms which almost always takes place under the use of the chlorate, is due to the remedy and not to the mere suspension of the mercurial, since the stomatitis will often relapse if the salt be too soon discontinued. The therapeutic action of the chlorate is also proved beyond question by Ricord's experiments, which show that the stomatitis will subside under its use if the mercurial be continued, and, in many cases, even if the dose be increased; and that the chlorate may be employed as a prophylactic from the commencement of treatment in persons who are peculiarly susceptible to the morbid action of mercury, without interfering with the remedial effect upon the syphilitic symptoms.[1] This statement has been confirmed by Laborde.[2]

During the use of mercury, much may be done to prevent salivation by attention to cleanliness of the mouth, and by avoiding exposure to sudden changes of temperature and to moisture. The teeth should be brushed several times a day, or the mouth be rinsed with some astringent gargle, as diluted tincture of myrrh, or equal parts of brandy and water with the addition of alum. The influence of cold and wet must not be regarded as chimerical. But the apprehension which is often entertained by patients in regard to the use of cold drinks, provided other hygienic conditions be favorable, is probably groundless.

The young surgeon must not, however, suppose that salivation is the only indication that the system is fully under the influence of mercury. There exists a class of patients who, it would seem, cannot be salivated, no matter how much mercury they may take; but in such persons the point of saturation, if we may call it, is indicated in other ways, commonly by loss of appetite, general malaise and depression of spirits; by diarrhœa; or by ulceration of the internal surfaces of the cheeks on a line corresponding with the free edges of the molar teeth, which may readily be mistaken for a syphilitic ulcer. With due care, however, any serious inconvenience from these symptoms can be avoided; only let it be remembered that any falling off in the general condition of the patient during a mercurial course, the supervention of diarrhœa when the remedy was for a time well borne, or any tendency to ulcerative action should be regarded with suspicion and be well weighed before treatment is further continued.

Other morbid effects of mercury are an eruption upon the skin (eczema mercuriale) which sometimes follows mercurial inunction; mercurial trembling, and other affections of the nervous system; mercurial spanæmia and cachexia, etc.

Mercurial eczema will soon disappear, if the remains of the ointment be carefully removed by warm water and soap and the part be dusted with some fine powder as that of talc or precipitated chalk. The other morbid

[1] Ricord, Leçons sur le chancre, p. 336.
[2] Laborde, Gaz. d. hôp., 24 avril, 1858.

effects of mercury are so infrequent at the present day that we need not discuss them. The popular idea, fostered unfortunately by some physicians, that mercury remains in the system indefinitely and that it is responsible for tertiary lesions, as gummata, necrosis, and caries of the bones, etc., is without foundation. These lesions appear after any treatment whatever, and also in the absence of all previous treatment, thus disproving the assertion that they are caused by mercury.

Duration of Treatment.—It is hardly necessary to remark that treatment should be persevered with as long as any syphilitic symptoms remain. While these persist, specific remedies must be continued in doses graduated according to the effect produced and the general condition of the patient, increasing the quantity if fresh symptoms appear or old ones cease to improve; diminishing it, or suspending treatment altogether for a time, if intestinal irritation, salivation, general malaise, or decided cachexia supervene; in all cases seeking the aid of hygienic influences, and of tonics. The effect upon the symptoms is to be taken as the gauge of the extent to which mercurial treatment should be carried, and it is a mistaken notion that anything is to be gained by causing salivation or any of the other pathological effects of mercury. So soon as the symptoms begin to improve, the maximum dose required for the time being has been reached; and this dose should be continued, subject, however, to the rules just mentioned, until all the symptoms have disappeared, and for several months afterwards. Persistence of the induration of the base of the initial lesion, and more frequently that of the neighboring ganglia, is a signal of danger ahead, warning us not to stop specific medication. As Ricord facetiously says:—

> "Tant que le dur dure,
> Donnez mercure."

When all this has been accomplished, and when no trace of the disease remains, the question comes up whether treatment should be still further prolonged, and if so, for what period, with the hope of securing immunity for the future. Upon this subject the greatest variety of opinion prevails among different authorities.

Some take as a standard the period which has already been occupied in subduing the previous symptoms, and would have the treatment still continued for half or the whole of the same length of time. Others are content with a month or six weeks, irrespective of the previous duration of treatment; while many practitioners advise a period of from six months to two years. There is an equal diversity in the recommendations as to the form of mercurial to be employed, the mode of its administration, and the extent to which it should be made to affect the system; some preferring the bichloride in small doses, and never pushing it to the extent of touching the gums; and others constantly keeping their patients upon the verge of salivation. Again, among those who favor a prolonged course of subsequent treatment, some would have it continuous, while others advise intermissions from time to time.

