for the most part in an iritis. (2) An interstitial, or parenchymatous, scleritis may present the features of an inflammation of the organ, or of a gummatous deposit, or of infiltration within its substance, which, following the rule in similar involvement of other organs, may undergo resolution, or degenerate into an ulcer with irregular edges, and softish, grayish floor. When the cornea also is implicated, one sees a characteristic conical area of corneal opacity, its base resting upon the involved sclera, its apex projected forward to the centre of the cornea.

Iritis.—More than one-half of cases of iritis are of syphilitic origin, the proportion ranging between sixty and eighty per cent. of all cases. It is not only a common complication of the disease, but, as regards the loss of vision, one of the most disastrous. The symptoms of specific and non-specific inflammation of the iris are, taken *per se*, indistinguishable. Three forms are to be recognized: simple plastic, serous, and parenchymatous. The two first named belong to the earlier period of the disease; the last is due to a gummatous infiltration of the organ. The disease is commonly unilateral in situation at the outset, but in fifty per cent. of all cases ultimately attacks the other eye. It occurs most frequently at the average age of the syphilitic subject—that is, in early adult life; and is much more frequent in men, by reason of the greater exposure of the eyes of the male to the accidents incidental to the trades and occupations of life. Iritis is decidedly more frequent when special conditions in the environment of the patient favor the occurrence of the disease, as, for example, when the eye is exposed to the radiation of light from newly fallen snow in winter. Simple plastic iritis is the condition in which there is, first, hyperæmia and later a plastic exudate from some portion of the iris with proliferation of the connective-tissue elements. It may be so slight in its symptoms as to escape detection, and be then accompanied by mild photophobia and vascular injection. In other cases the symptoms are marked and distressing. There is distinctly pericorneal vascularization, sometimes subconjunctival œdema. The large, mobile, tortuous, brick-red conjunctival vessels contrast strongly with the straighter radii of delicate pinkish underlying vessels visible in the sclerotic zone and limited largely to it. Both planes of injection aid in giving a distinctly reddish color to the eye, which is evidently in a state of inflammation. The affected iris is peculiarly dull-hued, its color, as compared with its unaltered fellow, being changed in various shades according to the color natural to the organ in health. It is sluggish to the light, and often its structure is indistinguishable to the eye of the careful observer, because covered with a delicate stratum of the plastic exudate. The latter may extend also over the anterior capsule and give the pupil a cloudy appearance. The aqueous humor also may become turbid. In consequence of these changes the free border of the iris is often agglutinated, in various degrees, at one or several points, to the anterior face of the capsule of the lens, so that when its muscles contract the pupillary outline becomes irregular, being changed from the figure of a circle to that of an interrupted curve, or to semilunar, trefoil, figure-of-eight, or scallop shapes.

Serous iritis is characterized by the exudation of a serous fluid, with hypersecretion of a cloudy aqueous humor, which precipitates a deposit in the form of a delicate, opaque, punctate, or diffuse film on the posterior face of the cornea, the anterior face of the lens, and the membrane of Descemet. There is increased intra-ocular tension, the pupil is immobile and dilated, and the iris is changed in hue. There is less injection of the sclerotic zone than in the plastic form of iritis. Glaucoma may eventually result, from participation of the ciliary body and choroid in the process.

Parenchymatous, gummatous, or suppurative iritis affects the stroma of the organ, the cellular and vascular elements of which then proliferate, causing a regular or irregular increase in its dimensions. The attachments which form between the lens and iris are firm and unyielding. Tubercles, nodules, or "condylomata" (gummata), become visible as light- or dark-colored, circumscribed elevations on the surface of the iris, marginal or not in situation, sometimes vascularized as they persist, and attesting the unicity of the syphilitic process in all tissues of the body. Pus may form in the anterior chamber, especially in cachectic subjects.

