sarcoma. These tumours often appear to start about the junction of epiphysis and diaphysis, but in their growth to leave intact the former; they tend to form elongated and ovoid, rather than globular, enlargements of the bones, and to be of very varying consistence owing to their frequent chondrification and ossification. The lymphatic glands of the part may be enlarged. The tumour may be seen fungating through an ulcer in the skin. They grow faster and are more malignant than central sarcoma. They are met with specially at the lower end of the femur, upper end of the tibia and fibula, lower end of the radius and ulna, and involving extensively the diaphysis of the humerus.

When an incision is made into such a tumour the periosteum is found raised over the new growth or entirely destroyed, and the bone is bare beneath the tumour. Should, however, the periosteum be found entire, the bone nowhere exposed, and the tumour altogether outside the periosteum, the growth is a *parosteal sarcoma;* this is a very rare form of the disease, and impossible to recognise without an exploratory incision.

If a tumour in connection with the shaft of a bone grow very slowly, assume a globular smooth outline, be very firm and painless, a *fibroma* may be diagnosed. In general features it will most nearly resemble enchondroma, from which it can only be distinguished by its position, ossifying enchondromata starting from the junction of epiphysis with diaphysis, and central enchondroma affecting the long bones of the hand. From sarcoma it will be distinguished by its more chronic course, its very slow growth or even stationary character, and the absence of fracture or pulsation. Fibroma is a very rare tumour of bone except in the form of fibrous epulis. (*See* page 393.)

Other tumours, rare in occurrence and still more

rarely diagnosed, are *hydatid cysts of bone.* They have been found in connection with the flat bones, or in the shafts and articular ends of long bones. In the shafts of long bones their first symptom is generally "spontaneous" fracture, with subsequent non-union, and then when an operation is undertaken the hydatid cysts escape. They may be suspected when after "spontaneous" fracture union does not occur, and a sarcomatous tumour does not develop. In other situations they cause a smooth globular distension of the bone, and their nature can only be suspected before operation. These tumours are likely to be mistaken for central sarcoma, from which, however, they differ in their greater chronicity.

Carcinoma only occurs as a secondary growth in bone. The so-called "*blood cysts*" and "*fibro-cystic*" tumours of bone are but varieties of *sarcoma.* Satisfactory evidence of the existence of true *osteo-aneurism* is wanting. (For the diagnosis of *Cystic tumours of the jaws, see* page 389.)

CHAPTER XX.

GENERAL DIAGNOSIS OF ULCERS.

THE diagnosis of an ulcer includes the recognition of its condition and its cause. In many cases observation of the former decides the latter; for the one, attention is directed solely to the state of the ulcer itself, without any reference to the general condition of the patient, to concomitant affections or to the progress of the sore; all these demand investigation when we have to decide upon the cause of an ulcer. As the natural and also the simplest and most convenient method to adopt, we shall first discuss the diagnosis of

the conditions of ulcers and then that of their causes. It will be best first of all to study the general features of ulcers, and the modifications they present under different circumstances. These features are five in number: (1) *the base* of the sore; (2) its *edge;* (3) the *surrounding tissues;* (4) the *discharge;* and (5) the *pain*, if any, associated with it.

(1) **The base of an ulcer** may be *shallow* or *deep*, indicating a slight or a more extensive loss of substance. It may be *smooth*, more or less glistening and pale in colour, indicating an entire absence of all activity. It may be covered with *granulations*, indicating a more or less perfect attempt at healing; or it may show a *sloughy* surface, indicating the death of tissues by gangrene; an *eroded, irregular surface*, with flocculent shreds adherent to it, may show that the ulcerating process is still advancing; or the base may be covered with special structures, such as the "bullock's liver-like" clot of *scorbutus*, or the false membrane of *diphtheria*.

More important still is *infiltration* of the base; this may be slight or exaggerated, and its characters differ much in different cases; it is recognised by the thickening of the tissues forming the base of the ulcer. In such cases the base may be deeply excavated, very uneven, warty, or granular, or may be covered with fungating masses of new growth, which protrude beyond the skin.

Among the special characters of the base of an ulcer are those which constitute it a *sinus* or a *fistula*. If the ulcer assume the form of a long passage into solid tissues it is a *sinus;* but if it form a direct communication between adjacent mucous surfaces, or between the skin and a mucous surface, it is a *fistula;* this term is also sometimes used to designate a sinus leading into any of the natural cavities of the body, such as a joint or the pleura.

