

Lymphadenoma, as above defined, is a process of enlargement of lymph glands which is remarkable in affecting several glands simultaneously, or in rapid succession. Usually the growth is limited to one group at first, to involve the others later, or it may appear in widely separated places at the same time. Sometimes the usually recognized groups of glands alone are involved, but often every portion of lymphadenoid tissue in the body is

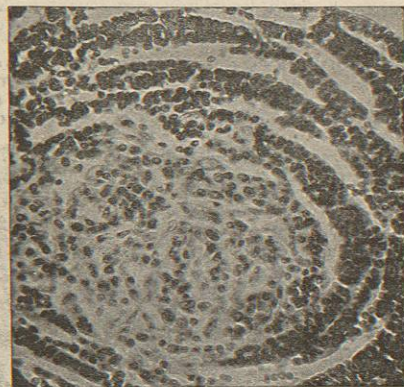


FIG. 3317.—Photograph of Centre of a Lymphoma Node. Showing the Pale Germinal Centre and the Rows of Lymphoblasts. (Le Count.)

affected, and microscopic structures may enlarge to considerable swellings. It is this peculiar diffuseness of the process that distinguishes it from any ordinary tumor growth and makes the infectious origin seem so probable.

When the growth is examined closely it is found that even in the largest masses the individuality of the component glands has not been lost by fusion; each preserves its own capsule, although they may adhere closely to each other. The separate glands may reach the size of a hen's egg, although usually few are larger than a hickory nut. The groups of glands in the cervical, axillary, mediastinal, and retroperitoneal regions often form huge tumors, of irregular outline and nodular surface. In consistence the glands are about as soft as normal kidney tissue. The external surface is pale, and the cut surface a pale pink. In some glands the cut surface shows almost no apparent structure, it is alike from centre to margin; in other cases, a considerable growth of connective tissue is seen, dividing the gland into irregular lobules. The gland is not pultaceous, and areas of necrosis and hemorrhage are rarely seen. Suppuration is uncommon, and almost always due, when present, to erosion of some surface. If the spleen is enlarged, as it usually is, it seems that the follicles are affected chiefly, and in a way quite like the glands. The tonsils and intestinal lymph follicles project, and may form tumors similar in structure to the glands.

Microscopically it is seen that a great increase in all the cellular elements of the gland has taken place, disorderly and not constant in proportion or arrangement. The arrangement of follicles and sinuses is quite lost. Both the large endothelial and small lymphoid cells are increased, sometimes one out of proportion, sometimes the other. Often there is also a distinct increase in fibrous tissue, generally in strands extending from the capsule toward the centre. Frequently large cells are seen, sometimes with a single enormous, irregularly shaped, deeply staining nucleus; large cells with from three to a dozen nuclei are also abundant in some cases. Phagocytic endothelial cells containing blood pigment and mononuclear cells may also be found. As a rule the more extensive the process the more the structure diverges from that of the normal gland; in the circumscribed, simple lymphadenomata, without constitutional

symptoms, the growth may be quite similar to the true lymphoma.

Lymphadenoma differs from the lymphosarcoma grossly in that the gland capsule limits the growth, surrounding tissues are not invaded, the process more often affects lymph structures throughout the body without involving any other tissue, there is never a single large mass of tumor tissue, while it may be soft yet it does not yield a milky fluid from the cut surface, and necrosis and hemorrhage are seldom seen. Microscopically the sarcoma shows a far more atypical structure; the round cells are usually almost alone, stroma formation is slight, and the endothelium-like formations are generally absent; hemorrhages, necrosis, and karyokinesis are much more abundant. As can be easily understood, it is at times very difficult, perhaps impossible, to make any distinction between the benign and the malignant forms of growth.

Tuberculous adenitis usually offers no difficulty because of the characteristic caseation, the typical zone arrangement, and the giant cells; but quite a number of cases have been described in which with a gross and minute structure corresponding to lymphadenoma, and without any evidences of tuberculosis, staining and inoculation have revealed tubercle bacilli. This fact leaves the neoplastic nature of lymphadenoma always in doubt.

Leukæmic glands offer to the naked eye no essential differences from those of lymphadenoma, and some authorities, as Ziegler, speak of a "leukæmic lymphadenoma," and a "pseudoleukæmic lymphadenoma." The fundamental difference in the process is that in leukæmia the new-formed cells leave the gland to form leucocytes, while they remain within the reticulum in lymphadenoma. Usually the structure is more atypical in leukæmia, the round cells predominating, but the only visible difference may be the presence of abundant leucocytes in the blood of sectioned vessels. Grossly the glands show few differences, although they are likely to be softer and exude milky fluid on section in leukæmia; the lymphoid accumulations in the viscera are of course quite characteristic.

