

of the vaginal walls. In some of these cases the finger can with great difficulty be introduced into a channel through which viable infants have been ushered into the world. Irregular projections of the inextensible vaginal membrane, club-shaped, knobbed, granular, eroded, or ulcerated, represent points where the larger submucous gummata are undergoing extreme development or ulcerating. These lesions break down more frequently and more disastrously than do the gummatous metamorphoses of the labia. Occasionally the ostium vaginae is converted into a vast gummatous ulcer, invading the vestibulum and even the urethra. In severe cases the rectum participates in the change.

The neck and body of the *uterus* exhibit more rarely and to a much less marked degree similar changes; induration, tumefaction, erosion, and ulceration of the mucous lining are reported by authors.

The Fallopian Tubes and Ovaries.—Lancereaux and Lecorché, respectively, have reported instances of diffuse and gummatous changes in the ovaries. In the case reported by the first-named author, there were two egg-sized tumors with long diameters parallel with the broad ligament. Bouchard and Lepine, quoted by Jullien, describe a single case of syphilitic salpingitis.

The kidneys undergo changes both in early and in late syphilis. The phosphates and chlorides may be unchanged in the urine; urea may be quantitatively in excess, and albumin occur in quantities as great as in Bright's disease. Severe albuminuria following syphilitic changes in the kidney and even extensive anasarca following may be satisfactorily relieved by treatment. Glycosuria has appeared and disappeared under precisely similar circumstances in syphilitic subjects. By some authors, these several conditions are claimed to be the results simply of the cachexia which may affect syphilitic as well as non-syphilitic patients, producing thus the amyloid, waxy, and other metamorphoses recognized in other cases. Without denying the possibility of such accidents, the striking fact remains that some of these cases bear the special imprint of syphilis in that, after the exhibition of alarming symptoms, a complete, rapid, and permanent recovery may ensue after energetic treatment by mercury and, more often, by the iodide of potassium.

Syphilitic sclerosis and gummata of the kidney are late lesions of syphilis, and of rare occurrence, the last named being decidedly the rarer of the two accidents. In the diffuse form of syphilitic nephritis there is usually a cycle of vascularization and tumefaction of the cortical portion, followed by interstitial proliferation, attachment of capsule to cortex, and formation of irregular, small, or large nodules and projections from the surface, the exterior gross appearances of which suggest the similar lobulations of the syphilitic testicle. In some places these undergo lardaceous, amyloid, and other degenerative changes resulting in cicatrices. Precisely as the seminiferous tubules of the testicle are choked and eventually reduced to atrophy, the glomeruli and uriniferous tubules of the kidney may be compressed, their channels obliterated, and their functions arrested. Here and there, on section, yellowish points or streaks of fatty metamorphosis are visible upon a granular surface; or the totality of the organ may be changed to a dead-whitish color.

Gummata of the kidney are developed in both the cortical and the pyramidal portions. They are single or multiple, grayish or whitish, definitely circumscribed masses, from the size of a pinhead to that of a pigeon's egg, with a whitish or reddened and vascular, fibrous envelope like a capsule. The centre is firm or cheesy, according to the age of the gumma; and the body of the lesion is made up of elements derived by proliferation from the connective tissue of the renal stroma. The subjects of these several complications of syphilis may suffer from vague pains, changes in the eye, peritoneum, pleura, and nervous centres, as well as ascites, anasarca, lumbar pain, hæmaturia, and albuminuria. The prognosis is decidedly less grave than in non-specific renal affections of similar type.

THE NERVOUS SYSTEM.—Affections of the nervous system may be early or late symptoms of syphilis, and are commonly the results of morbid changes in contiguous structures, such as bone, vessel, or investing membrane. They are much more common in men, chiefly because of the greater tax levied upon that sex in the demand for physical and mental strain.