The granulations found on ulcers or wounds vary much. Typical healthy granulations are bright red in colour, small, uniform in size, forming an even layer, neither painful nor tender, not readily bleeding on gentle contact, and discharging a small amount of laudable pus. As departures from this we see small, scattered, irregular, and congested granulations, where the formative material is deficient and the venous circulation impeded; in other cases large, florid, soft, readily-bleeding granulations testify to abundant cell growth with deficient organisation and congestion; and yet again, granulations of large size, uneven outline, pale colour and soft consistence, with abundant thin purulent discharge, indicate that the capillaries of new formation are scanty, and that the granulation tissue is sodden with exuded serum. A granulating surface may lose its vascular appearance, becoming converted into a grey or greyish-yellow firm "rind" or slough; this is spoken of by some as "croup" of an ulcer. When attended with severe local inflammatory symptoms and fever, it is called "diphtheria" of an ulcer. Another appearance, which, when it exists, is quite characteristic of tertiary syphilitic sores, and in them is often seen, is a raised base of a grey or pinkish-grey colour, glistening appearance, and very firm consistence; if pierced by a probe it is found to be much firmer than granulation tissue, to bleed but little, and to be insensitive, while its surface may show some signs of granulation; it is very enduring, and is quite distinct from a slough.

(2) **The edge** of an ulcer may be *sloughy*, or irregular, with an eroded appearance, and of a deep red colour indicating that it is still *ulcerating*. When it is shelving in character, gradually merging into the granulating base, and marked with three concentric zones, the innermost being narrow, deep red in colour and smooth, the middle of a pale purplish hue, the

outermost milk-white in colour and covered with soft epidermic scales, the ulcer is *epitheliating*. A *sharply-cut edge* with a punched-out appearance points to an equal loss of superficial and deep tissues, usually caused by the separation of a slough. A *rounded edge*, thickened, and adherent to the deeper parts, shows that the ulcer is of long standing, and neither healing nor advancing; to be distinguished from this is the *infiltrated edge*, firm, more or less swelled, and usually uneven, continuous with an infiltrated base, lacking the rounded smooth appearance of the above; it points to the ulcer being secondary to an infiltration of some kind, syphilitic, lupous, or cancerous. The edge may be *undermined*, and the undermined part may be thin or thick, variously coloured, and of different extent; this shows that the subcutaneous tissues have been more widely destroyed than the skin, and that the ulceration has especially attacked the deeper parts; it is most often seen when the ulcer has been formed by the bursting of an abscess or the detachment of a slough. Again, the edge may be *everted;* this is a frequent feature of ulcerating cancers. Or the edge may be *concealed* by a sprouting mass of granulations, or a fungating tumour. The edge may be straight, circular, or irregular, and may become very irregular by the coalescence of adjacent ulcers; if these should have been circular, a characteristic curvilinear outline is produced.

(3) **The condition of the tissues surrounding** an ulcer often throws much light upon the diagnosis. They may be *quite healthy*, which is an indication that the ulcer is the result of a strictly limited affection, all the implicated tissues having been destroyed; it is a frequent sign of late syphilitic ulceration. They may be *inflamed*, hot, red, painful, tender, and more or less swelled and œdematous, or showing an eczematous condition of the surface;

enquiry must then be made as to whether the inflammation or the ulcer was primary. The tissues may be *indurated, matted together*, and more or less congested and pigmented, with warty projections, or covered with scaly and unhealthy epidermis, owing to prolonged congestion and infiltration leading to the production of a coarsely fibrillated and cellular tissue, and hypertrophy of the papillæ. The great thickening of the epidermis around the orifice of a perforating ulcer of the foot is an exaggerated example of this condition. Distinct from this is the clearly circumscribed *infiltration* of the tissues with a malignant neoplasm, in which there is a tumour having the features characteristic of one or other of the cancers or sarcomas. In some cases the surrounding skin is found *cold, livid*, and benumbed from very torpid circulation. Particular attention should be paid to the neighbouring vessels (induration, tortuosity, or obstruction of the arteries, varicosity, or occlusion of the veins), and also to the functional activity of the nerves, as indicated by disordered sensation, motor paralysis, and intense local sweating.