The etiology is quite unknown, as in the case of a true tumor, but that the growth is of infectious origin seems most probable in view of the simultaneous involvement of so many lymph glands, and the difficulty of distinguishing it from the generalized tuberculous adenitis that has been so frequently observed in recent years. In favor of its being a true tumor are mentioned its frequent change to malignancy and the narrow demarcation from lymphosarcoma, the abnormal nuclear forms seen in the large cells, and the progressive course. Various organisms have been described, but too inconstantly to be entitled to consideration. The growth occurs oftenest in young adults, particularly males, without predisposing causes being recognizable, as a rule.

The course is almost inevitably downward in the cases of generalized glandular enlargements, *i.e.*, Hodgkin's disease. In the cases of localized glandular tumors the growth may be very slow, and after reaching a certain size, become stationary. It has been said that they may cicatrize and heal spontaneously, but considering the difficulty in distinguishing them clinically from tuberculous glands, such statements are open to question.

H. Gideon Wells.

<sup>1</sup> E. E. Le Count: Lymphoma, a Benign Tumor Representing a Lymph Gland in Structure. *Journal of Experimental Medicine*, iv., 539, 1899.

<sup>2</sup> Sternberg: *Zeitschrift für Heilkunde*, xix., 1898.

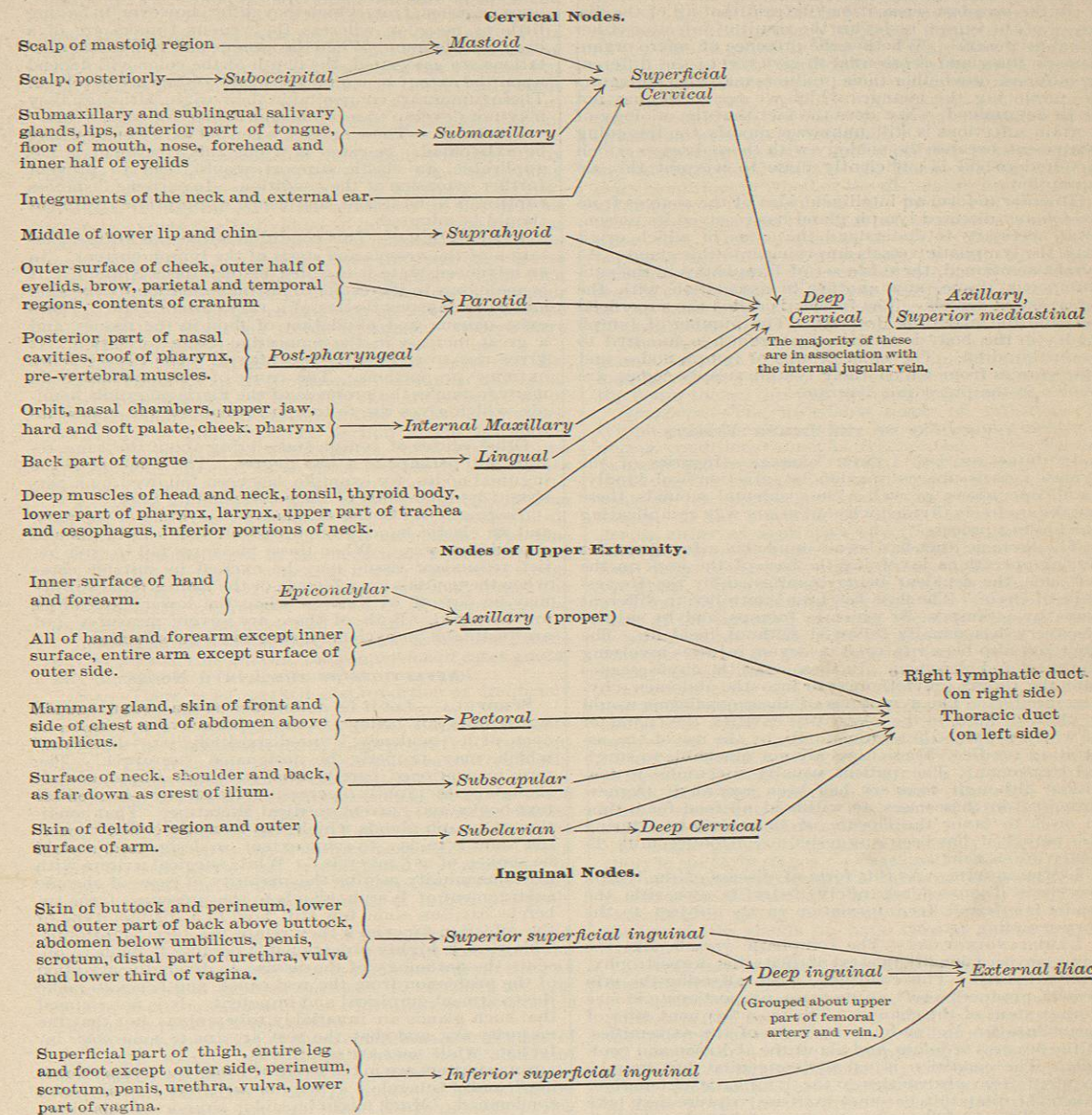
<sup>3</sup> T. R. Crowder: *New York Medical Journal*, 1899.