The diagnosis of these disorders is not difficult, since their association with a syphiloderm, often papular, and the history of the case, usually corroborate the suspicion aroused by the lachrymation, pain, photophobia, and circumcorneal vascularization. The treatment is by the administration of mercury and the iodide of potassium internally, pushed until the system is controlled by these drugs; and by the instillation into the eye of the sulphate of atropine in solution (gr. ij. ad fl. ℥ i. [0.133–32]). In exceptional cases vesication over the temple may be employed with advantage, or a leech or two may be affixed near the ear. Opium hypodermatically, or cocaine locally, may be required to relieve pain. The oleate of mercury and morphine also may be applied by inunction over the brow, even where the mydriatic is employed. The eyes should be disused and protected against light (by a darkened chamber or shaded glasses). Paracentesis of the cornea and iridectomy may be required in severe cases at the hands of the ophthalmic surgeon.

A form of iritis has been observed in the first half-year of life of infants, mostly of the female sex, affected with inherited syphilis. It is both unilateral and bilateral, and accompanied by few of the marked subjective symptoms of the disease experienced by adults, but is far more liable to result in pupillary occlusion.

The *lens* is affected in syphilis chiefly by extension to it of inflammation of the delicate organs with which it sustains anatomical relations. Cyclitis, or inflammation of the ciliary body, is for the most part similarly excited by an iritis or choroiditis of the same eye. Very rarely, indeed, a gummatous exudation occurs primarily in its substance, and then commonly the iris is secondarily involved, with characteristic symptoms.

Choroiditis and Retinitis.—Plastic, serous, and parenchymatous inflammations of the retina and choroid are described by authors, the distinction between which forms, as also between inflammations of the two organs, is difficult to establish. The objective symptoms of these disorders, as recognized by the aid of the ophthalmoscope, may be described as increased vascularity, ecchymosis, opacity, œdema, and appearance in the fundus of the eye of whitish or yellowish spots. Often the pigment of the choroid atrophies, permitting in one or more places a view of the sclera through its tissue. Blackish areolæ may surround these irregularly bordered macules. In other cases the choroid presents the appearance of maceration; or again, circumscribed nodules (gummata) project above the general level. When there are distinct retinal changes, the point of entrance of the optic nerve is usually pinkish or reddish in shade, œdematous, and surrounded by distended and conspicuous vessels; or it is hidden from view by plastic deposits upon its surface, or by a fog in the vitreous humor.

The *optic nerve*, when affected with syphilis, is usually involved after extension to it of a retinitis or choroiditis. It is with great rarity primarily infiltrated with a gummatous product. The same is true of the vitreous, which is usually implicated only after syphilitic changes in its investing membranes.

Paralysis of the nerves of the eye is as nearly pathognomonic of syphilis as is iritis, from fifty to sixty per cent. of all cases occurring in syphilitic subjects. Many of these are early phenomena of cerebral syphilis, and hence amblyopia, failure of co-ordination of the ocular movements, and visual disturbances of every kind should be closely investigated at all times when occurring in the victim of syphilis. Paralysis of the third pair of cerebral nerves, the oculomotorius, is characterized by ptosis of the upper lid, external strabismus, and inability to move the globe upward, downward, or inward. Accommodation is wholly or partially lost, and the pupil is dilated. Paralysis of the sixth pair, the abducens, is, on the other hand, characterized by internal strabismus, amblyopia on the outer side of the vertical axis of the eye, and inability to move the globe outward. Paralysis of the fourth pair, the patheticus, is characterized by amblyopia for all objects lying below the equator of the globe of the eye, and by the fact that the patient is obliged to make an effort to correct the visual impressions of objects below that equator by the inclination of the head.

These paralyses may occur singly or in combination; and, with or without them, may be recognized monocular mydriasis, which, albeit occasionally associated with grave cerebral syphilis, the author has seen persist for years without impairment of co-ordination or other ocular symptom. Unquestionably these paralyses may be due at times to gummatous and other syphilitic changes in the membranes, periosteum, and bones within the cranial vault. Convergent strabismus is readily distinguished from paralysis of the sixth pair by the relief of the squint in the former case when the sound eye is covered. The treatment of these paralyses by the usual method of managing constitutional syphilis is, for the most part, encouraging. Tenotomy may be occasionally required.