(4) **The discharge** from an ulcer may be *laudable pus*, and if this be in small quantity it is a sign of healthy action; if the pus be *abundant and thin* it shows a rapid breaking down of granulation tissue, and therefore an imperfect organisation. The discharge may be *thin* and *ichorous*, indicating an abundant serous effusion, with insufficient cell-exudation and cell-proliferation; such discharge, especially when the ulcer is sloughy, quickly decomposes, and becomes foul-smelling. It may be *sanious*, showing a delicacy of capillary wall, or exaggerated intravascular pressure. It may deposit on the neighbouring skin, or when dried, a white chalky sediment of *urate of soda*, indicating very clearly the gouty nature of the ulcer. Or pus may be found rich in *lime salts*, showing that

it is in part the result of the disintegration of bone. In other cases the true discharge of an ulcer may be mixed with *special excretions*, such as urine, fæces, milk, saliva, bile, etc. The *infective nature* of the discharge from some ulcers is a fact of great importance; auto-infectivity is shown by the occurrence of secondary ulcers on those surfaces exposed to the action of the discharge. The *microscopical examination* of a discharge may throw light upon the nature of the ulcer, revealing special cell-forms, or even micro-organisms; this subject is ably dealt with in Pepper's "Elements of Surgical Pathology."

(5) **The pain of an ulcer** may be nil; or it may be the continuous, smarting, stinging, burning pain of inflammation and active ulceration. Pain of special significance is that which occurs apart from signs of local inflammation, is very intense, often radiating along the nerve distributed to the ulcerated skin, and especially excited by movement of the ulcer or contact with its surface; in some such cases, the probe detects one particular spot in the ulcer, the least touch of which causes a severe paroxysm of pain; such ulcers are well called *irritable*. In these cases it is believed that a nerve filament or cord is exposed in the base of the sore.

A. **Diagnosis of the condition of an ulcer.**—Ulcers may be classed into three main groups, according to whether they show signs of healing, of spreading, or of being more or less stationary. The *first group* is characterised by the presence of granulations covering the base of the sore, and by the absence of signs of active inflammation in the edge and surrounding tissues. The *spreading sores* are characterised by the absence of all granulations over the base, the irregular and acutely inflamed or sloughing edge and base; there is also a history of progressive enlargement. The *stationary sores* are marked by the absence

of the characteristic features of both the above; there are no granulations over the base, the sore is not enlarging, and the edge and surrounding skin by their thickening, pigmentation, and induration, show signs of chronic congestion.

Sinus and fistula are separately considered.

(1) **The ulcer is granulating.**—It may be:

(*a*) Healthy,	(*c*) Weak.
(*b*) Fungous, or	

(*a*) If the *base* be covered with an even layer of small, florid, uniform granulations, if its *edge* be shelving and marked by three concentric zones, deep red, pale purplish, and milky white, if the *surrounding tissues* be free from inflammation or infiltration, and if the *discharge* be a small amount of laudable pus, while there is no *pain*, it is a *healing ulcer*. The surgeon must remember that many grades of activity and perfection of the healing process are met with, and that epitheliation, which gives the special appearance to the edge of a healing ulcer, is usually postponed until the granulations have become level with the surface.

(*b*) If the *base* of an ulcer be covered with large, prominent, uneven, deep red granulations, which easily bleed, the *edge* being concealed by the sprouting base, or showing no signs of epitheliation, while the *surrounding tissues* are congested (or healthy), and the *discharge* is purulent and abundant, the ulcer is *fungous or exuberant;* such sores are especially seen after burns, and are often very painful.

(*c*) If the *base* of the sore be covered with an uneven layer of large, pale, flabby, œdematous granulations, which may wholly or in places project from the surface, while the *edge* is thin, pink, or purplish in colour, and undermined, and the *discharge* is a thin unhealthy pus, it is a *weak or œdematous ulcer*.

(2) **The ulcer is stationary.**—It may be :

(*d*) Chronic, or	(*e*) Irritable.