Although, in a previous edition, we expressed a contrary opinion, further

experience leads us now to recommend most decidedly that treatment should be continued for at least two years or two years and a half, counting from the date of its commencement, and this, too, even in such cases as show no sign of the disease after its first general outbreak. Ricord[1] was in the habit of advising six months of mercurial treatment in as full doses as the system would bear, followed by three months of treatment by iodine, but we have known the most serious symptoms to appear within a month or two after this programme had been faithfully carried out. It would seem that the length of treatment has a much greater influence in the cure of the disease than the amount of the drugs taken. Thus, a certain quantity of mercury pushed to the verge of salivation during six months will be much less advantageous than the same amount given in smaller doses and distributed over several years. We now endeavor to impress this fact upon our patients at their first visit, when their fears are greatest and when they are more ready to listen to advice, than after the disappearance of their early symptoms, and we seek to convince them of the importance of prolonged treatment if they would protect themselves for the future.

We do not mean, however, to imply by the above that the treatment should be continuous during the period stated, as recommended by some authors, and we would range ourselves on the side taken by Hunt,[2] Fournier,[3] and others, in favor of an interrupted and not a continuous course. The tolerance which the system requires in the continuous use of any drug, as, for instance, opium or arsenic, is well known, and the same is true of mercury. If this metal be continued month after month without interruption, the surgeon will often find new lesions cropping out at a time when he was on the point of leaving off all treatment; whereas, if intermissions be allowed from time to time, the system loses its tolerance and the remedy acts with renewed power on its resumption. The length of the intermissions is subject to variations in different cases. In general, they should at first be short, and not exceed one or two weeks; at a later period they may extend over one or even two months, during which time the iodide of potassium, either alone or combined with tonics, should be given.

The question will naturally be asked, What indications have we to guide us as to the dose after the more manifest lesions, as the eruption, etc., have disappeared? In many cases, the remaining induration of the base of the chancre and of the ganglia may be relied upon. In the absence of this guide, we continue the mercurial in the same dose as has thus far been used for about two months after the eruption upon the skin and mucous membranes has disappeared, when we allow a respite of a week or two. Upon resuming treatment, the dose may generally be reduced one-third or one-half, but no absolute rule in this respect can be laid down, since

[1] Leçons sur le chancre, 2e éd., Paris, 1860, p. 312.

[2] On Syphilitic Eruptions, etc., with especial reference to the Use and Abuse of Mercury, by Thomas Hunt, F.R.C.S., 2d ed., London, 1854.

[3] Leçons sur la syphilis, Paris, 1873.

each case must be decided by itself. After another two weeks' treatment, a longer intermission may be allowed, as for a period of four weeks, if all has been going on well, and the intermissions may gradually be increased in length at a later date.

After a course of treatment, which is deemed sufficient, has been gone through with, the patient, on his last visit, is sure to inquire what the probabilities are of any reappearance of the disease, and if he can regard himself as safe for the future. Our only answer can be that there is no absolute certainty for any man who has once had syphilis, but that the chances are greatly in his favor, that we know that the great majority of cases (estimated as high as ninety-five per cent.) which have been thoroughly treated are absolutely cured, and are never followed by a relapse, and that he has great reason to be satisfied with this prospect. At the same time he should be warned never to forget the fact that he has once been infected with syphilis, and never to omit to state this fact to his medical attendant if at any future time he should be taken ill. The confession may be entirely unnecessary, but it may be of the utmost importance in the diagnosis and treatment of his illness. Many of the late manifestations of this disease, occurring years after infection, are most dangerous in their character, but may be arrested by the timely use of the proper remedies. Indeed, in numerous diseases, and especially in affections of the brain, it is a source of great satisfaction to the medical attendant to be able to point to syphilis as the cause, since the course of treatment is then evident, and the chances of the patient's recovery are most decidedly increased.

Iodine and its Compounds.—The therapeutic effect of iodine and its compounds upon syphilitic symptoms is in direct ratio to the duration of the disease. Although possessing little if any power over early secondary manifestations, their action upon tertiary lesions and those of the transition stage is very decided. In deep tubercles of the cellular tissue, rupia, syphilitic orchitis, affections of the bones and periosteum, syphilitic cachexia, etc., the results of their employment are frequently almost magical. An unfortunate patient whose life has been rendered miserable for months by pains in his bones which have deprived him of sleep, by a pustular eruption upon his face which has debarred him from society, by deep ulcerations about the pharynx which have rendered speech and deglutition almost impossible, and which finally threaten suffocation, or who has suffered from any other of the numerous late manifestations of syphilis, will in most cases obtain comparative ease and comfort in the course of a few days or weeks from the administration of the iodides. It would be difficult to name the circumstances under which the surgeon feels more pride in his profession, or in which he finds more conclusive evidence of his power over disease, than when he is able to recognize the symptoms which indicate the exhibition of these remedies and can watch their marvellous effects from day to day. Unfortunately the iodides possess greater power to subdue tertiary symptoms for a time than to cause their permanent removal. The disease rapidly declines and disappears under their use, but in most

cases returns in a few weeks or months after their suspension ; and thus the patient becomes the slave of medicine, or is obliged to resort to mercury for an effectual cure.

