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 (p. 505) 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 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

[1] British and For. Med.-Chir. Rev., Jan., 1857, p. 206; from the Wien Wochenschrift, No. 18.

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 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 resistant, 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

[1] Étude clinique sur l'induration syphilitique primitive, Arch. gén. de méd., nov., 1867.

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 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 I 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] These facts are regarded by some as proving 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

[1] Leçons sur le chancre, p. 274.
[2] Annuaire de la syph. et d. mal. de la peau, Paris, année 1858, p. 241.

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.

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 Professor 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

[1] Brit. and For. M. Chir. Rev., London, Oct., 1856. [2] Ibid. for April, 1859.

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, whereby heat and moisture are maintained; as, for instance, upon the internal surface of the prepuce and the 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

[1] Études cliniques des maladies vénériennes; des plaques muqueuses. Arch. gén. de méd., 4e série, vol. ix., p. 182.

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."[1]

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;[2] and 18 of 50 chancres followed by a tubercular eruption produced 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[3] 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

[1] Ricord and Hunter on Venereal, 2d ed., p. 371. [2] Op. cit., p. 442.
[3] Histoire naturelle de la syphilis, p. 84.

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 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.) Always due to contagion from the secretion of a chancre, syphilitic lesion, or from the blood of a person affected with syphilis.	*Origin.* (Confrontation.) In practice generally due to contagion from a chancroid, or chancroidal bubo, or lymphitis.
Incubation. Constant; usually of from two to three weeks' duration.	*Incubation.* None. The sore appears within a week after exposure.

The Chancre.	The Chancroid.
Commencement. Commences as a papule or tubercle, which afterwards, in most cases, becomes ulcerated.	*Commencement.* Commences as a pustule, or as an open ulcer.
Number. Generally single; multiple, if at all, from the first; rarely, if ever, by successive inoculation.	*Number.* Often multiple, either from the first or by successive inoculation.
Depth. Most frequently a superficial erosion, "scooped out," flat, or elevated above the surface; rarely deep, and then cup-shaped, sloping towards the centre.	*Depth.* Perforates the whole thickness of the skin or mucous membrane; "punched out," and excavated.
Edges. Sloping, flat, or rounded, adherent.	*Edges.* Abrupt, sharply cut, eroded, undermined.
Floor. Red, livid, or copper-colored, often iridescent. Sometimes covered by a false membrane, scaly exfoliation, or scabs.	*Floor.* Whitish, grayish, pultaceous, "worm-eaten."
Secretion. Scanty and serous, in the absence of complications. Auto-inoculable with great difficulty.	*Secretion.* Abundant and purulent. Readily auto-inoculable.
Induration. Firm, cartilaginous, circumscribed, movable upon neighboring tissues; sometimes thin, resembling a layer of parchment, or, again, annular; generally persistent for weeks or months.	*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. So little painful as often to pass unnoticed.	*Sensibility.* Painful.
Destructive tendency. Phagedæna rare and generally limited.	*Destructive tendency.* Often spreads and takes on phagedenic action.
Frequency in the same subject. One chancre usually affords complete, and always partial protection against another.	*Frequency in the same subject.* May affect the same person an indefinite number of times.
Lymphitis. *Induration* of the lymphatics common.	*Lymphitis.* *Inflammation* of the lymphatics rare.
Characteristic gland affection. The superficial ganglia on one or both sides enlarged and indurated, painless, freely movable; suppuration rare and pus never auto-inoculable.	*Characteristic gland affection.* Ganglionic reaction absent in the majority of cases. When present, inflammatory; suppuration frequent, pus often auto-inoculable.