**LYMPH VESSELS AND NODES, SURGICAL AFFECTIONS OF.**—ANATOMY AND PHYSIOLOGY.—In order to make the subject of this article clear, the writer desires to recur for a few moments to the anatomy and physiology of the lymphatic system. This system comprises the lymphatic vessels or channels and the nodes or ganglions which are commonly spoken of as glands. The vessels are analogous to veins in their structure. They

are distributed almost universally throughout the body. There are, however, three principal groups, *viz.*, those which ramify in the subcutaneous cellular tissue, those which accompany the great vessels, and those in associ-

ated lymphoid tissue situated in the course of the lymphatic vessels. They are in some instances solitary, but more frequently arranged in groups. The more important groups are in close proximity to the great blood-ves-

DIAGRAMS SHOWING THE CHIEF GROUPS OF EXTERNAL LYMPH NODES, AND THE SOURCES FROM WHICH THEIR LYMPH SUPPLY COMES. (THE NAMES OF THE NODES ARE PRINTED IN ITALICS.)



ation with the various internal organs. The first and second of these groups are of special interest to the surgeon, whilst the third, being largely inaccessible during life, will not here be considered.

The nodes (or glands) are collections of specially ar-

sels. The nodes are surrounded by loose connective tissue, and in the case of the extremities they are found chiefly at the flexures of the joints.

The lymphatic system is sometimes spoken of as the absorbent system, inasmuch as one of its chief functions.



is to take up the fluids from the tissues and carry them to the venous circulation. This function is shared by the veins, which also act as absorbents to a considerable extent. For our present purpose we need not go into the theories of the function of the lymphatic nodes further than to say that they act as filters in removing from the lymph current extraneous matters which may have gained access to the system.

In the broadest sense, it may be said that all of the diseases of the lymph nodes are the result of infection either local or general. Whether the presence of micro-organisms in the gland is essential to give rise to the different conditions, or whether their products may also be factors in producing the changes which we recognize, has not been determined. Nor does the fact that the etiology of certain affections is still unknown modify the foregoing statement, because the analogy with those diseases which are understood is sufficiently close to warrant this assumption.

In order to form an intelligent idea of the sources from which any diseased lymph gland has received its poison, it is necessary to understand the areas in which originate the lymphatic vessels emptying into this gland. As above mentioned, there is a set of lymphatics in the subcutaneous tissue, and another in association with the great blood-vessels. The former is called the superficial set, and the latter the deep set. The number of lymph nodes in the body is estimated at from five hundred to seven hundred. The chief groups of lymph nodes, and the sources from which their lymph supply comes, are shown in the preceding diagrams.

#### AFFECTIONS OF THE LYMPH VESSELS.

**INJURIES OF THE LYMPH VESSELS.**—Injuries of the lymph vessels unaccompanied by infection heal kindly. In all operations, as well as in accidental wounds, these trunks are freely divided without in any way complicating the healing process.

The thoracic duct has been wounded in a few instances during operations involving the base of the neck on the left side, the accident being manifested by the free escape of chyle. The flow has been controlled in different cases by a tampon, by pressure forceps, and by suture. Recovery has usually followed without incident. The duct has also been ruptured in severe injuries involving the chest and abdomen. In these cases the chyle escapes into the thorax (chylothorax) or into the abdomen (chylous ascites). The symptoms of these conditions would be those of fluid in the respective cavities, the character of which could be determined only by the use of the aspirating needle. These cases are not amenable to surgical treatment. The patient usually succumbs to inanition, although recovery has been recorded. Agnew proposed, in these cases, to withhold all food for a time in order to favor the closure of the opening. During this period, it has been suggested to introduce milk directly into a vein.

**LYMPHANGITIS.**—As this form of disease of the lymph vessels is discussed separately under its own title, the reader is referred, for information on the subject, to the corresponding article.