The literature of nervous syphilis, most of which has been contributed during the last twenty years, has been both voluminous and valuable. In the following paragraphs it will be possible merely to trace the outlines of the important advances which have been made in this special field. The clinical pictures presented may be briefly named as follows:

Headache, insomnia, and irregular performance of functions of many of the organs of the body (eye, ear, heart, muscle, liver), dependent upon nervous disturbance, are not infrequent in the early periods of syphilis. The headache of this stage of the disease is often persistent and obstinate. It may be frontal, temporal, or occipital in situation, and of the moderate grade from which few infected subjects are wholly exempt, or severe, with intense nocturnal exacerbation, eliciting groans from the sufferer. This distressing complication of the disease may endure for only a few days, or last for weeks or months, proving eventually a mere precursory symptom of cerebral syphilis. Without question these symptoms are often recurrences or exaggerations of morbid states existing previous to infection by the subjects of hysteria, alcoholism, other cerebral affections, and epilepsy. Mild nervous manifestations may be recognized, including anaesthesia, analgesia, circumscribed hyperidrosis, and hypertrichosis, and cutaneous sensations of coolness, heat, formication, and tingling. Many of these features are such that the pathological changes on which they depend are necessarily unknown, or can be estimated only by reasoning from analogy. The supposed cerebral syphilis *sine materia* has for its basis only the non-recognition of structural changes where autopsies were made after the exhibition of well-marked nervous symptoms. In such cases, the possibility that the actual physical basis of the morbid phenomena was simply not discovered cannot properly be ignored.

When a patient is actually affected with cerebral syphilis, the unmistakable features of the accident, as indicated above, often follow the milder symptoms. The headache, which was at first simply annoying or tolerable, sets in with paroxysms of distress which make the patient dread the hours of the night as a period of torture. Constant or intermittent grinding, boring, or hammering sensations are referred to the whole or any one of the regions of the head described above. The patient becomes eloquent in declaring that the head feels as if it were screwed in a vice, riveted with iron bands, hammered upon an anvil, etc. Under treatment even this condition may yield in a few days, or, defying all skill (a rare complication), go on to the extreme conditions described later. At times definitely circumscribed regions of tenderness may be appreciated by both patient and physician, the latter by the pain evoked in percussion of the cranial vault. Insomnia, vertigo, intellectual hebetude, apathy, melancholia, and other morbid mental states, photophobia, and marked cachexia are the usual concomitants of this state. When the disorder progresses uninterruptedly to full evolution, the patient becomes weaker, takes to the bed day and night, may exhibit some mild ataxic or parietic symptoms, usually goes into delirium, and presents the picture of one affected with utterly hopeless cerebral disease. Yet here, as so often in the history of this singular malady, he is really far from such a hopeless state, and thus furnishes the diagnostician with a clew to the syphilitic origin of the disease. Such a patient, properly treated, may rise from his bed, regain his flesh, return to his occupation, and live out his natural days, so far as regards the disorder under consideration.

Many odd features may be presented in the course of this complication. There are patients thus affected who

present singular hallucinations; yet others suffer from vague terrors, dreading self-destruction or attacks from enemies.

Chorea, or at least choreic symptoms, may be recognized in some patients of this class. Spasmodic contractions may affect one or a group of muscles, either before or after the occurrence of paralytic symptoms, or independently of the latter. There may be slight, severe, transitory, remittent, or constant contractions of muscles of the head or extremities. A persistent, rhythmical swaying of the head from side to side may last during the hours of wakefulness for a fortnight.

Aphasia, partial or complete, continuous or intermittent, often of sudden onset, may be the sole symptom of nervous syphilis, or occur before or after some of its grave complications.

Paralysis, sensory or motor, partial or complete, usually succeeds a prodromal stage in which the patient has complained of obstinately persistent headache or some other premonitory symptom of cerebral disorder. The paralyzes of the motor muscles of the eye belonging to this group of disorders have been already described. In a similar way the nerves of special sense, not only those of vision and hearing, but also those of olfaction and gustation, are totally or partially deprived of sensitiveness to external impressions.