(*d*) If the *base* of the ulcer be depressed, devoid of granulations, either smooth and glistening in appearance, or dull and tawny, or covered with a thin tough rind, or a green slough, and the *edge* be rounded, smooth, inverted, thickened, and adherent to the deep fascia or base, with the *surrounding skin* indurated, thickened, adherent to the deeper parts, perhaps covered with scaly epidermis, pigmented, and marked with dilated veins, the *discharge* being thin and watery, scanty or profuse, and often very foul, it is a *chronic, callous, or indolent ulcer.* Great variations are met with in these chronic ulcers, but the features common to all are the absence of healthy granulations, and the thickening and induration of the edge and surrounding tissues. They occur most commonly upon the lower half of the leg, and generally in middle-aged or elderly persons.

(*e*) If an ulcer be attended with very severe *pain*, quite out of proportion to any signs of local inflammation, and if the base or one particular part of it be found exquisitely tender, it is called an *irritable or neuralgic ulcer;* these sores are common at the anus, and are only occasionally seen on the legs; they show no tendency to heal while the "neuralgia" continues.

(3) **The ulcer is spreading.**—It may be :

(*f*) Inflamed, (*g*) Phagedænic, or	(*h*) Sloughing.

(*f*) If the *base* of an ulcer be depressed, uneven, or spongy in appearance, reddish-yellow in colour, with fine shreds adhering to it; if the *edge* be sharply cut, uneven, deep red in colour, or undermined; if the *surrounding skin* be inflamed, hot, red,

tender, painful, swelled, or even œdematous or eczematous; and if the *discharge* be a thick greyish-yellow flocculent fluid, it is a *spreading or inflamed ulcer.*

(*g*) If an ulcer have the same general characters, but the *base* be very irregular, the *edge* sinuous and rapidly melting down, showing, perhaps, small adherent sloughs in places, and the sore enlarge rapidly and progressively, or spread in this manner by one edge while it heals at the other, it is a *phagedœnic or serpiginous ulcer.*

(*h*) If the *base* and *edge* of an ulcer be covered with a slough (tough and tenacious, or soft and flocculent), the *surrounding tissues* being swollen, livid, and painful, and the *discharge* offensive and ichorous, it is a *sloughing sore. Hœmorrhagic ulcers* are arranged in a separate class by some writers, but as hæmorrhage is met with under very varying conditions, and is not peculiar to any one class of sores, this does not seem necessary.

B. **Diagnosis of the cause of an ulcer.**—Apart from the history and condition of ulcers, and the existence of concomitant affections or dyscrasiæ, there are certain factors of importance in the diagnosis which may be conveniently discussed before describing the rules for diagnosis. Under this heading reference will be made to the position, number, and shape of ulcers, their mode of origin, and the condition of the surrounding tissues.

(1) **The position of an ulcer** is often of great service in diagnosis. Speaking generally, a wide distribution of ulcers indicates their dependence upon a constitutional taint, and their *in*dependence of a purely local cause, this is frequently evidenced by syphilitic ulcerations; but care must always be taken to exclude a widely diffused local cause of the mischief, such as scabies. A local grouping of ulcers, however, is of

little value in diagnosis, as it may be due equally to constitutional and to local causes. The occurrence of sores in situations especially subject to injury, such as over the shin, on the heel, or the front of the ankle, suggests a traumatic origin; and if ulcers are found on parts most distant from the heart (the tips of the fingers and toes), the cause is probably a defective circulation of blood; the occurrence of ulcers in paralysed limbs points to a trophic origin.

Of the various diathetic ulcers it is to be remembered that strumous ulcers are most frequent in the neck, the axilla, the groin, and over joints, in the latter situation being often associated with strumous ostitis; syphilitic ulcers may be found in any situation, but are especially frequent upon the genital organs, and about joints, particularly over and just below the knee. Consecutive ulcers, such as lupous and cancerous, of course occur where those diseases are found, lupus most often attacking the face and then the hands; cancerous ulcers are most frequent about the lips, tongue, neck, breast, axilla, penis, scrotum, vulva, anus, and groin. Of the ulcers dependent upon local conditions, the position of the venereal sores on the genital organs, rodent ulcer on the head and face, and the chronic so-called varicose ulcers of the lower half of the leg is characteristic; so constant is the situation of the last, and so common the position of syphilitic sores higher in the leg, that a rough rule of some value has been formulated thus: "every ulcer above the middle of the leg is syphilitic."