But these preparations are none the less of very great value. Mercury alone is too slow in its action to meet the urgent requirements of a threatening perforation of the soft palate and like dangerous manifestations of the tertiary stage. By the use of the iodides the patient finds almost immediate, though temporary relief from suffering; his appetite improves, he gains flesh and strength, and his system is brought into a proper condition for the administration of remedies which will prove of more lasting benefit.

The ground above taken with regard to the therapeutic effect of iodine and its compounds is at variance with that assumed by some most eminent authorities, and especially by Ricord, who considers the iodide of potassium as much a specific for tertiary as mercury is for secondary symptoms. In our own practice, however, we have rarely been able to secure permanent relief for our patients unless the former agent was accompanied or followed by the latter, and this experience coincides with that of the most eminent authorities of the present day.

Persons are frequently met with who have taken the potassium iodide for years and years, and who are still obliged to continue it if they would keep their symptoms in check. They generally become familiar with its use, purchase and mix it for themselves, and take it as regularly as their daily meals even in doses amounting to one ounce (30.00) per diem.

The observations of MM. Melsens and Guillot have proved that iodide of potassium is capable of rendering soluble mercury or any of its compounds retained within the tissues of the body and of causing their elimination through the urinary secretion, in which they may be detected by chemical analysis. In this manner, mercury which has been retained in the system is again rendered soluble, and before elimination may exercise any of its therapeutic or morbid effects. Thus iodide of potassium administered subsequently to a mercurial course has frequently been known to excite profuse salivation.

The question has been raised whether iodide of potassium by itself has any power over syphilis, and whether its therapeutic action may not be entirely explained by the facts above stated. According to this view, it is only curative because it has the power of rendering active mercurial preparations which have been accumulated in the system by previous treatment ; while others who believe that tertiary syphilis is an effect of mercury have ascribed the action of iodide of potassium to the elimination of this mineral and the consequent removal of the supposed cause of the disease. Neither of these suppositions will bear the test of examination. Cases of tertiary syphilis in which mercury has not previously been given, and in which, therefore, the independent action of iodide of potassium may be tested, are not common ; but a sufficient number have been met with to prove that this agent does not play so secondary and insignificant a part as has been attributed to it. Of 195 cases of syphilis successfully treated

with iodide of potassium by Hassing of Copenhagen, in 70 no mercurial treatment whatever had been employed.[1] The independent action of the iodide is now too well established to admit of a question.

The solubility of iodide of potassium enables it to be administered in any aqueous or alcoholic mixture, while its deliquescent properties poorly adapt it for the pilular form. It may, however, be obtained, put up in sugar-coated pills or in compressed tablets, each containing either three or five grains (0.20–0.30), but these should always be dissolved in water or other fluid before swallowing.

From five to fifteen grains of the iodide three times a day is the usual dose with which to commence treatment in an adult, and if the case be properly selected, marked improvement will generally take place within a week. In old cases of syphilis, however, this quantity is often insufficient, and it may be necessary to increase the dose to one, two, or even six drachms *per diem*. Symptoms will often yield to fifty, sixty, or one or more hundred grains a day, which have remained stationary under a less amount, and we hold that the following rule should never be forgotten: *When the symptoms appear to indicate the use of the iodide, the case should not be pronounced intractable to this remedy unless a trial has been made of full doses and these have been found to be without effect.*

The following are convenient formulæ:—

℞. Potassii Iodidi, ʒss 15
Aquæ Cinnamomi, ʒss 15
M.

Fifteen drops (1.00) of this solution measure ten minims (0.65) and contain seven and a half grains (0.50) of the iodide.

℞. Potassii Iodidi, ʒij 6
Aquæ, ʒiv 120
M.

Two teaspoonfuls (10.00) three times a day.

The action of the iodide of potassium is supposed to be increased by combination with the muriate or carbonate of ammonia.

℞. Potassii Iodidi,
Ammoniæ Muriatis, āā ʒj 4
Tinct. Cinchonæ Comp., ʒiv . . . 120
M.

A tablespoonful (15.00) three times a day.

℞. Ammoniæ Carbonatis, ʒiss 6
Potassii Iodidi, ʒiij 12
Syrupi Sarzæ Comp.,
Aquæ, āā ʒiiss 80
M.

Dose.—One drachm (4.00) three or four times a day.

Experience shows that the most favorable time for the administration of the iodide of potassium is half an hour or an hour after eating. It not unfrequently excites griping pains in the bowels, which may be avoided

[1] British and Foreign Medical Rev., Oct., 1845, p. 482.

by the addition of a syrup containing tannic acid, as the syrup of cinchona or of orange peel.[1] The addition of a small quantity of tannic acid to solutions of the iodide in a syrup which does not contain tannin answers the same purpose. The following formula is employed by Ricord and Nélaton :—[2]

℞. Potassii Iodidi, ʒj 4
Syrupi Corticis Aurantii, ʒvj . . . 200
M.