**LYMPHANGIECTASIS.**—The lymphatic vessels, like the veins, are occasionally the seat of dilatation, hypertrophy, and varicosity. This condition, when affecting the skin vessels, produces a soft pulpy mass, proportionate in size to the extent of the change. The most frequent sites of occurrence are on the inner surfaces of the extremities, at the flexures of joints, and about the abdomen and genitalia. The condition is usually congenital, but may be acquired from obstruction to the lymphatic circulation. When the dilatation becomes extreme, rupture may take place. This is followed by a flow of lymph, which is called *lymphorrhagia*. If the condition is marked enough to call for treatment the affected areas may be extirpated by the knife if there be no contraindication; or, in the case of an extremity, an elastic support may be worn. This condition is one of the causes of enlargement of the

tongue, known as *macroglossia*, and of the lips, *macrocheilia*.

**LYMPHANGIOMA.**—When the dilatation of the lymphatic vessels is marked and circumscribed, the condition is called lymphangioma. This corresponds in every way with a venous angioma, with which, in fact, it is sometimes associated. These tumors are soft and semifluctuating, giving the same sensation to the touch as a venous angioma, from which they differ, however, in having little or no color, whereas the venous tumors are of a deep purple hue. When the venous and lymphatic dilatations are associated, the depth of the color will depend upon the extent to which the blood-vessels are involved. These tumors are congenital in their origin, although they may not develop to a prominent degree for some years.

**Treatment.**—These masses, when not too extensive, may be extirpated. In cases in which this treatment is not applicable, an elastic support would tend to prevent further extension of the condition. In extreme instances rupture is to be feared, and hence appropriate treatment should be adopted.

**LYMPHŒDEMA.**—This condition is due to a diffuse dilatation of the vessels and stasis of the lymph current. In an advanced state it is called elephantiasis Arabum. It is analogous in its results to an inflammation of the skin and subcutaneous tissues, of a very chronic type. There exist œdema and exudation of fluid in the tissues, and a great increase in the connective-tissue formation. It gives rise to elephantiasis, which in some cases reaches extreme proportions. The cause of elephantiasis is in many instances the presence of the filaria sanguinis hominis, which gives rise to lymph thrombosis and inflammation.

Other causes of lymph stasis bring about the same result, but perhaps to a less degree. The removal of the inguinal nodes, for example, has been followed by a persistent lymphœdema of the corresponding limb.

**Treatment.**—The use of massage, elevation of the part, and an elastic bandage comprise all that can be done in a palliative way. When these measures fail to give relief, redundant tissue may be excised in suitable cases when the genitals are affected; or the main arterial supply may be cut off by ligation when the lower extremities are involved. Both of these are severe measures, but are justifiable in extreme instances of the affection.

#### AFFECTIONS OF THE LYMPH NODES.

**SCROFULA.**—Let it be understood at the outset that the writer does not believe in the existence of a disease, or even of a "tendency," "predisposition," or "diathesis," which may properly be designated "scrofula." The term is mentioned here because it is still employed—although with rapidly decreasing frequency—in medical text-books and current medical literature. That condition of lymph glands which was formerly called "scrofula" and is to-day, to some extent, so designated, should be spoken of as "tubercle." While surgical writers with great unanimity ascribe the majority of cases of chronic enlargement of lymph glands to the presence of the tubercle bacillus, some few still hold to a distinct type of the affection for which they retain the term scrofulous. This view is highly objectionable because it tends to obscure the pathology of the disease, to divert the attention of the profession from the real cause, and hence to make the treatment empirical and impotent. It is not claimed that such glands are invariably tuberculous, but that the majority are, and that the rest are due to some other infection, while *none* are scrofulous.

Some writers are in the habit of using the terms "scrofula" and "tubercle" synonymously, but this is to be condemned. Much might be said in support of this view, but it is not the purpose of this chapter to deal with pathology. Suffice it to say, therefore, that whatever lacks a sound pathological basis is either to be rejected or held *sub judice* until sufficient light has been added to warrant a conclusion.

Nor is there any more justification for believing in a

"vice of constitution" which should be called scrofulous. It may be asserted with great positiveness that the local affection of the lymphatic glands which has been known as scrofula is a primary infection of the glands, usually with the bacillus of tuberculosis, and not the secondary effect of a constitutional disease. It cannot be denied that tuberculous glands are frequently, although by no means always, found in individuals who are anæmic and otherwise ill-conditioned. This relation is to be explained upon the ground that such subjects not only suffer from catarrhal and other affections that offer a ready means by which germs may gain an entrance into the system, but also possess phagocytes which, like the tissues and glands generally, are not up to the normal standard of vigor, and consequently are unable to resist effectually the invasion.

Neither the profession nor the patient will benefit by calling such a condition scrofula. The underlying causes are probably not the same in all cases. As suggestions, it may be said that affections of the mucous surfaces expose the individual to infection, inasmuch as bacteria more readily penetrate an inflamed or ulcerated membrane, while at the same time the resistance is less effectual on account of the depressing effect which such conditions have upon the system. Some persons appear to have defective blood-making organs, and hence to have impoverished blood and feeble resistance. Others have imperfect digestion and assimilation, etc.