The Eye in Inherited Syphilis.—In congenital diseases the lids, conjunctivæ, cornea, iris, choroid, retina, and optic nerve, may, one or all, be affected with specific inflammatory changes, or, more commonly, by gummatous deposits resulting in degeneration and ulceration. Grave ocular troubles in early life, especially if coexisting with persistent alterations of the subcutaneous structures, periosteum, or bone, should generally awaken the suspicion of syphilitic disease.

[For affections of the ear in syphilis consult the exhaustive article on this subject in Vol. III. (page 674)].

AFFECTIONS OF THE RESPIRATORY TRACT.—*The Nose.*—The lining membrane of the nares may be the seat of macules, papules, erosions, mucous patches, and ulcerations, with catarrhal symptoms, the discharge from the nares becoming serous, purulent, or hemorrhagic. Inspissated masses of these secretions smeared with an offensive discharge are at times expelled. Gummata form in the same region, the degeneration of which leads to ulcerative changes in cartilage, periosteum, and bone. This order of sequence may be reversed, the gummatous infiltration first occurring in the osseous structure. The septum, floor, Eustachian tube, pharynx, roof of the mouth, antrum, and even the cerebral meninges, may be attacked by extension of the disease from one point to another. When the bridge of the nose is in this way undermined, a characteristic and highly disfiguring flattening occurs, which is rarely seen in any other disorder save syphilis, traumatism excepted. Cartilaginous destruction is productive of flattening of the tip of the nose. The practically remediless nature of these deformities renders the treatment of all nasal disorders in syphilis a matter of the highest consequence. When the antrum of Highmore is affected, there is a peculiar tumefaction, unaccompanied by coloration or change in the skin, of one side of the face, the treatment of which may require removal of a tooth, penetration of the floor of the antrum, and the wearing of an obturator for a time. When the Eustachian tube is involved, the drum membrane may be perforated and a purulent otitis media follow. Many of these changes, whether vegetative, erosive, or ulcerative in type, are accompanied by fetid ozæna, nasal phonation, and partial or total loss of the olfactory sense. Sometimes osseous fragments, varying in size from a hemp-seed to a finger nail, are discharged from the nares, the detritus of the carious process as it affects the nasal, turbinated, or other bones. Eburnation and thickening of the bones *in situ* may also result. The internal treatment of these cases is by mercury, iodide of potassium, the mineral acids, and ferruginous tonics. Locally, the treatment may be successfully conducted by the aid of mercurial fumigation, but the use of a cleansing douche, followed by lotions containing the bichloride of mercury, resorcin, iodized phenol, potassium chlorate, or boric acid, may be preferable.

The Larynx.—The vocal cords, arytenoid and glosso-epiglottic folds, and all parts of the mucous, submucous, cartilaginous, and osseous tissues of the larynx, may become the seat of syphilitic changes. Diffuse circumscribed erythema, mucous patches, papules, "condylomata," vegetations, erosions, and gummata may be followed by superficial or deep ulcerations, circumscribed or extensive infiltrations, and cicatrices, the contracture of which may induce grave and dangerous laryngeal stenosis. Pain, cough, changes in the volume or pitch of the voice, dyspnœa and dysphagia, are not at first noticeable. The supervention of œdema may gradually or rapidly usher in a serious condition. Later, when stenosis of the larynx (the more frequent of the ultimate results) is induced by cicatricial contraction, or (more rarely) by vegetations, false membranes, gummata, or nodes, the voice may be reduced to a whisper, or there may be complete aphonia, dysphagia to a slight extent, or dyspnœa even to a grade demanding tracheotomy for the preservation of life. The mucous membrane of the larynx is affected also with a chronic form of infiltration, which results in a characteristic induration of the important submucous tissues of the larynx, distinguishable from œdema by its firmness and density. The deeper ulcerations of this organ resulting from degenerating gummata, circumscribed or diffuse in extent, commonly spread from similar lesions in the pharynx, resulting ultimately in destruction of the epiglottis, leaving often in such cases a single wide and ragged laryngo-pharyngeal chasm; or involving the cords, aryteno-epiglottic ligaments, and deeper structures. When the cartilage is involved, crepitation is said to be perceptible after the occurrence of perichondritis; and sequestra have been removed when caries or necrosis has attacked the ossified cartilage. Syphilitic aphonia, obscure as to its immediate cause, as well as paralyses whether of one or both sides, is not to be confounded with syphilitic aphasia. Tuberculosis can now be satisfactorily differentiated from these affections by the modern methods of recognizing the bacillus of that disorder, as well as by the other signs of phthisis and the absence of a history of syphilis and its concomitant symptoms.

