ered with an empurpled integument; its motions are impaired; and distinct crepitus is perceptible on palpation, due to erosion of the cartilages composing the joint. Ankylosis, abscess, destruction of the capsule and the entire joint, or simple impairment of the function of the articulation, with repair, may ensue.

In a second form the process is first instituted in the osseous, periosteal, or medullary structures, which become the seat of gummatous changes resulting in thickening of the two involved parts. The process may result, as shown above, in either rarefying, formative, or eburnating osteitis, so that the digit may be increased or decreased in size, or become softish and cheesy when handled, or as firm as ivory. Ulceration and abscess bursting through the stretched and empurpled skin may lead to the formation of fistulous tracts communicating with bone that is either carious or in process of slow repair. An oval, symmetrical tumor limited to a single phalanx of one or more digital or metacarpal bones, crepitating under firm pressure and painful and tender, is wellnigh characteristic of syphilis. The atrophy of a proximal or middle phalanx as a result of the processes here described, whereby a distal is made to fall upon a proximal phalanx, or the distal and middle phalanges upon the adjacent metacarpal bone, is highly suggestive of the same specific process.

Care should be had to recognize the distinction between these deformities and those due to tuberculosis, paronychia, and gouty or rheumatic affections of the digits. Lepra, the "melanotic whitlow" of Hutchinson, and the lesions of syringomyelia are all to be differentiated.

Syphilis of the Larger Joints.

Pains in the joints as well as in the bones and the muscles are not rare in early syphilis. These sensations do not necessarily imply the existence of a localized lesion of these organs, but they often point to neuralgic conditions due to the circulation of intoxicated blood. At times, without doubt, they are due to the action of mercury administered for the relief of that intoxication in persons peculiarly subject to the action of the metal.

Synovitis and arthritis in syphilis may involve one or several of the larger joints simultaneously, in which case the symptoms *per se* are scarcely to be differentiated from the same symptoms in the subjects of other diseases. The articulations are tumid, tender, painful, and hot to the touch, with limitations in flexion and extension, and evident fluctuation when synovium is effused in a fluid form. Patients thus affected may exhibit pyrexic symptoms; rarely have they been in good health prior to the date of syphilitic infection. As a rule, when examined they are pallid and weak. The termination of the arthritic complication may be by resolution without sequelæ, by ankylosis, or by destruction of important structures in and about the articulation affected.

Pathology.—The synovial membrane is usually in these cases the seat of gummatous infiltration, with well-marked tufts springing from its surface; or the subsynovial structures, the ligaments, the capsule of the joint, the cartilage, and the subchondroid tissue may be involved, with the result of producing eventually thickening, degeneration, or the bursting of an abscess externally, and the formation of sinuses connecting with the joint-cavity.

The diagnosis of syphilitic arthritis is made chiefly by consideration of other symptoms of the disease usually present, as well as by the history of the patient. Strumous, tuberculous, and other systemic affections exhibiting arthritic symptoms may in general be recognized by the earlier age of the patient. In syphilis the knee and the sterno-clavicular and scapulo-clavicular joints are chiefly involved. The hip is very rarely attacked in syphilis. Adult male patients are liable to display these symptoms usually from two to four years after infection.

Syphilis of the Bursæ.

The bursæ may be acutely inflamed, with symptoms of tumefaction, tenderness, pain, sensations of heat, and redness or an unchanged color of the skin over the part; but this complication is rare. More often an insidiously deposited gummatous material accumulates within or about the bursa. In practice the distinction is often well made between a gummatous degeneration of the tissue about a large bursa, later involving and opening into the latter, and a specific primary involvement of the sac. The subsequent career of the lesion, whether after resolution or after degeneration, is practically that of the same process in the skin. When the prepatellar bursa or that over the tuberosity of the tibia is implicated, the disorder has been termed "tertiary syphilitic housemaid's knee."

Syphilis of the Tendons and the Tendinous Sheaths.

The tendons and the tendinous sheaths may be acutely or slowly involved in gummatous processes beginning

either in the teno-synovial sheath or in any of the contiguous parts. The process is usually accompanied by pain, swelling, and disturbance of function. The issue, even after extensive hydrops, is usually complete resolution, but more or less persistent thickening, ulceration, or agglutination of the tendon to its sheath may follow.