Dose.—A tablespoonful (15.00).

Should it still disagree with the stomach, relief may often be obtained by drinking one or two gobletfuls of warm water.

The iodide of sodium and the iodide of ammonium have been recommended as substitutes for the potassium iodide. They are less agreeable to the taste than the latter, and, we think, less efficient, but they serve for a change and are better borne by some patients.

The iodide of iron cannot be said to possess any special anti-syphilitic power, but is a valuable tonic in cachectic or chlorotic subjects either with or without the iodide of potassium. We often employ it, especially towards the close of treatment and after the use of mercury. Blancard's pills are the most convenient form of administration, or the liquor ferri iodidi may be used.

The contra-indications to the use of iodide of potassium are acute or chronic inflammation of the digestive organs, plethora, and a predisposition to hemorrhages. Some patients cannot, or believe they cannot, tolerate it even in the smallest doses. These are difficult cases to deal with in the presence of a tertiary lesion. Sometimes the evil is merely an imaginary one on the part of the patient, and we have succeeded, by first administering surreptitiously small doses until we were in a position to convince him of his error, in carrying the remedy up to the usual quantity given. In other instances, however, the smallest dose acts as a poison, and cannot be tolerated. In such cases, it has been proposed to soak the underclothes in a solution of the iodide before drying them, and have it absorbed by the skin, but this does not prevent its deleterious influence. The skin, moreover, is only capable of absorbing it after imbibition of the epidermic layers, and even then in a merely infinitesimal quantity. A better way is to mix it with vaseline or simple cerate and apply it by inunction.

Van Buren and Keyes state that, in certain cases where it has been impossible to administer iodides by the stomach, they have obtained favorable results by injecting daily into the rectum half-drachm (2.00) doses dissolved in an ounce or more of beef-tea, but that the rectum usually revolts after a time, especially if the solution of the iodide be too concentrated.

[1] Boinet, Traité d'iodothérapie, Paris, 1855, p. 102, and L'Union méd., 1858, p. 487; also same journal for March 6, 1860.

[2] Richelot, L'Union méd., Feb. 28, 1860.

In obstinate cases, the other iodides may be tried, but, in intractable cases, we are obliged to forego the use of this remedy and resort to mercury alone, preferably by inunction. Even in the severest forms of tertiary syphilis, as serpiginous ulcerations of the skin, gummata of the palate, the nasal and other bones, etc., in which the usual treatment consists of very large doses of the iodide of potassium, mercurial inunctions alone will often be found successful.[1]

Iodide of potassium rarely occasions such unpleasant effects as to demand more than a mere temporary suspension of its employment. Its morbid action is chiefly manifest upon the various mucous membranes. Some patients, shortly after commencing its use, are seized with coryza, which is sometimes quite severe, and accompanied with acute pain in the frontal sinuses; others are attacked with œdema of the conjunctiva oculi and swelling of the lids; irritation about the fauces and bronchitis are occasionally met with, and œdema of the glottis and larynx. Dr. Fenwick[2] reports a most remarkable instance of this kind, occurring after only four doses of ten grains each had been taken, and in which the life of the patient was saved after breathing had already ceased, by tracheotomy.

Gastro-intestinal irritation is a frequent symptom which has already been adverted to. Loss of vision, apparently dependent upon sub-retinal effusion, has been observed in a few rare instances. Salivation sometimes occurs, but is never as severe as that occasioned by mercury, nor is it ever attended by ulceration like the latter. Strange to say, many of these unpleasant effects will soon cease if the remedy be persisted in, the system apparently becoming habituated to it. It has been falsely asserted that iodide of potassium produces atrophy of the breasts and of the testicles.

Ricord states that he has accurately measured the scrotal organs before and after treatment, and has never found any diminution in their volume, unless they were affected with syphilitic orchitis, which generally terminates in atrophy. Iodide of potassium may hasten this result, when it would inevitably have taken place without it, but cannot produce it in healthy organs. In general, patients taking the iodide increase in weight. Zeissl states that sleeplessness is produced in many persons by the iodide of potassium.

One of the most frequent morbid effects of this remedy consists of various eruptions upon the integument, generally in the form of papules or acne-pustules, and often of furuncles or boils. They are quite common about the neck and face, where they present an unsightly appearance and are the source of much annoyance to patients who frequent society, and also upon the trunk and upper extremities.

Adamkiewicz,[3] in a very severe case of acne produced by the administration of iodine, was able to demonstrate the presence of iodine in the pus of the acne-pustules. The latter are simply inflamed sebaceous glands,

[1] Consult Sigmund, Neuere Behandlungsweisen der Syphilis, Wien, 1876, S. 27.
[2] Lancet, Lond., Nov. 13, 1875.
[3] Charité-Ann., Berl., iii, 1878, p. 381.

and he therefore infers that they act as true excretory organs and eliminate the iodine. This disagreeable effect of the iodine may be altogether prevented or greatly alleviated by adding to each dose of the remedy from five to ten minims (0.32–0.65) of the liquor potassæ arsenitis (Fowleri).