The trachea may become the seat of lesions similar to those recognized in the larynx; but the absence here of the delicate mechanism required for phonation explains why they are rarer, less conspicuous, and less complicated. The larynx, trachea, and bronchi are usually simultaneously or successively involved, the trachea alone very rarely. All the lesions of mucous surfaces in syphilis, all the vegetations, infiltrations, and degenerations, may here be noted, including extratracheal abscesses from perforation. Stenosis from cicatricial contraction may here also induce fatal results. The internal treatment of laryngeal and tracheal syphilis is that of the disease in general. Locally, the parts may be wiped with solutions of boric acid, benzoin tincture, eucalyptol, or dusted with iodoform, or tannin in fine powder, reduced if desired. The galvano-cautery is best employed in the surgical management of membranoid occlusions, which are, it should be remembered, quite uninfluenced by large doses of the potassic iodide. The last-named drug is indeed, in some cases, credited with producing a form of laryngeal œdema. Dilatation with bougies has not won for itself much favor in the management of these cases. The use of tobacco, both by smoking and by chewing, is to be interdicted in all cases.

The bronchi may become the seat of the syphilitic changes described in connection with the larynx and trachea. Few cases, however, have been carefully studied, though stenosis following ulceration has been recognized post mortem.

The lungs may be the seat of a syphilitic infiltration affecting usually one side of the chest only, and then the upper, middle, or lower lobe. The pulmonary tissue becomes so dense in these cases as to be impermeable to the

air; and yellowish points are visible here and there in the relatively small patch of consolidation, due to the irritation of the parenchyma by the sclerotic nodule.

These sclerosed portions of the lung by their contraction induce either stenosis or ectasia of the normal canals and chambers in the vicinage. Under the microscope the sclerosis is seen to be made up of bundles of firm connective tissue, between which appear stellate, fusiform, and roundish cells, with a granular detritus. The vessels of the part are first engorged with blood, and later choked with the stasis of their contents.

Pulmonary gummata, or circumscribed syphilomata, of the lung rarely form at the apices of these organs, but are found in all other parts. They are grayish, semi-solid masses, varying from the size of a pea to that of an egg, set in the pulmonary parenchyma, surrounded always by an opalescent, fibrous, basket-like capsule, and as they grow older they often exhibit one or more yellowish points in their mass where caseation has begun. Softening progresses from centre to periphery, and the contents may find exit by the portal of a neighboring bronchus with a secreting cavity left behind; or resorption may occur with the result of leaving in the lung tissue a fibrous mass, having a cheesy centre. These conditions may be found in one lung: gummata forming in cavities originally resulting from lesions that have degenerated, mingled with fibrous sequelæ of resorption, and contracting cicatrices. Often the pleura and bronchi are either involved in the same process or exhibit the irritating effects of the pulmonary neoplasms. Microscopically, the centre of these gummata is found to be made up of granular connective tissue, in process of degeneration, and highly refractive granules. The fibrous tissue is concentrically wrapped about them, the cellular elements nearest the core having undergone in part fatty metamorphosis. Still more externally lie irregular masses representing a small-celled infiltration, which in places blocks up the alveoli. The lesions are encircled by peripherally distributed connective tissue with clearly defined limits. The result, as regards the lung tissue, is, according to Councilman, a pneumonia with fibrinous exudation, accompanied by fibrous thickening of the alveolar walls, the whole undergoing caseation. When the action of the virus is intense, necrosis of tissue occurs before there is time for the development of the protecting connective tissue.