(2) **The number of ulcers** present is a factor in diagnosis which must be used with some caution. Multiplicity is *per se* a sign of the constitutional origin of ulcers, indicating a like affection of many parts of the body; but it must always be borne in mind that constitutional ulcers may be single, as we not unfrequently see in syphilis, while purely local

ulcers may be multiple, as we see in scabies and soft chancre, and not unfrequently in chronic varicose ulcers of the leg. It is only when ulcers without obvious local cause are multiple, that the fact of number becomes strong evidence in favour of their constitutional origin.

(3) **The shape of an ulcer** may be characteristic. Syphilitic sores are very commonly circular in shape, and if contiguous circular ulcers have coalesced, the sore assumes a sinuous outline which is rarely, if ever, seen in other ulcers. But still more characteristic of syphilis is it to find the ulcer healing by one border while it spreads at the other, producing reniform or annular ulcers. Strumous ulcers are generally oval, and their edge is frequently undermined. A sharply punched-out appearance indicates a marked loss of substance, and is more frequently seen in syphilitic sores than in others, but is by no means diagnostic of them.

(4) **Mode of origin.**—A careful investigation into the mode of origin of an ulcer usually throws great light upon its cause. Thus, it may be *purely traumatic*, the original injury being attended with destruction of tissue and the production of an ulcer. Other sores are what may be termed *partially traumatic*, *i.e.* the original injuries were unattended with destruction of tissue, and their conversion into ulcers has resulted from some other superadded cause, either local irritation by friction, dirt, or improper dressing; local malnutrition (impaired circulation and innervation, chronic congestion and induration), or a general cachectic state, such as is found after severe illness or in those suffering from chronic starvation. When some trifling scratch or abrasion, or the development of a small pimple, leads to the formation of an ulcer, there is one of two causes for it; either some special irritating and destructive matter is inoculated in the

wound, as, for instance, in syphilitic infection, or the tissues are so impaired in their nutritive activity that the slightest injury destroys them, or the attempt at healing results in disintegration. This is the common origin of the chronic ulcers of the leg, and of the recurring ulcers of scars.

Occasionally an ulcer is seen to originate in a small black gangrenous patch of skin, which separates and leaves a sore. This clearly points to a vascular lesion as the source of the evil, and thrombosis of the small vessels is generally believed to be the starting point of such ulcers. It is common for ulcers to result from the melting down or the sloughing of indolent indurations, papules, and nodules; the recognition of the fact throws back the diagnosis of the ulcers to that of the nodules and indurations in which they occur. We see this in lupus, where there is, first of all, a nodular infiltration of the skin, and then a disintegration of the nodules; in syphilis, too, where small or large papules, or gummata, form in the skin or the subcutaneous tissue, and by their death lead to the formation of ulcers. In epithelioma, also, there is first an infiltration of the part with the epithelial growth, and then its molecular disintegration (ulceration); and in other cancers, including sarcomata, we notice first of all the new growth, and then its partial destruction by ulceration.

Lastly, we see ulcers that originate from progressive inflammation. This assumes two forms. In the first, the inflammation is purely superficial, and is attended with disintegration spreading from the surface into the deeper tissues; of this the eczematous or catarrhal ulcer is the type. In the second form, the inflammation begins in the deeper parts, leads to the formation of an abscess, which gradually advances to the surface and destroys the skin from within out, and so forms an ulcer. The ulcers left by

suppurating glands, softened scrofulides, and nearly all strumous ulcers, illustrate this mode of formation; they are subsequently characterised by a thin undermined edge. Where the separation of a slough has given rise to an ulcer, the sore generally has a sharply-cut edge, and a punched-out appearance, which are often well seen in syphilitic ulcers.

(5) **The condition of the surrounding tissues** often throws great light upon the cause of an ulcer by showing an earlier stage in the disease, or the predisposing cause of the ulcer. Thus, the skin may be eczematous, or infiltrated with lupus growth, epithelioma, or other malignant tumour; or it may be congested and thickened, adherent to the deeper structures, pigmented, with varicosity of the veins, and an unhealthy condition of the epidermis; or it may be cold and livid. In other cases the skin and the subcutaneous tissue may be the seat of scrofulides, enlarged glands, or of gummata; and yet, again, the surrounding tissues may be perfectly healthy. Where that is the case, it indicates either that the ulcer has resulted from a local cause of precisely limited area, as an injury, or that the disease is constitutional, as syphilis. The healthy state of the skin of the leg is one of the most useful and frequent distinctions between syphilitic and the common varicose, or chronic ulcers of the leg.