An *erythematous* and an *eczematous* eruption have also been noticed to be produced by the compounds of iodine.[1]

In the *erythematous form*, the skin, and especially that covering the forearm, assumes an intense red color, which is sometimes isolated in points, and at other times covers the whole surface; the temperature of the part is also heightened. This erythema disappears if the treatment be suspended, or, if the latter be continued, runs into a papular form.

The *eczematous* variety, which closely resembles ordinary eczema, is very rare. It most frequently affects the hairy scalp and the neighborhood of the scrotum, and soon disappears on stopping the iodide. M. Mercier[2] describes a case in which moderate doses of iodide of potassium, upon two occasions in the same person, brought out an eruption of eczema rubrum over the whole body, attended by severe fever and dyspnœa, and so copious an exudation of fluid that the bed on which the patient lay was completely wet through.

In 1871, the writer published what he supposed to be the first case on record of a *bullous* eruption produced by iodide of potassium.[3] The eruption appeared suddenly, after taking only three doses of the iodide of twenty grains each, and occupied the back of the neck, forehead, face, and backs of the hands—in other words, those parts which were most exposed to the air. Within thirty-six hours after taking the first dose, the bullæ were very large, some of them one and a half inches in diameter. Some were filled with a clear serum; others were turbid or of a reddish or purplish color. The surrounding skin was reddened and œdematous. The patient complained of heat and a burning sensation in the parts. It was ascertained that on three previous occasions he had been affected in the same way upon taking the iodide. To Dr. John O'Reilly, of New York, is, however, due the precedence of recognizing the dependence of bullæ upon the potassium iodide.[4]

This eruption has in later years been studied by a number of dermatologists, and especially by Hutchinson[5] and Tilbury Fox,[6] under the name of Hydroa. In rare instances it occurs over the whole body and is always symmetrical. In its earliest stage, the bullæ are quite small, not larger

[1] These eruptions have been carefully studied by Dr. H. E. Fischer, of Vienna, Union méd. Par., 31 jan., 1860, from Wien. med. Wchnschr.

[2] Observations nouvelles sur le traitement des valvules du col de la vessie, Paris, 1847, and Union méd. Par., 11 fév., 1860.

[3] Pemphigus produced by the administration of Iodide of Potassium, by F. J. Bumstead, M.D., Am. J. M. Sc., Phila., July, 1871, p. 99.

[4] N. Y. M. Gaz., Jan., 1854.

[5] The causes of some of the eruptions which have been classed as Hydroa; Clinical Soc. Trans. Lond., vol. viii, 1875, p. 151.

[6] Trans. Clinical Soc. of London, 1878.

than a shot, and closely resemble those of smallpox, but their rapid development into vesications of larger size and without umbilical depression soon settles the differential diagnosis. The eruption dries up and disappears in a few days if the iodide be stopped. The microscopical appearances of the skin in this affection have been studied by Dr. Geo. Thin.[1]

Purpura is another cutaneous effect of the iodide of potassium and is sometimes of a very serious character. It does not appear to be dependent upon the patient's general condition nor upon the severity of his syphilitic lesions, but upon his individual idiosyncrasy. It usually appears within a short time after commencing the iodide, perhaps after taking only a very few doses. In most cases it completes its course in a few days, even if the medicine be continued, but is liable to recur if the dose be increased. The discoloration of the skin may be seen for several weeks.

The parts most liable to be affected are the legs below the knees and the neck and face, though other portions of the integument may be attacked. The purpuric spots, which cannot be effaced by pressure with the finger, are sometimes small and seated around the hair follicles. Fournier[2] describes a miliary form, consisting of small, non-pruriginous, sanguineous spots, of which he has met with fifteen instances, all of them except one confined to the legs. In other cases the spots attain the large size of ordinary purpura hæmorrhagica, and may be an inch or an inch and a half in diameter. Mackenzie[3] reports a case of death in a syphilitic infant, aged five months, following the administration of two grains and a half of the iodide of potassium. In this case, the whole of the face, eyelids, and lips became swollen and of a purplish-black hue; there were a few hemorrhagic spots on the arm; none elsewhere.

Mr. Langston Parker described a hard, tubercular condition of the tongue, which is sometimes cracked and fissured, consequent upon the long-continued use of iodine.[4] This affection, which we have never seen, is said to closely resemble syphilitic tubercles, from which it may be distinguished by its disappearance soon after the discontinuance of the iodine.

In addition to the morbid effects already mentioned, iodide of potassium in large doses sometimes gives rise to a combination of symptoms known under the name of "iodism," and consisting of a sensation of oppression in the head, tinnitus aurium, neuralgia, spasmodic action of the muscles, impaired voluntary motion, and sluggishness of the intellect.