Syphilis of the Aponeuroses.

The aponeuroses may be involved in the processes of syphilis, usually by extension of gummatous infiltrations from adjacent tissues. The significance of this lies chiefly in the consequences to the structures with which such aponeuroses are in anatomical connection.

Syphilis of the Muscles.

Myositis occurs in syphilitic subjects in differing forms. It has been supposed that the muscular pains experienced soon after infection in any subject proceed from an "irritative myositis," but, as has been shown, it is probable that these pains are due either to the nerves supplying the muscles, which acknowledge the presence of a special toxine without change in the tissues, or to the special sensitiveness of some patients to the early action of mercury administered with a view to the relief of the disease. In any event, the muscle-lesions in such cases are not yet demonstrated.

In chronic interstitial forms of myositis it has been demonstrated with sufficient clearness that a gummatous infiltration, diffused or in distinct foci, may involve the muscle-bundles, resulting in compression of the latter, with consequent pain, distortion, and even permanent contracture. The ultimate issue as regards the infiltrate is either fatty degeneration and coagulation-necrosis,

ulceration and fistulous connection with the outer integument, or complete resolution with restoration of function.

Progressive ossifying myositis is a rare complication of formative and eburnating osteitis, though it is claimed to have resulted from changes in the central nervous system.

Atrophy of muscles in syphilitic subjects, especially in those who have been its victims for years, is more common than is usually believed to be the case. It may result from (*a*) gummatous involvement of the nerves, the ganglia, or the tissues about the same; (*b*) from gummatous deposits in the muscles themselves; or (*c*) from disuse of the limbs and the body in syphilitic subjects as a result of disease of other organs involving long-continued decubitus, or of life in a wheeled chair (grave ulceration of feet and legs, severe ulceration opening into the knee-joint, etc.).

Syphilis of the Heart.

Pericarditis is a rare complication of syphilis; it results from gummatous deposits in the fibrous tissue or from implication of the pericardia by the extension thither of a degenerative process originating in neighboring organs.

Gummata in the form of distinct yellowish circumscribed nodules may be found post-mortem in the septa and the substance of the heart, usually accompanied by hypertrophy and thrombus. On section these gummata are seen to be non-vascular and composed of a capsule of connective tissue within which lies centrally a sclerotic mass. In the tissue where these gummata have been implanted the muscles are replaced by fibrous bands.

The fibrous myocarditis of syphilis is due, according to Councilman, to an encroaching endocarditis affecting the coronary arteries, as a consequence of which the heart-muscles undergo various degenerations. The sub-endothelial tissue of the heart may be responsible for changes which have been described as a syphilitic endocarditis, in which whitish nodules have been detected along the free edges of the valves, with thickening and induration of the pericardium, shortening of the chordæ, and thrombi of the free surface.

Aneurysm of the Heart.—In a few instances saccular dilatations of the ventricular space, with walls indurated in part and in part thinned, have been recognized post-mortem in the ventricles, one or several of such dilatations being visible in a single subject.

Among all the lesions recognized after death in the heart and the vessels of the subjects of undoubted syphilis, it is difficult to determine which should be described as directly due to that disease, and which to the indirect results of cachexia and to the presence of a chemical toxine engendered by the mutual play of micro-organism and invaded tissue. Without question, some of the conditions described above are the indirect results of specific infection, the direct attack of which has been pursued along different lines.

The symptoms of many of the lesions suggested above are not readily differentiated from those occurring in non-syphilitic subjects. They are for the most part betrayed in disturbances of respiration, præcordial distress, angina, asthma, palpitation of the heart, and other symptoms accompanied by nocturnal aggravation. In the simpler syphilitic affections of the heart the distress is usually paroxysmal, and the general condition

of the patient is one of weakness occurring simultaneously with the cardiac disturbance. Complete relief may ensue under treatment, but fatal results are recorded in a proportion of recorded cases.

Syphilis of the Blood-vessels.