(6) **The condition of the ulcers** may or may not throw light upon the diagnosis of its cause; but the following propositions may be stated:

(*a*) *Weak ulcers* are most frequently "*strumous*."

(*b*) *Indolent ulcers* are nearly always "*varicose*," or dependent upon disorders of the circulation.

(*c*) *Serpiginous ulcers* are nearly invariably syphilitic.

(*d*) *Phagedæna* may be accepted as evidence of syphilis, in absence of strong evidence to the contrary.

(*e*) *Sloughing ulcers* are very frequently *syphilitic.*

(7) **The state of the circulation.**—A general sluggishness of circulation is necessarily attended with imperfect nutrition, and its effects are most obvious and injurious at the parts farthest removed from the heart, such as the toes, the fingers, and the ears, which are constantly cold, livid-red in colour, and subject to chilblains or local congestions on any exposure to cold. Under these conditions, ulceration is liable to occur, producing what is known as "cold" ulcer. Local disturbances of the circulation are, however, of much greater frequency. They consist in arterial degeneration and venous enlargement, congestion, and thrombosis. As causes of ulceration they are almost entirely limited to the lower half of the leg, inducing the common "chronic" or "varicose" ulcers. These local disturbances are recognised by the evident condition of the subcutaneous vessels, by œdema, induration of the tissues, with an unhealthy condition of the epidermis, and by coldness. They are specially met with in persons about and after middle age, and are most frequent in women of the lower classes of society.

(8) **The state of the nervous system** is of most interest in connection with "perforating ulcer of the foot." In some of these cases there is merely a local anæsthesia affecting one or more of the nerves of the foot; but in many other cases, the absence of knee-jerk, the lightning-like pains, the state of the pupil and the unsteady gait, proclaim the patient to be the subject of locomotor ataxy. Hemiplegia, or paraplegia, with injury of the nerve centres, may be attended with rapid ulceration and sloughing of parts exposed to pressure or irritation. (*See* page 104.) Frequent nervous phenomena attendant upon chronic ulcers are profuse local sweating and pigmentation.

(9) **The state of the lymphatic glands** connected with the ulcerated area may throw much light upon the diagnosis. The glands may be inflamed, or infected with some specific poison. In the former case the inflammation is chiefly marked around the gland, which becomes fixed by the effusion, while there is local heat, redness, pain and tenderness, and a tendency to terminate in suppuration. Any ulcer may give rise to this lymphatic irritation, when itself irritated, but it occurs most frequently from traumatic ulcers, such as grazed heels and toes, and from soft chancres. Lymphatic infection, on the other hand, is characterised by an enlargement of the gland itself, which at first, at any rate, is not fixed to the surrounding tissues. It is caused by hard chancre, when many glands are affected, and become moderately enlarged, indurated, and remain freely movable; by malignant ulcers, particularly epithelioma, when the enlarged gland is at first single and movable, and later on becomes adherent, and may soften down and form an ulcer like the primary sore, its growth being continuous, and the infection tending to spread to other glands. Soft chancres occasionally infect lymphatic glands, setting up virulent inflammation of the gland itself, ending quickly in suppuration. Of quite other significance, but of no less value for diagnosis, is the detection of the chronically enlarged strumous glands.

(10) **The age.**—Traumatic ulcers may be met with at any age; excluding these, the ulcers most common in children and young persons are strumous sores and lupus, and ulcers from congenital syphilis; in adults, syphilitic ulcers predominate; in middle life and old age, "chronic" and "varicose" ulcers, gouty and malignant ulcers, including rodent ulcer, are most frequent. The influence of age is by no means absolute, even "rodent ulcer," which is usually exclusively limited to the later decades

of life, having been met with in a girl under twenty.

(11) **Cachexia.**— The cachexiæ attended with ulceration are struma, syphilis, gout and scurvy, and of these the two former are much the most frequent. The surgeon must remember that both inherited and acquired syphilis may cause ulceration, and that the former may cause large and often chronic ulcers on the legs of young persons.

There are certain ulcers the characters of which are so distinctive, that they stand out clearly apart, and can be at once recognised. We will first of all mention these, and then give the differential diagnosis of those whose features are less obviously distinctive, and which might be mistaken one for another.