Hemiplegia, occurring suddenly in a patient under fifty years of age, is, in the great majority of all cases, of syphilitic origin. It may be of early or late, sudden or gradual occurrence, and constitute a mere paresis of a group of muscles on one side, or, much more rarely, a complete motor paralysis of one-half of the body. It is usually preceded by cephalalgia, vertigo, lassitude, and neuralgia, with anaesthesia or tingling of the parts about to be affected, or mild choreic, rarely convulsive, seizures. Usually, after well-marked prodromal symptoms have been exhibited for some days or weeks, the patient awakes from sleep to find himself more or less unable to move one or both limbs of one side; or the attack comes on in the hours of the day, the patient falling to the ground in a state of partial unconsciousness. The leg only is most commonly affected; at times it is followed by involvement of the arm. Rarely the arm alone is affected. The bladder and rectum may participate in the resulting symptoms by loss of power to expel their contents. Alternate paralysis of the facial muscles is occasionally noted, e.g., the right leg and the left side of the face. There may be dilatation of the pupil of the eye on the sound or affected side, with or without ptosis and involvement of the oculomotorius. With these symptoms are occasionally associated total genital impotence, which may even survive the paralytic symptoms in the extremities, muscular tremors, and contractures. Sensory disturbances are few; rarely there is complete sensorimotor loss. The affection is commonly attributed to an obliterating endarteritis. The prognosis in most cases is favorable as respects the preservation of life, but restoration of the function of the paralyzed organ is rarely complete.

Epilepsy is simulated in syphilis, under the influence of which epileptiform seizures occur. They are far rarer than hemiplegic complications. With or without premonitory sensations comparable to those experienced in the aura, both the *grand mal* and *petit mal* are represented in syphilitic seizures. There is, in the first case, the usual precursory severe cephalalgia, followed by distressing sensations in the extremities or about the heart, or singular creeping sensations of chilliness. Jullien insists that during these attacks the patient, even if unable to speak or to move, never wholly loses consciousness and never utters the cry, an important diagnostic distinction.

The patient may fall as if shot, and exhibit tonic, followed by clonic, convulsions during a portion of the time, but rarely throughout the whole period occupied by a seizure. These convulsive movements do not notably affect all of the muscles of the body. The patient may foam at the mouth and bite the tongue or lips, though often, with marked convulsive seizures, these

symptoms are absent. The intervals between these crises may be but a few hours, or days, or several weeks. They tend to multiply with each recurrence, and may result in dementia.

The *petit mal*, or mild form, is betrayed in tremors, spasms of the muscles, for example, of a single limb, or of the neck, or of one shoulder; dyspnoea, dysphagia, or vertigo. Other patients experience sudden loss of memory, or imperception of environment, confusion of ideation, and incoherence of speech.

Paraplegia is, in more than fifty per cent. of all cases occurring in male patients under forty years of age, of syphilitic origin. Over ninety per cent. of cases of syphilitic paraplegia occur in males. There may be precedent cephalalgia of extreme violence, rachialgia, neuralgia, convulsive seizures of the muscles of the lower extremities, and hyperaesthesia or anaesthesia of the cutaneous surface. The paraplegia may be partial or complete, and sudden or gradual as to occurrence, but, as Althaus indicates, is unaccompanied by loss of consciousness, the patient often "assisting" at the invasion. It is apt to terminate in complete loss of power of both lower extremities, with and without sensory disturbances, partial paralysis of rectum and bladder, and complete impotence, lasting often for years. One side of the body may be involved after the other; or the same side may be again affected after an interval of months has elapsed. Paralysis of cranial nerves, mental hebetude, mydriasis, and other signs of syphilis of the nervous system may be present, but are often absent; and when the paraplegia is complete this may be the sole objective symptom of the infective disease.