**TUBERCULOSIS.**—This is by far the most important disease of lymph nodes, as it outranks in frequency all other affections combined. Under this title are included all of the glandular conditions heretofore called scrofulous. No region is exempt; every portion of the lymphatic tract is perhaps equally susceptible, but certain groups of glands are affected much more frequently than others because of their greater exposure to infections.

**Frequency.**—Observers have asserted that tuberculous lymph nodes exist somewhere in the body in one-third, or even a larger proportion, of all autopsies. The majority of instances are in the bronchial, mesenteric, and retroperitoneal nodes, which, as a rule, cannot be recognized during life. Of the surgical (external) forms, the cervical nodes outnumber all others in frequency, the axillary nodes stand next, and the inguinal last.

**Age.**—The affection is most common in the first decade of life. From this time on, the proportion of cases gradually diminishes. No age, however, is exempt.

**Sex.**—There is no marked disproportion of frequency in the two sexes.

**Race.**—The negro, as met with in this country, probably exhibits the highest degree of susceptibility to tuberculosis. The Irish immigrants seem to be more frequently affected than those who are acclimated.

**Etiology.**—The bacillus tuberculosis is the cause of the affection. The bacilli find their way into the tissues through abrasions of the skin or mucous membranes and are then taken up by the lymph current and carried along until arrested by the first lymph gland. It must also be admitted that the bacilli may be deposited in the nodes by the blood current, but this mode of infection is probably infrequent.

The lymph nodes of the neck are affected very much more frequently than any other group of external lymphatics. The reason for this is that these drain such an extensive area of exposed surfaces, all of which are subject to pathological conditions which permit the tubercle bacillus to penetrate the tissues.

The more important of these conditions are: eczema of the scalp, fissures of the lips, carious teeth, ulcers of the tongue and buccal surface, various affections of the tonsils, nasopharyngeal catarrh, adenoids, and suppuration of the middle ear. Of these the tonsils are probably the portal through which the bacilli enter the system in the majority of cases. The frequency of tuberculosis of the tonsils has but recently been recognized, and its importance as a means of infecting the individual appreciated.

Tuberculous disease of the nodes of the axilla and

groin, the two other groups of surgical interest, occur as a result of infection passing through lesions of the upper and lower extremity respectively. Examples of the affection in these situations are rare because of the fact that the surfaces drained by these glands are—the hands excepted—well protected and not predisposed to the conditions which favor the entrance of the bacillus. Moreover, the great sources of the infection are the air, the food, and milk. If the mucous membranes of the respiratory and alimentary tracts are normal, the presence of the bacilli probably does no harm; but if abrasions exist, or even if the surface is merely inflamed, they are able to penetrate its layers, from which they are taken up, and carried along, by the lymph current. A chronic catarrh probably so reduces the normal resistance of the epithelium as to invite infection.

An important question, still unsettled, is as to whether the tuberculous infection of the glands is always the primary condition, or whether the glands are first the seat of inflammation, the result of the presence of some other micro-organism, and the tuberculous process is engrafted upon this. It is probable, however, that the disease begins in both of these ways, and, further, that a gland primarily the seat of tuberculosis frequently becomes the seat of a secondary infection. Certain it is that some of the cases appear to be examples of pure tuberculous disease, while others show a mixed or multiple infection.

The means by which other bacteria reach the lymph glands is similar to that described in speaking of tuberculous infection, namely, through lesions of the surface of the body, thence through the lymphatic vessels.

**Symptoms.**—The invariable result of infection of a lymph gland is enlargement; hence a gland which under normal conditions cannot be felt becomes, when diseased, palpable and frequently visible. In the purely tuberculous type the increase in size is commonly the only evidence of the disease, until softening occurs in the later stages. If the infection be due to one of the pyogenic germs, either as a primary affection or superadded to a tuberculous node, there will be, in addition to swelling, local pain, tenderness, and redness of the surface over the gland. In some cases these symptoms come on with great rapidity and marked severity, due either to the virulence of the infecting material, the dose received, or the weak resistance of the individual, or perhaps to a combination of two or all of these factors. In illustration, it may be said that a tuberculous adenitis runs a chronic course and gives rise to but mild symptoms. Adenitis due to the staphylococcus gives rise to moderately acute symptoms, while in streptococcus infection the manifestations are frequently so severe as to justify the term virulent. There is every grade of severity between these extremes. It must also be borne in mind that glands which have been enlarged for some time, but have remained quiescent, may, as the result of a fresh infection, suddenly take on acute symptoms.

A single group of glands are usually affected, especially in the early stages. Occasionally there are multiple foci of disease; particularly is this true in the neck, where it is sometimes bilateral. In the late stages the affection extends from group to group until it seems that all of the lymphatic glands on both sides of the neck are involved.