(*a*) A very chronic ulcer lasting for years, occurring in an elderly person, attacking the face, and slowly destroying all the tissues (hard as well as soft), presenting a narrow indurated edge, and a smooth shallow base, showing no signs of healing, but steadily progressing, without infection of lymphatic glands, is a *rodent ulcer*.

(*b*) An irregular ulcer occurring in an infiltrating tumour is a *malignant ulcer*. This differs much in its characters, varying with the structure of the tumour in which it forms; at times it is fungating, at others deeply excavated.

(*c*) An irregular-shaped ulcer, with livid swelled edge, and the base covered with a "spongy dark-coloured, strongly adherent, fœtid crust," the removal of which causes bleeding; the patient at the same time having swollen spongy or ulcerated gums, petechiæ on the legs, and deeper brawny swellings, with a sallow anæmic appearance, is a *scorbutic ulcer*. The history will throw light upon the diagnosis of such an ulcer.

(*d*) An ulcer situated in a diffused area of reddened swollen skin, with adherent scales or crusts of

epidermis and dried discharge, is an *eczematous ulcer*. Such sores are often multiple. It is important to determine that the eczema preceded the ulceration, as sometimes the discharge from an ulcer, or an improper mode of dressing, causes an eczematous condition of skin around an ulcer of quite a different origin.

(*e*) A very chronic ulcer on the sole of the foot, surrounded by thick horny cuticle, deep, and leading down towards or to bone is a *perforating* or *trophic ulcer*. This is frequently associated with locomotor ataxy, or with local anæsthesia; these ulcers may be multiple. They have been met with in connection with caries of the spine, congenital club-foot, and also in leprosy.

(*f*) A small round or oval ulcer, with thin livid edge and smooth shallow base, situated on or near the tip of a finger or toe, in an individual whose hands and feet are habitually cold, and quickly become livid on exposure, with a weak compressible pulse, is a *cold ulcer*.

(*g*) An ulcer occurring over a gouty deposit, small, shallow, and smooth, the discharge from which may leave a white chalky deposit on the surrounding skin, is a *gouty ulcer*. There will be the history and other evidences of gout to aid in the diagnosis.

The remaining ulcers may be divided into two groups, one consisting of those which have originated in the gradual molecular disintegration of the surface of solid deposits or growths, and which are found as ulcerated nodules or tubercles, the ulcer being surrounded by the original induration; and the other group in which the ulcers have formed by the molecular death of the original tissue of the part or the sloughing of the whole of a deposit; in such cases if there be any induration round the ulcer it is secondary to it, and ill-defined. Excluding rodent ulcer and malignant ulcer, whose characters are so very

distinctive, the ulcers belonging to the first group of ulcerating indurations are

Lupus.	Chancre.
Epithelioma.	Syphilis (the ulcerating papule).

If the ulcer be single, and occur in a person otherwise healthy, if it be acute in its course, with well-marked induration of the base and edge, the ulceration being, perhaps, not more than a superficial abrasion, and if the neighbouring group of lymphatic glands be enlarged and indurated, but movable under the skin and over each other, and if the sore be followed by a dusky papular rash, papules on the fauces, or mucous patches, and any of the secondary effects of syphilis, it is a *Hunterian chancre*. The diagnosis rests mainly upon the succession of symptoms, first the local induration, then the indolent buboes, and later on the rash, etc.; the local induration is characterised by its flatness and continuity: it is not tubercular, nor made up of several nodules as is lupus; the buboes are painless, multiple, and not adherent. Hard chancres are only very rarely multiple.

If the ulcer be chronic, situated in a nodular tubercular eruption on the face or hand, which commenced during childhood or youth, has only very slowly broken down, and has left scars behind, it is *lupus*. Of this there are several varieties described, the most common being *lupus vulgaris*, which is most frequent on, but not limited to, the face, and in which the tubercles are well developed, and *lupus erythematosus*, which first attacks the nose and adjacent parts of the cheeks, then spreads to the hands, and is very rare in other situations; it is nearly always symmetrical. By the chronicity of the growth it is distinguished from chancre and epithelioma; and it differs from the ulcerating tubercles of syphilis in the

greater softness and vascularity of the tubercles; its much slower and less destructive course, and the absence of scattered tubercles around the patch, as well as by the different associated affections.