Tabes is an affection the precise etiological relations of which have been the subject of no little careful study and discussion. By Fournier the disorder is classed with a group of morbid conditions named by him the "parasyphilitic affections." It is now fairly well established that between seventy-five and eighty per cent. of cases of locomotor ataxia occurs in syphilitic subjects, chiefly male patients; and the symptomatology, pathology, diagnosis, and prognosis of this affection, as detailed in the treatises devoted to the subject, belong to the domain of syphilis. None the less it is to be admitted that, in the minority of cases represented by the percentages given above, the disease occurs with classical features in persons who have never contracted syphilis; and further that, as in the other affections of the group described as "parasyphilitic," there is little if any amenability to antisiphilitic treatment. In the syphilitic affections of the cord, the well-defined sclerosis of the posterior columns which is characteristic of progressive spinal ataxia is not readily recognized.

Syphilis rarely selects a definitely limited portion of the cord for its manifestations, but involves here and there a patch in the columns, near which can commonly be recognized altered vessels or investing membranes where the morbid process originated.

GENERAL PARALYSIS of the insane (*"Délire des grands"*) is to-day by most modern authors placed in the category of affections described by Fournier as "parasyphilitic." It occurs in the victims of former syphilis, in almost the same proportion as does tabes; and, like that disorder, is singularly uninfluenced by antisiphilitic treatment. Due weight can be given to the argument that these are "parasyphilitic" rather than syphilitic disorders (by reason of their admitted failure to respond to energetic treatment of a syphilitic involvement) when attention is drawn to the significant fact that a group of other admittedly syphilitic changes are to the same slight degree influenced by an appropriate therapy; as for example, the pigmentary syphiloderma, monolateral mydriasis, hemianopsia, etc., all syphilitic in origin.

Jullien calls attention to the fact that the syphilitic patient supposed to have general paralysis is really ill (cachectic, anæmic, or adynamic), while the "real fool," on the contrary, exhibiting moral decrepitude, stupid facial expression, and perturbed cerebration, appears to be otherwise in good physical health. The

former, moreover, is apt to display one or more of the syphilitic paralyses following a characteristic vertigo, hemicrania, or a cephalalgia, or some one of the ocular or aural complications of syphilis, in brief, at capriciously selected points where nervous symptoms are displayed. This also is associated with a milder exaltation of ideas and a more rapid evolution of symptoms.

Other symptoms of nervous syphilis are exhibited in gastro-intestinal derangements (vomiting, etc.), in functional disturbances of the kidneys and bladder, and in disorders of other viscera.

Coma, preceded by cephalalgia, anaesthesia, mental hebetude, or aphasic symptoms, may occur during sleep or result from sudden diurnal accidents. The patient is usually found lying listless, or apparently asleep, pallid, expressionless, and not suffering pain. He may be roused to take food or drink, to thrust out the tongue, or even momentarily to recognize a friend or answer a question. The pupils are usually contracted, insensitive to the light, and covered by the lids. The globes are shrunken in the orbits. Sensibility and reflex excitability are either wholly preserved, impaired, or lost. The pulse and respiration are retarded in frequency, the temperature is subnormal, and the excretions are passed unconsciously.

The pathology of these several complications of syphilis is explained chiefly in post-mortem examinations.

The cranial and other bones, when involved in an ostitis or periostitis (diffuse, circumscribed, gummatous), may produce nodes capable of explaining etiologically several of the groups of symptoms described above by pressure effects, including inflammation and even destruction of the parts invaded. Nodes of the internal tables of the cranial vault or of the vertebrae may thus be responsible for mental, parietic, paralytic, convulsive, neuralgic, and ataxic symptoms of the most varied character. Well-defined cranial nodes in the outer table also of the skull are, as the result of sympathetic influences, capable of producing many of the milder symptoms of nervous syphilis.

The meninges of the brain (dura mater, arachnoid, pia mater) are subject to the same involvement. They may be changed by pressure of a node, and be agglutinated to it; or may be separately involved in diffuse or circumscribed, single or multiple thickenings, due to proliferation and vascularization of the tissues (pachymeningitis). The lesions may be symmetrical or asymmetrical, and involve the brain more often than the cord. These changes are capable in various degrees of producing cephalalgia; and at times a distinct area of meningeal surface may be recognized as the seat of the severe headache of syphilis, with intense nocturnal exacerbation, by pressure or percussion with the finger over a limited region of the skull—a manoeuvre which decidedly increases the pain.