Arterio-sclerosis.—There are two forms of disease to which the title *arterio-sclerosis* has been given. These are the diffuse and the circumscribed (or nodular) forms. Both are due to a primary fatty metamorphosis of the muscular walls, with consequent dilatation of the lumen and compensatory increase of the intima of the vessel, which, as also the muscular overgrowth, may subsequently undergo hyaline or atheromatous degeneration. From these changes aneurysmal pouches may form; and the modern view that all aneurysms not originating in trauma should be suspected to be syphilitic, is in part due to the fact that iodide of potassium has proved of value in so many instances.

Endarteritis Obliterans.—In this special affection there is proliferation on the part of the endothelium of the vessel, resulting in a thickening which eventually involves all the tunics of the vessel, and in an encroachment upon its calibre tending to obliteration. The process is differentiated from the arterio-sclerosis described above chiefly in the production of a neoplastic as distinguished from the purely hypertrophic thickening of arterio-sclerosis. A gummatous periarteritis in which the adventitia and the media are involved has also been observed in both the circumscribed and diffuse forms. The hyaline and amyloid degenerations of the small-sized arteries, as well as the primary changes described above, are encountered as well in non-syphilitic disease.

Here, as in syphilis of the skin, the mode of involvement rather than the lesion is characteristic of syphilis. It is the recognition of several necrotic points with restriction of the lumen of the vessel by thickening of the intima that suggests the nature of the process in any given case.

Syphilis of the Lungs.

The great difficulty in discriminating between gummata of the lung and tubercles of the same organ has up to the present obscured the characteristic features of syphilitic disease. Gummata occur as firm, often quite dense, whitish, grayish, or reddish-gray nodules, set in consolidated lung-tissue, and varying in size from a split-pea to that of a small egg. They are built up of granulation-tissue; they degenerate rapidly by caseation, fatty metamorphosis, and central necrosis. Fibrous trabeculæ pass from the outer envelope of the mass toward its centre, as if to produce lobulation. These lesions are found in the posterior and lower lobes of the lung oftener than in its apices, furnishing thus a valuable diagnostic difference between syphilis of the lung and the apical disorders of early pulmonary tuberculosis (*Spitzenkatarrh*). Diffuse infiltration of gummatous material in the lungs is characterized by the consolidation of a smaller or larger area, as the result of accumulation in the alveoli of an epithelio-fibrinous exudate, or from a new growth of connective tissue. On section the lung closely resembles the condition seen in simple pneumonia, its substance being firm and in color grayish and reddish. Under the microscope the connective tissue is seen to extend from the blood-vessels into the thickened alveolar parietes, almost obliterating the alve-

oli or changing them into narrow clefts with epithelial linings. The absence of leucocytes is conspicuous. Councilman, who amply illustrated this subject, describes this condition as a "true syphilitic pneumonia."

Gummatous Fibrosis of the Lung.—In this condition the tissue about the bronchi and the arteries undergoes a fibrinous metamorphosis to the point of production of thick, cord-like radiations spreading from the root of the lung toward the pleura, inducing later, by contracture, both emphysematous and atrophic states of the constricted pulmonary tissue. Along these fibrous bands are set gummata of usual type which may degenerate by ulceration. Irregularly alternating points of constriction and dilatation of the bronchi produce the symptoms of bronchitis of non-specific type—evolution of pus-cells with thickening and erosions of the mucous surface.

Ulceration in the lungs, with the consecutive formation of cavities, as in pulmonary tuberculosis, has been both affirmed and denied as of occurrence in syphilis. There is good reason, however, to believe trustworthy the recorded cases in which cavities have been found, communicating or not with bronchi, surrounded by firm cicatricial tissue, and associated with other symptoms of that disease in unquestioned subjects of syphilis.

Diagnosis.—The discovery of tubercle bacilli in any case is of the greatest value in establishing a distinction between syphilis and tuberculosis of the lungs. The physical signs of consolidation, dyspnœa, and cough are in the two usually similar. We have seen severe hemorrhage, even to the point of fainting, with perfect recovery. The chief important points are the localization of the disease in syphilis (as already shown); an apparent limitation of all symptoms, in certain cases, to the chest; the remarkably good thoracic development and general physique of the subjects of the disease; the frequent absence of fever; and the marked dyspnœa of some of the affected.