A chronic ulcer situated in a firm tubercle, deep, with a punched-out appearance, with other firm tubercles scattered around, occurring in an adult, with signs or a history of constitutional syphilis (and usually such ulcers are not the sole manifestations of syphilis present), is a *syphilitic ulcer*, the ulcerating syphilide or tubercle.

An ulcer occurring in a person at or past middle life, commencing in a wart or fissure, steadily progressing, with an indurated everted edge, and indurated uneven base, covered with firm pink granulations with yellow specks, with enlargement of the neighbouring gland or glands, which become adherent to the surrounding tissues as they enlarge, is an *epitheliomatous ulcer*. These ulcers are most common on the lips, tongue, penis, scrotum, vulva, and anus, around old sinuses, or in old scars. They are very rarely multiple. The age of the patient, the progressive character of the affection, the infiltrating enlargement of the lymphatic gland are eminently characteristic. If the surface be scraped, and the scraping examined microscopically, large quantities of epithelial cells are found, and perhaps an epithelial "globe," or "nest," may be detected. (*See* page 273.)

The second group of ulcers includes

Traumatic.	Strumous.
Varicose.	Syphilitic.

An ulcer occurring in a healthy individual, and in healthy tissues, as the result of an injury, is a *traumatic ulcer*. Injury often enters into the production of other ulcers, especially the so-called "varicose" ulcers.

A chronic ulcer situated on the lower half of the leg, or about either malleolus, with depressed base, smooth or covered with a few scattered ill-formed granulations or a thin greenish or grey slough, with thickened adherent edge, indurated, congested and adherent surrounding skin, with enlargement of the superficial veins of the limb, is a *varicose ulcer*. These ulcers often originate in some trifling injury inflicted on thickened ill-nourished skin, and their direct dependence upon varicosity of the veins as apart from other vascular disturbances is very problematical. They occur most often in women at and after middle life, and among the poorer classes.

An ulcer with pink or livid undermined edge, with weak flabby granulations covering the base, and thin purulent discharge, occurring in a child or young person of strumous habit, with enlarged glands or other evidence of that diathesis, is a *strumous ulcer*. These ulcers are most common over lymphatic glands in the neck or elsewhere, or over joints. They commence as abscesses, and a history of the bursting of a collection of pus, the thin undermined edge, and the general condition of the patient are their chief distinguishing features.

Syphilitic ulcers have many characteristic features, one or more of which may be present in any given case.

(1) *Number.*—They are often, but not always, multiple.

(2) *Position.*—They may occur in any situation; if on the leg they are not limited to the lower half, and are more common on the outer than the inner side, and are very frequent about the knee.

(3) *Shape.* — Circular or oval, or irregularly sinuous from the coalescence of adjacent sores; most characteristic is an ulcer healing at one edge and spreading at the other, or an annular sore.

(4) *Character.*—A "punched-out" appearance; or a base covered with a tough yellowish grey, "wet washleather-like" slough; or dark conical adherent crusts; or a base covered with very thick and firm mottled grey and pink granulation tissue; or phagedæna, are all characteristic. Syphilitic ulcers may assume all the characters of "chronic ulcers." The healthy condition of the surrounding tissues is a noteworthy feature of the deep and perhaps chronic ulcers of the leg.

(5) *Origin.*— In an induration, or a gummatous infiltration.

The diagnosis of ulcers of the genital organs is given in chapters xxxvii., xxxviii., xxxix.

CHAPTER XXI.

DIAGNOSIS OF SINUS AND FISTULA.

"A LONG narrow suppurating canal" is a *sinus*, and if the sinus communicate with a mucous, synovial, or serous cavity, and give exit to the secretions of these cavities, it is a *fistula*. An unnatural direct communication between two adjacent mucous surfaces is also called a *fistula*. The diagnosis of a sinus is established by the passage of a probe along it, but the size and character of its aperture, and the amount of discharge which flows from it, or the special means by which that discharge can be made to flow, are other signs by which they can generally be recognised. A sinus being recognised, the surgeon must first decide whether it is a fistula by noticing the character of the discharge, and also whether a probe passed along it enters a mucous, synovial, or serous cavity. *Salivary fistula, branchial fistula, urinary fistula, fæcal fistula,*