The brain and medulla are always involved as a sequence of changes either in the bones, meninges, or vessels in anatomical relation with those organs. The softening which results may be either of the red or white forms of *ramollissement* recognized in non-syphilitic cerebral disease. Gummata of the brain may be single, or usually multiple, occasionally exceedingly numerous, circumscribed or diffuse, superficial or deep tumors, from the size of a millet-seed to that of a small egg. They most often exist as superficial lesions in direct association with gummatous changes in the meninges. They have a well-defined yellowish or whitish cheesy centre, with a firm, sclerotic, peripheral mass set in vascularized and greatly softened nervous tissue. Evidences of simple inflammation in the brain substance, excited by the irritating presence of the neoplasm, are usually to be recognized, and are described by Jullien as distinctive marks of a cerebral syphiloma, inasmuch as the brain substance tolerates with greater ease the softer nodules of tuberculosis. The deep-set lesions are much rarer, but are recognized, for example, in the substance of one ventricle, in the optic thalamus, the corpus striatum, or the white substance of the cord.

The arterial changes, responsible for so many of the

nervous complications of syphilis, are of frequent occurrence, and may be primary or consecutive in order—that is, they may be the original and immediate cause of cerebral disease or the sequence of changes induced by a neighboring gumma or pachymeningitis. Heubner, Greenfield, Hutchinson, Dowse, Dreschfeld, and others have chiefly contributed to the present knowledge of this interesting subject. The small arteries are most often attacked, symmetrically at times as regards the two halves of the brain, in distinctly limited areas, where whitish points or nodules become visible to the naked eye. Longitudinal section of vessels thus implicated reveals an obliteration wholly or in part of the lumen of the vascular tube, due to thickening of the inner coat; the middle, clearly defined, being scarcely affected (endarteritis obliterans). The adventitia is doubled or trebled in volume, its cells under the microscope being exhibited as long, parallel, fusiform elements. The obliteration of the lumen, however, is chiefly due to a cellular proliferation between the endothelial lining of the vessel and the fenestrated membrane, resembling a granuloma in appearance. Externally and internally are flattened or fusiform cells, arranged more or less regularly in parallel lines, between which are more irregularly and loosely packed larger cells, mingled with minute fibres of elastic tissue and the vasa vasorum. The endothelium is then finally separated from the membrana fenestrata, and projects into the lumen of the vessel as a vegetation, occasionally forming a second fenestrated membrane on the sides of the vessel wall. In this way complete stenosis of the tube is eventually produced—an accident rare in atheroma, in which the cellular proliferation is more indolent, more generalized, more disposed to terminate by calcification, and never results in complete obliteration. These accidents are often the causes of the severe headache, vertigo, chorea, epilepsy, and other of the nervous phenomena noted above.

It is by the production of thrombosis or cerebral ischaemia that the arterial stenosis operates to induce the derangement.

A syphilitic periarteritis is described by a few authors (Charcot, Rabort, Bumstead and Taylor), in which circumscribed, lenticular, whitish masses of irregular shape result from an endarteritis affecting the external coats of the vessel, with proliferation also of the media and internal coat. The internal elastic tissue is reported intact, with round-celled infiltration of the muscular layer, and multiplication and dilatation of the vasa vasorum.