In very rare instances the whole lymphatic system has been involved.

Constitutional symptoms are usually present in proportion to the severity of the local manifestations. In the tuberculous form there may be but a slight elevation of temperature, while the suppurative cases exhibit a marked pyrexia, accompanied by the usual symptoms of fever—malaise, anorexia, headache, coated tongue, etc.; in other words, the condition is that of a septic infection.

**Course.**—The course of a tuberculous gland tends to destruction by liquefaction. The degenerative process may be very slow, extending over a period of months or years. The glands sometimes remain quiescent for long periods, only to take on renewed activity sooner or later. In some cases there are several attacks of acute symp-



toms, followed by recession before breaking down finally occurs.

Liquefaction is invariably followed, soon or late, by spontaneous evacuation through the skin, or other route, unless the abscess be evacuated by incision. A sinus remains which persists until all of the remaining tuberculous material is discharged, which is usually a long time.

When a number of glands are involved in the same group they may coalesce and discharge through a single tract, leaving but a single sinus; or there may be as many sinuses as there are diseased glands.

Cases which have a secondary infection superadded run a much more rapid course.

Finally, in rare instances, the breaking down of the gland is followed by absorption of the fluid, and spontaneous cure results by caseation and calcification.

**Diagnosis.**—The presence of enlarged lymph glands, without apparent cause, running a subacute or chronic course, especially if situated in the neck, is presumptive evidence of tuberculous adenitis. A tuberculous family history or tuberculous surroundings add strength to this view.

The conditions from which this must be distinguished are:

1. Simple adenitis, if such a term may be employed, but more properly an adenitis in which the dose of poison has been relatively small, and the gland has been able to dispose of it successfully; this form tends to undergo resolution.

2. A pyogenic adenitis. In this affection, which may be of the same type as the foregoing, the poison is present in larger dose; the tendency of the inflammation is toward early suppuration.

3. Syphilitic glandular enlargement will be recognized by the general and symmetrical distribution of the affected glands, especially the post-cervical and the inguinal, by the painless character of the affection, by the presence of other signs, and by the history.

4. Carcinomatous glands, secondary to epithelial cancers of the lips, tongue, etc., must be suspected if such a lesion exists or has been previously removed; hence the importance of inquiry in every case at middle age or later.

5. Glanders and other specific infections not already mentioned will be readily recognized by the presence of the primary focus of disease.

6. Bubonic plague need only be mentioned to put the surgeon on guard if the disease happens to exist in the particular locality, or if the individual has come from an infected district.

7. Lymphosarcoma may be indistinguishable from tuberculous disease of the gland in the early stages. In the later course of the case the malignant character will usually become manifest. It is sometimes proper to remove a gland for microscopic diagnosis.

8. Hodgkin's disease in the beginning presents no distinctive symptoms. It is rare before puberty; three-fourths of the cases occur in men; and the deep chain of cervical glands is apt to be the first affected. Later, the glandular enlargement becomes general, and other signs of the constitutional nature of the condition appear. The glands may be hard or soft to the touch. They very rarely suppurate.

**Pathology.**—See the article on *Lymph Nodes, Diseases of.*  
**Treatment.**—The treatment of tuberculous lymph nodes may be described under the following heads: (1) The prevention of further infection; (2) rest of the part affected; (3) local applications; (4) constitutional treatment; and (5) surgical treatment.

**The Prevention of Further Infection.**—Before discussing the treatment of tuberculous glands something should be said on the subject of prophylaxis. In speaking of the etiology, it was stated that the disease was caused by the absorption of tubercle bacilli from some part of the surface of the body. As the majority of examples of the affection occur in the cervical glands, it will be proper to speak particularly of these. Begin by making a careful examination of every region that might furnish the in-

fection—lesions of the scalp or face, carious teeth, ulcers of the lips, tongue, or cheeks, and particularly disease of the tonsils, nasopharyngeal catarrh, and adenoids. Nothing could be more irrational than to dose the patient with cod-liver oil, iron, etc., and to paint the skin with iodine while he is daily absorbing more germs. Even the effect of sea air and sunshine will prove futile under such circumstances. Therefore first treat the local infection astringent, in order to stop further absorption. To this end, have all carious teeth properly filled or extracted, remove adenoids, treat a nasopharyngeal catarrh, and, above all, restore the tonsils to a healthy condition, or excise them if need be, and then take up the treatment of the enlarged glands.