Iodoform.—The internal administration of iodoform as a substitute for the potassium iodide is favorably mentioned by some authorities. Berkeley Hill[5] has given it in pills of one and a half grains (0.09) with the extract of gentian, commencing with three pills a day and increasing to eight or

[1] Lancet, London, Nov. 16, 1878.

[2] Rev. mens. de méd. et de chir., Paris, sept., 1877; also Med. Times and Gaz., Lond., Oct., 1877, p. 445.

[3] Med. Times and Gaz., Lond., Feb., 1879.

[4] Prov. M. and S. J., Lond., No. 3, 1852; also Parker on Syphilitic Dis., p. 211.

[5] Brit. M. J., Lond., Jan. 26, 1878.

ten, and with, he thinks, good effect. Our own experience in a number of cases has been against it. It has had little, if any influence upon the syphilitic lesions; its odor rising from the stomach and passing from the bowels in the flatus renders the patient disgusting to himself and his friends; and, if long-continued or given in considerable doses, it produces intestinal catarrh and even iodism.

Nitric Acid and Gold.—Nitric acid[1] was formerly recommended by Alyon and others, for the treatment of syphilis, and is still a favorite remedy with the "homœopaths," whose leader, Hahnemann, in 1825 also revived the use of gold, which is said to have been employed by the Arabians in the treatment of venereal diseases, and which was recommended by Chretien, of Paris, in 1811. According to the "homœopaths," gold is of great value in many tertiary lesions, especially sarcocele, affections of the bones, and syphilitic cachexia.[2] Our experience with these agents has been limited, but has led us to assign to them but little value.

Vegetable Decoctions and Infusions.—Decoctions and infusions of sarsaparilla, saponaria, water-dock, stillingia, and other vegetable substances have at times enjoyed considerable reputation with the profession for the cure of syphilis, and are still held in high repute by the public. When used alone they are found to be entirely destitute of anti-syphilitic properties, and when given in combination with mercurials and iodide of potassium, do not appear to add to the effect of the latter. This statement coincides with the opinion of most surgeons[3] who have had the largest experience in their use, and has been confirmed, so far as regards sarsaparilla, the reputation of which has exceeded that of all the others, by a series of careful experiments conducted by Sigmund, of Vienna, who concludes that this substance does not exercise the slightest perceptible influence on the course or termination of syphilitic diseases.[4] Whatever virtues are possessed by these substances can only be ascribed to their influence as tonics, stomachics, diuretics, or diaphoretics, to which the ordinary mode of their administration in a large amount of fluid greatly contributes. When employed with these purposes in view they may prove useful adjuvants of mercury and iodide of potassium, but alone are unworthy of confidence.

Clifford Allbutt,[5] however, believes that the inefficacy of sarsaparilla is due to the small doses in which it is given, and recommends from a pint to a pint and a half of the decoction to be taken.

[1] See an article by Dr. Budd on the "Influence of a Long Course of Nitric Acid in Reducing the Enlargement of the Liver and Spleen that sometimes results from the Syphilitic Cachexy."—Sydenham Soc.'s Year Book, 1863, from the Brit. Med. Journ.

[2] Hughes, Manual of Pharmacodynamics, 3d ed., p. 154.

[3] See Stille's Materia Medica, ii, p. 948.

[4] British and For. Med.-Chir. Rev., Am. ed., July, 1860, p. 183.

[5] Practitioner, Lond., May, 1870.

Zittman's decoction, a favorite remedy with the Germans, contains an appreciable amount of mercury, but acts chiefly as a cathartic and diaphoretic. The large doses in which it has been recommended, a pint of the stronger preparation in the morning, and a quart of the weaker at night, can rarely be borne without producing violent purging. We have employed it with good results in some inveterate cases of syphilis, giving from eight ounces to a pint of the strong preparation in the course of the day, and aiming to produce from three to five discharges from the bowels. In some instances it has had a very marked effect in increasing the appetite and improving the general condition of the patient.

Tayuya.—Within the last few years, a new remedy has been proposed for the treatment of syphilis and of scrofula, viz., the tincture of the root of Tayuya. The botanical name of this plant, indigenous to South America, is Dermophylla pendulina, or, according to Bentham and Hooker,[1] it does not appear to differ from Trianosperma, one of the *cucurbitaceæ*, but it is not entirely known.

The tincture is given at first in doses of from fifteen to twenty drops, diluted with water, and it has also been injected hypodermically.[1] It seems to have excited some little interest in Italy, but the reported cases in which it has been tried, are not conclusive as to its value. It is said to have acted well in three cases, occurring in the wards of Prof. Gamberini, of Bologna (Galassi). Prof. Pellizzari, of Florence, and other recent writers, state that it has completely failed in their hands.[2] Dr. J. Nevins Hyde, of Chicago, imported a number of bottles of this article, which he tried in his own practice and distributed to some friends for trial. They failed to find in it any anti-syphilitic power (oral com.).