Syphilis of the Gastro-intestinal Tract.

Syphilitic lesions of the œsophagus are known only in the report of a few isolated cases, upon which some doubt rests in consequence of their great rarity. Of cases in which the stomach is reported to have been involved, though the recorded instances are somewhat more numerous than of œsophageal invasion, but little is known of any characteristic symptoms. Gummatous infiltration of the mucous and submucous tissue is supposed to be responsible for areas of definite outline where at one or more points thickening and subsequent ulceration have occurred. Syphilis of the intestinal canal is rarely encountered save in the ano-rectal pouch. Its lesions are due to gummatous deposits, either diffuse or in localized points, the latter often corresponding with the sites of the agminate glands. The results are seen in fibrous thickenings and dense infiltrations, with ulceration at one or several points. Often there is coincident peritoneal adhesion and serous effusion.

Syphilis of the Liver.—Gummata are not rarely found in the liver of the subjects of syphilis, where they appear as few or numerous grayish-red and grayish-yellow nodules lying near the capsule or deeply set in the substance of the organ. When lying near the superficies they usually induce contracture of the hepatic capsule, which is also often thickened and attached to the

adjacent organs. The nodules are composed of connective tissue, which undergoes a metamorphosis into dense cicatricial bands appearing, when they are fully developed, to divide the hepatic mass into lobules. Centrally the nodules undergo softening and necrosis, due to obliteration of the vessels which supply them. Most observers agree with Virchow, that there is also a fibrosis affecting the syphilitic liver, not due to gummatous deposits. In these cases fibrous bands stretch from the capsule in many directions, compressing the hepatic substance between the divisions thus artificially produced, which are further intersected by lesser striations of fibres passing from the larger bands. The effect is very like the shrunken condition of the gland occurring in cirrhosis. As a sequence of this and also of the other changes noted above, amyloid degeneration both of the walls of the hepatic vessels and of the liver-cells themselves may occur. Calcareous metamorphosis is rarely seen, and ulceration is of rare occurrence. We have noted a single case only in which an adult within the first year of infection died apparently as the sole consequence of syphilis of the liver. This organ was stuffed with gummata to an extent interfering seriously with the performance of its function.

During life it is rare that any symptoms are displayed sufficiently distinct to point unmistakably to hepatic involvement. Icterus is by no means rare in syphilis, especially in its early months; there can be little question, however, but that the symptoms may be wholly due to functional derangement of the liver. Pain and tenderness in the hepatic region, and ascites, may or may not be present. There are no signs absolutely diagnostic of hepatic disease in syphilis.

Syphilis of the spleen and of the pancreas is exceedingly rare. When unmistakably involved, the spleen may be large and soft, as in non-syphilitic affections, or enlarged and indurated from fibrosis, or affected with diffuse, yet more rarely circumscribed, gummatous deposit. As usual in splenic enlargements, when voluminous as a consequence of syphilis, the organ is usually many times its normal size.

When the pancreas is attacked, the lesions of syphilis are usually found in and about the head of the gland, which, like the spleen, may be either enlarged or dense and contracted. In the latter event the acini are firmly compressed, as in the case of the hepatic cells of the liver, by an interstitial overgrowth, corresponding with the condition of fibrosis found in the spleen. Circumscribed gummata of this gland are rare, but they have been noted in both large and miliary-sized nodules.

Gummatous changes of the suprarenal glands have been reported in a few instances. The affection may be said, however, in consequence of its great rarity, to be a pathological curiosity.

Syphilis of the Rectum and the Anus.

Chancres of the anal region are apt to be ignored in consequence of the fact that physician and patient do not usually suspect the nature of the trouble. In our experience these lesions, as distinguished from the soft chancres of the anal region occurring in women, are more common in men, and result usually from practices against nature. These initial scleroses are often supposed to be "piles," of which complaint is usually made. Split-pea-sized and firm papules are then visible, usually one only, just beyond the anal verge, and the