**Rest of the Part Affected.**—The first principle in the treatment of inflammatory affections is to secure rest of all the structures involved. The more acute the inflammation the more imperative this rule becomes. This course is just as necessary in treating inflammation of lymph nodes as it is in treating inflammation of other structures. For the purpose of keeping the structures of the neck at rest, in cases of cervical adenitis, a kind of "stock" should be worn. This is made of pasteboard and should be cut to fit the particular individual. The two ends meet at the back of the neck. The lower edge should rest on the clavicles, the upper margin is high at the sides, and cut out for the chin just sufficiently to permit the head to maintain a normal position. It need not be high at the back. Having carefully fitted the pasteboard to the neck, and being assured that it is of proper dimensions, the surgeon should have it lightly padded and covered with either white or black silk as preferred, and provided at the back with tapes for tying it in position. It should be worn during the night as well as during the day. If properly made it prevents rotation of the head as well as flexion and extension. In addition to affording rest to the inflamed part it serves to maintain an even temperature of the surface, which is doubtless a factor of definite value. Appropriate means for placing the important structures at rest in adenitis occurring in other parts of the body will readily suggest themselves.

**Local Applications.**—This is perhaps the least important part of this subject. It is probable that many of the local applications in common use are quite inert, while the most efficient have but a feeble influence. Of all the remedies employed the compounds of iodine seem to have best stood the test of time. A very efficient form of exhibiting this remedy is the ointment of the iodide of lead or of iodide of cadmium, or the compound iodine ointment, all of which are official in the Pharmacopœia. The ointment may be well rubbed into the affected region twice daily, covered with lint and waxed paper, and, if the neck is involved, the stock applied. The tincture of iodine is less efficient than the ointment, but may be liberally applied in some of the mildest cases, especially if spread well around the whole area involved.

Ichthyol in ointment (ten to fifty per cent.) or solution (five to fifteen per cent.) is highly recommended by some. The writer does not favor the practice of injecting antiseptic or irritating substances into the centre of an inflamed gland. It does not seem to be based upon a rational foundation, and besides he has not seen sufficient benefit follow the treatment to warrant its employment.

Up to a certain point the tendency of every inflamed gland is to undergo resolution and return to a condition nearly if not quite approaching the normal. If, therefore, the further absorption of poison be prevented and the parts put at rest, the symptoms will subside without any other measures.

**Constitutional Treatment.**—Other conditions being equal, the rapidity of improvement in the cases that undergo resolution will be in direct proportion to the health and vigor of the individual. This is to be explained by the well-known fact that the phagocytes of an individual in robust health are infinitely more efficient in destroying infections than when he is in an enfeebled state. Therefore, as an adjunct to the other measures mentioned, the patient should be instructed to lead a healthful out-of-

door life. The tubercle bacillus is killed by the direct rays of the sun, and it cannot be doubted that the effect of sunlight in increasing the resistance of persons to tuberculous infection is very great. Hence a residence at the seashore, or in the country where the individual may be in the open air all day, is to be advised. The time devoted to rest and sleep should exceed that proper for a healthy individual. Unless some special indication exists, a generous diet is to be advised. If, however, in addition to this, a liberal quantity of milk, not less than a quart a day for an adult, and an abundance of cream and butter be taken, the best results will be obtained. In other words, "forced feeding" is to be practised; at the same time the limits of the patient's digestive power must be carefully respected.

The indications for internal medication are simple. For anaemia, iron or manganese is the sheet anchor. The hypophosphites deservedly enjoy a good reputation. Arsenic given to the limits of toleration is highly indorsed by some writers, and really appears to be of invaluable service in many cases. Cod-liver oil is still very largely employed when the nutrition is poor, and perhaps nothing can be said against this practice if the stomach tolerates it well, although many prefer to administer fat in the form of cream and butter. It has not been demonstrated that cod-liver oil exerts any specific influence upon tuberculous subjects.

If the digestion is poor, pepsin or other artificial aid should be given.

**Surgical Treatment.**—It is frequently a matter of some moment to decide when surgical measures are necessary in these cases. Whenever a gland or group of glands is enlarging rapidly, or when the local signs of inflammation indicate that pus is either present or forming, operation should not be longer delayed. In the absence of these acute symptoms one may safely wait for as long a time as two or three months, during which the other methods of treatment may be given a thorough trial. If at the end of this time there is no improvement, the removal of the affected gland should be advised. During the time mentioned, any increase in the local symptoms would be an indication for operation without further delay. On the other hand, the simpler forms of infection which have a tendency to undergo resolution would have disappeared. Manifestations that remain after this length of time are apt to be due to tubercle, sarcoma, or Hodgkin's disease.

It is impossible to distinguish in the early stages between these three conditions, but it is equally proper to remove the affected glands in either case, for then a definite diagnosis can be made by a microscopical examination.