The cerebro-spinal nerves may suffer compression by an osseous or meningeal lesion of syphilis sufficient to produce a series of symptoms ranging from formication, hyperaesthesia, and moderate numbness to complete anaesthesia, analgesia (rare), or paralysis. The derangements of vision induced by syphilitic changes in the optic nerves supplying the muscles that move the globe of the eye have been already considered. In a similar way, the olfactory, sympathetic, and other nerves may be implicated. Petrow, in the cases examined by him in which the sympathetic nervous trunks were involved, recognized a pigmentation of the cellular protoplasm, attributed to the deposit of haematin in the nervous cells. The endothelial elements were proliferating and surrounded by polygonal nucleated cells, some undergoing colloid metamorphosis. These nervous elements were compressed by an hyperplastic connective-tissue growth, undergoing later sclerosis, and eventually starving the nervous elements into atrophy. The membranous envelope of the latter, after undergoing hypertrophy, may be the seat of fatty metamorphosis.

The treatment of the nervous complications of syphilis is that of the disease in general. The credit of employing large and progressively larger doses of the iodide of potassium in all serious emergencies, with brilliant results, is largely due to American practitioners. The best and simplest way of attaining the end is to administer drop doses of a saturated aqueous solution of the potassium or sodic iodide in a gobletful of water or milk every four hours, beginning with a relatively small dose, five

to ten drops (0.33-0.66), and pushing on by increasing one drop each dose until the end in view is reached. By this means one ounce and a half (48.00) of the iodide may be given in twenty-four hours, with happy effect; and still larger doses have been reached by others. The pepsin, pancreatin, or takadiastase solutions may be employed at times with great advantage as vehicles for the administration of the salt. The rule should be to stop the increase at once on the supervention of any toxic effects or marked symptoms of physical protest against the large dose; to then hold at a given point, or to reduce the dose to a point of complete toleration, and to recognize the fact that after the extreme point of toleration has been fully reached, perhaps slightly surpassed, and for a moderate length of time held, further medication of this sort, in the absence of the definite and brilliant results usually attained by its adoption, is useless and in cases harmful. In the absence of such desired results, mercury in full doses (e.g., calomel gr. $\frac{1}{16}$ [0.0066] every hour or two in any serious emergency) may prove of inestimable value.

The prognosis in syphilis of the nervous system, even in the face of apparently desperate peril, is far more favorable than in the case of nervous symptoms of similar import occurring in those who are not the victims of that disease.

MUSCLES, TENDONS, AND ARTICULATIONS.—Muscular contracture is described by a number of authors as a syphilitic accident occurring slowly or rapidly, and producing fixed flexion or extension of any movable part to which the tendon of the muscle is attached, the latter, on palpation, being recognized as a rigid and inflexible cord. The joints are not in such cases involved. One or several muscles may be attacked, the biceps being that most commonly affected, the forearm being then flexed at an acute angle upon the arm. The involved muscle may and may not be then the seat of pain and tenderness. A tetaniform involvement also of a much larger number of muscles is described as of occurrence in syphilis.

In the diffuse form of myositis occurring in syphilis, there is diffuse swelling of the whole or a part of a muscle, some redness and oedema of the overlying skin, and pain when the muscular fibres contract. Gummata of the muscles are small, at first firm, later softish, usually globular masses, from the size of a nut to that of an egg, of insidious development, and often, when in process of disintegration, attached to the skin and undergoing the cycle of changes already described in connection with the ulcer resulting from subcutaneous gummata. It is believed that the sheaths of the muscle-bundles are first involved in these changes. They undergo, in some instances, osseous and cartilaginous metamorphoses instead of disintegrating.

The tendons, tendinous sheaths, and aponeuroses may become in syphilis the seat of flattish, triangular, circumscribed, and usually painless tumors, due to effusion in the serous sacs; or to projecting gummata which may break down and ulcerate, leaving a cicatrix the contraction of which may subsequently interfere with the function of the muscle to which such a tendon or aponeurosis is attached. Diffuse gummatous thickenings also affect the fascia and aponeuroses, more particularly those of the lower extremities.

In gummatous syphilis the bursae are not rarely affected, more particularly those of the patella and of the tibial tuberosity. They begin as single, painless or slightly painful, firm, elastic, or softish gummata, from the size of a nut to that of an egg, which are apt to involve the skin eventually, and to be obstinate under treatment.