Tayuya is a proprietary medicine of the Messrs. Ubicini Bros., of Pavia, who carefully conceal its origin. So far as present appearances go, it is likely to share the fate of the many nostrums that have preceded it. A partial bibliography upon the subject is appended.[3]

Balneotherapia.—At the time when, under the teachings of Priessnitz, hydropathy was believed to cure all diseases, syphilis was included

[1] Genera plantarum, vol. i, p. 835, Lond., 1867.

[2] Gazz. med. ital. lomb., Sept. 1878.

[3] Faraoni, Tayuya, Relazione al Congresso medico di Torino, 18 Settembre, 1876.
Galassi, Gior. ital. d. mal. ven., Milano, Nov. 25, 1876.
Longhi, Gazz. med. ital. feder. lomb., Milano, Nov. 25, 1876.
Bettelli, Principii attivi del Tayuya, Bologna, 1877.
Tanturri, Morgagni, Napoli, Oct. 8, 1877.
Faraoni, Seconda relazione, Milano, 1878.
Castiglioni, Ann. di med. pubb., Roma, Aug. 15, 1878.
Veladini, Gazz. med. ital. lomb., Milano, July 6, 1878.
Torregrosso, same journal, July 6, 1878.
Longhi, same journal, Dec. 21, 1878; Jan. 4, 1879; Jan. 11, 1879, and Jan. 18 1879.
Ronus, Cor. Bl. f. schweiz. Aerzte, Basel, Sept. 15, 1878.
Geber, Vrtljschr. f. Dermat, 1879, p. 285.

in the category. It is now known that the use of baths, and even the systematic "water-cure," has no direct influence upon this disease, and this fact is frankly acknowledged by many of the best known medical men in charge of bathing establishments in Europe.[1] All that is claimed for this course of treatment is, that it is especially adapted to patients suffering not only from syphilis, but also from the (supposed) excessive or injudicious use of mercury; and, again, Hofmeister[2] thinks that, during the cold-water treatment, aliments and medicines are more completely digested and assimilated, and that by this means favorable results are produced by means of a reduced quantity of medicine. Less mercury may, therefore, be employed, and if a cumulative effect is produced, it is readily cast off in consequence of the increased excretion and secretion. Furthermore, the regimen to which patients are subjected in the cold-water treatment materially facilitates metamorphosis. There is reason to believe that the frequent use of baths hastens the appearance of secondary lesions.

In America, the Hot Springs of Arkansas have acquired great notoriety in the treatment of syphilis, and thousands upon thousands flock to them every year. It is not claimed that the water of these springs has any virtue discoverable by chemical analysis, but the foolish pretense has been set forth that, owing to the fact that it is heated in the bowels of the earth, it possesses an occult power far surpassing water heated in a tea-kettle over the fire, or in the boiler of a kitchen range. It is a notorious fact, however, that the water is not relied upon to effect a cure, but that mercury, generally by inunction, and the iodide of potassium are employed by the resident physicians in doses carried to the utmost extreme. Under this energetic but spasmodic treatment, the existing lesions disappear for a time, only to return again, as we have frequent occasion to observe soon after the patient's return home. We cannot believe that even this temporary benefit is due to the water, but we ascribe it to the change of air and scene, to the relaxation from business cares, and, above all, to the specific remedies employed. For the sake of the first two of these three desiderata, the rich patient may be counselled to visit the Hot Springs, but the man of moderate means, who would sacrifice his all by going, had better be told that he can do as well at home under proper treatment.

Sulphur springs have also acquired considerable reputation, especially in Europe, not so much as a curative agent in syphilis, as a means of bringing to the surface any latent remains of the diathesis; and patients are told that if, after taking the baths and drinking the water for a certain number of weeks, no new lesions appear, they may regard themselves as cured. Whether this is true or not, is a difficult point to decide, since the natural course of syphilis is to appear in successive outbreaks, and whether these are hastened any more by sulphur water than by any other water we are unable to say. Sulphur baths are also extolled as a means of

[1] Our space will not allow us to give their evidence in detail, but it may be found in Zeissl's admirable work, vol. ii, p. 403.

[2] Med.-Chir. Rundschau, Wien, Dec. 1876.

removing mercury from the system, and one pound of this metal is said to have been extracted from the body of an unfortunate patient under the care of a physician of Prague, by means of a single bath! *Credat Judæus Apella, non ego.*

Climatic Influences.—A warm climate is more favorable than a cold one for persons under treatment for syphilis. In voyages round the world made by vessels penetrating the different zones, it has been noticed that the sailors affected with this disease did better in the warm than in the cold regions, and this is what might reasonably have been expected. A refuge to a warmer climate from the severity of our northern winters might, therefore, be recommended to many patients, were it only possible to secure for them constant supervision under the care of some one competent physician, and avoid their being left to themselves or seeking advice from a dozen different sources in their travels.