In operating for the removal of enlarged glands of the neck, the incision should be made sufficiently free to give proper access to the tumor, and at the same time it should be so placed as to produce the least deformity. The usual principles governing surgical operations apply to the solid forms of these tumors. As the majority of these operations will be for tuberculous glands, it should be emphasized that satisfactory results will only follow thorough removal. Before the glands have broken down this will be a task of comparative ease. After abscesses have formed, however, the dissection is much more tedious, and the chance of obtaining a radical cure is much diminished. In neglected cases and those in which early breaking down has occurred, it has been a common practice to incise the fluctuating swelling and treat it as an ordinary abscess. It will be found in many of these cases that the pus comes from a suppurating gland beneath the deep fascia, and that the discharge has worked its way through the latter and has appeared beneath the skin. With this knowledge, it is our duty in these cases, after incising the abscess, to explore carefully in all directions for any evidence of a track leading to a deeper focus of suppuration. If such be found, it must be followed up and treated in the usual way. The deep glands of the neck lie in close apposition to the great blood-vessels, and when the seat of disease they are particularly prone to in-

volve the internal jugular vein. In all operations, the important anatomical structures which lie in apposition with the glands must be kept in mind and avoided if possible. If the internal jugular vein is distinctly involved, a ligature may be applied on either side of the part affected and the section removed. In order to get better access, if the disease is extensive, the sterno-mastoid muscle may be divided and sutured again after the mass has been removed. In the absence of pus these wounds may be closed without drainage, but when suppuration is present suitable drainage must be provided.

Alfred C. Wood.

**LYSIDIN**—ethylene-ethenyl-diamine, methyl glyoxalidin ( $\text{NCH}_2\text{.NHCH}_2\text{.CCH}_3$ )—a reddish-white, very hygroscopic crystalline mass of mouse-like odor and alkaline reaction, is prepared by acting on ethylene-diamine hydrochloride with sodium acetate, and separation by caustic alkali. It is freely soluble in water and alcohol, is insoluble in ether, decomposes silver nitrate, and with ferric, zinc, and mercuric chlorides and iodides forms precipitates which are soluble in excess of lysidin. One gram of lysidin requires for neutralization 5 c.c. normal hydrochloric-acid solution. The drug, on account of its hygroscopic nature, is marketed only in fifty-per-cent. aqueous solution, a pale-yellow liquid with soapy feel.

Lysidin is a near relative of piperazin, and, like the latter, has a noteworthy value in gouty conditions. Goodbody considers it more powerful than piperazin as a solvent for uric acid, and Gompertz, Grawitz, and others give favorable reports of its action. The dose is 2 to 10 c.c. (3 ss.—iiss.) of the solution daily, given with large quantities of water.

*Lysidin bitartrate* is a soluble white crystalline salt of lysidin of about one-third the strength of the latter.

W. A. Bastedo.

**LYSOFORM** is an odorless, clear, yellowish, soapy liquid containing formaldehyde, and miscible in all proportions with water (slightly cloudy) and alcohol. Symanski, to make a comparative study of lysoform with lysol, mixed urine with bouillon, incubated it for three days, and added 0.1 to 1.0 c.c. of lysol and lysoform, respectively, to 100 c.c. Platings were made after twenty-four, thirty-six, and seventy-two hours. In 0.5-1 c.c. mixtures the lysol plates were sterile, while cultures were obtained from all of the lysoform plates; the strong lysoform solutions were about equal in antiseptic power to the weak lysol solutions. Spore-forming anthrax bacilli were killed by two- to three-per-cent. lysol, and by three- to five-per-cent. lysoform. Lysoform had but little antiseptic power on albuminous fluids, but possessed the greatest deodorizing power. Inoculated into mice and guinea-pigs it is very little poisonous. For cystitis, Simmons recommends injections of 10-30 c.c. (3 iiss.—3 i.) of two-per-cent. solution, and for chronic gonorrhœa one-per-cent. Strassmann uses it as a vaginal douche, and in two- to four-per-cent. aqueous or alcoholic solution as a disinfectant for the hands.

W. A. Bastedo.

**LYSOL.**—This is a proprietary preparation of cresol introduced to supersede creolin, the best-known solution of this valuable disinfectant. The advantages claimed for lysol over the other cresol compounds are that it forms a clear solution when mixed with water, contains a greater amount of cresol, and is perfectly free from injurious qualities. It is said to be prepared by dissolving the cresols, which distil between 190° C. and 200° C. in fatty matter and subsequently saponifying by the addition of alcohol. It is a brown, oily-looking, clear liquid, with a feeble, aromatic, creosote-like odor. It is said to contain fifty per cent. of cresol. Its solution forms a soapy, frothing fluid, which becomes turbid only when mixed with hard water, the extent depending upon the quantity of lime salt present; this turbidity increases upon standing for some time. Lysol mixes freely with alcohol, glycerin, chloroform, and benzene.

For surgical purposes it is used in different degrees of