Syphilitic rheumatism (arthralgia, pseudo-rheumatism) may be an acute, more often a subacute, polyarthritism with tender and painful points about the articulations, preceded often for days by arthritic pains, as distinguished from simple rheumatism. This complication is remarkable for the failure of acuity in the symptoms, the relative painlessness of the affected joints, the absence of articular swellings (*arthritus sine materia*), and the nocturnal exacerbation of the pain. Hydrarthrosis, most

commonly symmetrical and of the knee-joints, though also mono-articular, is both an early and a late symptom of syphilis, and is chiefly remarkable for the extent to which the joints may be distended with synovial fluid, and be yet sufficiently free from pain to permit of performance of their function. It often recurs and disappears for several weeks at a time. The so-called "syphilitic white swelling" is due to fibrous thickenings and subsynovial gummatous infiltrations in and about the joint. These synovial effusions chiefly occur in the subjects of cachexia, or male patients of fragile constitution.

The fingers and toes may be the seat of early and late syphilitic lesions, and in both acquired and inherited syphilis. To Dr. R. W. Taylor's researches we are indebted for a knowledge of this interesting subject, to which merely a brief reference can be made in these pages.

The affection is more common in hereditary than in acquired disease. In the former the disease may begin in the subcutaneous connective and fibrous articular tissues, or primarily in the osseous and periosteal tissues, and consecutively invade the other structures named. The digit affected, either in one or in several phalanges, enlarges insidiously, becomes dense, painful, inflexible, with attached overlying and purplish-red skin. Sometimes an articular hydrarthrosis can be detected; again, one or more of the symptoms resulting from gummatous infiltration. These gummatous deposits are circumscribed or diffuse, and not prone to ulcerative degeneration. Specific dactylitic osteomyelitis, periostitis, or osteoperiostitis may be a slow, rapid, or relapsing accident, producing in full evolution a balloon- or acorn-shaped, globular, or pyriform swelling, involving one or several phalanges of a single digit, usually the proximal, and more often those of the fingers than of the toes. As sequelae, may be enumerated inflammatory changes with abscesses discharging a caseous matter, crepitation from roughness of the articular faces of the cartilages, the formation of sinuses, hydrarthrosis, and osseous atrophy after resorption of the gummatous deposit, leaving the shaft of the phalanx more slender and fragile than before. In other yet more marked cases the phalanx is reduced by shrinkage till the finger is shortened one-third or one-fourth of its length. The resulting deformity is conspicuous, and almost peculiar to the special disease under consideration.

Cartilages and bones are attacked in both early and late forms of the disease. The most common form of bone disease is an osteoperiostitis characterized by inflammatory phenomena, vascularization, and exudation, diffuse or circumscribed, of the area of contact of the osseous and periosteal surfaces. The result is declared in the formation of well-defined, rarely poorly circumscribed nodosities in various degrees sensitive, and usually the seat of a characteristic pain, intensely, often intolerably, aggravated at night after retiring to bed. Absorption may result or, much more rarely, degeneration and exfoliation of a thin lamella of bone. In other cases an exostosis results from a plastic effusion between the periosteum and bone, usually circumscribed and flattish, globoid, annular, sessile, or pedunculated, which may undergo eburnation and exhibit compact or cancellated tissue in its structure. When the bone has been infiltrated with a gummatous material which degenerates, it is usually the epiphysis which is the seat of the disorder, though the medulla (osteomyelitis) and bony substance, or even periosteum and bone, may be involved. Ulceration may then leave a roundish cavity, from the size of a pea to that of a nut, possibly communicating with the medullary canal, filled with a bright yellowish pulp; the faces of the cartilages become the seat of salient granulations and depressions (scars?), the size of millet-seeds. At times the diaphysis of the bone is first attacked and the epiphysis secondarily. Often the synovial membrane remains intact.

The "dry caries" or "inflammatory atrophy" of Virchow is a change beginning with vascularization, but