"Syphilization."—About the year 1844, before the distinct nature of the chancroid and syphilis was known, M. Auzias (Turenne) undertook a series of experiments to test the accuracy of the doctrine advanced by Hunter and Ricord, that syphilis is not communicable to the lower animals. By protecting the inoculated points in such a manner that the animal could not lick them and thus remove the virus, he was able to produce local ulcers with a soft base upon monkeys, cats, rabbits, and horses; but neither in his experiments nor in those of others who followed him, were general symptoms ever developed, showing that the system was not contaminated with the syphilitic virus and confirming the statement of Hunter and Ricord. Moreover, there is reason to believe that the virus employed in many, at least, of these inoculations was chancroidal and not syphilitic, since matter was taken from the sores developed upon the animals and inoculated on four occasions upon the person of M. Robert de Welz, of Würzburg, with the effect of producing only chancroids. Even supposing that Auzias did in some instances employ the secretion of a chancre, it is none the less true that he produced merely a local sore and that there was no absorption of the virus into the system.

M. Auzias, while performing these experiments, observed that the first ulcer inoculated upon an animal was more rapidly developed, was of a larger size, secreted a greater quantity of matter, was surrounded by more intense inflammation, and was more persistent than the second; that the second bore the same relation to the third; the third to the fourth; and so on, and that finally a period arrived when further inoculations entirely failed. He believed that at each inoculation a fresh portion was absorbed, and ascribed the final immunity to saturation of the system with the poison; when no more could be taken up, as he thought, he said that the animal was "syphilized," and the process by which the result was attained he called "syphilization."

Reasoning upon this basis, M. Auzias inferred that the same result could be accomplished in man; that the human system could be so saturated

with the syphilitic virus by repeated inoculation that any further application of the poison would prove innocuous; and in 1850 he gravely proposed to the Freneh Academy, not only to employ repeated inoculations for the eure of syphilis, but to "syphilize" the greater part of mankind in order that they might never have syphilis!

The proposition of Auzias to employ this process as a prophylactic against syphilis was soon abandoned, if for no other reason, on account of its own absurdity; but "syphilization" for the cure of syphilis was extensively practised by Sperino, of Turin, commencing in 1851, until he was forced to desist by the opposition it excited.

The idea thus started was subsequently taken up by the late Prof. W. Boeck, of Christiania, who devoted years to its investigation, and who, in 1862, under the auspices of the Norwegian Government, issued a large and laborious work, in which were reported 252 cases treated by "syphilization," and the results most favorably compared with those obtainable by mercury and other modes of treatment.

Prof. Boeck spent a portion of the years 1869 and 1870 in this country, winning the admiration and the esteem of all who knew him, by his purity and gentleness of character, and his enthusiasm, and affording an opportunity to witness his practice in my wards at the Charity Hospital[1] and elsewhere; but he failed to make converts to "syphilization."

In the last edition of this work, considerable space was devoted to an account of this visit of Prof. Boeck, and to the doctrines and practice of syphilization. This treatment, however, may now be said to be dead, as is its lamented advocate, and we shall content ourselves with only a very few remarks upon it.

In the first place, syphilization is based upon an erroneous supposition. The matter employed in these inoculations, whether taken from chancroids as in Boeck's earlier practice, or from irritated chancres as in his later, is nothing but chancroidal. There is no syphilitic virus in it with which to "saturate the system," even if saturation of the system with a virus in order to get rid of the same virus were not of itself an absurdity. Practically, we do not doubt the assertion of Prof. Boeck and other advocates of syphilization, that, under repeated inoculations, the skin acquires a certain immunity (which, however, we believe to be temporary), but this is simply in accordance with the general law that the integument, under the repeated application of any class of irritants, will finally cease to react for a time. Nor do we doubt that syphilitic lesions disappear and fail to reappear, for a time at least, under this treatment, and this effect can only be ascribed to the eliminative or depurative action of the numerous and constantly repeated ulcerations. Trials have been made in Christiania and elsewhere by means of a succession of blisters, plasters containing tartarized antimony, etc.; and the results have been the same. Certainly, no mode of treatment can be more repugnant than this to the patient himself.

[1] A report of the cases treated at Charity Hospital may be found in the Am. J. M. Sc., Phila., July, 1870.

In the cases treated at Charity Hospital, the patients kept their beds during the greater part of the three or four months that the inoculations were going on, although they had every inducement to be up and out upon the grounds; and it often required all our powers of persuasion to lead them to consent to a continuance of the treatment, so great was their discontent. Indeed, I never made a visit to the hospital without the fear that some of them had eloped, as actually happened in three instances. They represented that the soreness of the ulcerations was so great that they could scarcely endure the contact of the bedclothes, much less that of their daily dress, and the appearance of the sores corroborated their statement. I cannot well imagine how persons in their condition could have been about attending to their daily business. When they left the hospital they bore scars over the chest, arms, and thighs, which they will doubtless carry with them to their graves. Moreover, the serious tendency of some of the ulcers to take on phagedenic action showed that this practice is not devoid of danger.

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