The analogy between tuberculosis and syphilis of the lung is shown by the fact that in both processes a caseous pneumonia results; but in the former instance the inflammatory process is the direct result of the presence and irritative effects of tubercle bacilli; in the latter, the primary process is an atrophy of the alveolar walls, most probably due to a hyaline degeneration of the capillaries.

The diagnostic differences, as given by Delafield, are, in syphilitic disease of the lung, dyspnœa on inspiration; a varying degree of supra- and infraclavicular retraction; on percussion, marked dulness over the affected parts; on auscultation, prolonged and high-pitched respiratory murmur, with a pause between it and a prolonged and almost equally high-pitched expiratory murmur. Sibilant, sonorous, crepitant, and subcrepitant râles are often wanting; vocal fremitus on coughing is increased. The symptoms of these lung changes of syphilis are largely those of non-specific inflammatory disorders, viz., bronchial catarrh with expectoration of muco-pus; diminution of sonority in percussion; limitation of the respiratory area in affected parts of the lung; dry and moist râles; prolonged expiration, and dyspnœa. Cases of severe hemorrhage in patients affected with syphilitic pulmonary sclerosis may go on to complete recovery after appropriate therapy. In the event of degenerating gummata of the lung, the symptoms are those of pulmonary caverns, whatever be the cause, hollow gurgling râles, pectoriloquy, raucous voice, etc. The diagnosis is established by the history of syphilis and by any concomitant symptoms present; by the relative immunity of the pulmonary apex; by the smaller number and larger size of gummata, as contrasted with miliary tubercles; and by the absence of the bacilli of tuberculosis, of the signs of hydatid cysts, and of neoplasms of other diseases. The treatment is that of syphilis in general, with such remedies as are specially indicated by the pulmonary symptoms present.

Affections of the Digestive Tract.—*The Mouth.*—As the lining membrane of the mouth is more often exposed to the eye of the practitioner than any other mucous surface in the body, the symptoms which it exhibits in the victim of syphilis may be regarded as representative of mucous lesions in general. They are all properly in alignment with the cutaneous lesions, the modifying influences being chiefly heat, moisture, and motion; the latter incidental to the performance of the important functions of the mucous cavities. Thus the buccal cavity is often the seat of diffuse or circumscribed erythema, in dull red shades, faucial or palatal in situation, with defined or irregular outlines, accompanied by infiltration, œdema, and often by erosions. These may be multiple, pea-sized patches, or a single sheet of diffuse blush. The former, after maceration, may, by either a vegetative or a degenerative process, form papules, mucous patches, or ulcers. In malignant cases a dull-red erythema often precedes the gangrenous crateriform ulcer which opens, almost as at a stroke, the oral and nasal cavities by a communicating chasm.

Mucous Patches (Mucous tubercles, Plaques muqueuses, Moist papules, etc.).—The larger number of these lesions appear in the mouth and about the anus, though they are to be seen near all the mucous outlets of the body. They are far more common and more severe in the mouths of men than in those of women, on account of the tobacco habits of the former. They are early and late lesions of syphilis, and are represented in the symptoms of relatively few diseases not syphilitic. They consist of roundish, oval, or irregularly shaped discs, or longer, narrow, indefinitely outlined bands of a delicate rosy hue; grayish or opalescent in color; often granular and elevated about a millimetre above the general level of the surface where they appear. Many of them seem to be covered with a delicate pellicle. When of a pinkish or reddish shade, they represent merely a stage of hyperæmia of the membrane; when opalescent, as if pencilled by the silver crayon, a stage of maceration of the previously infiltrated epidermis; when granular, a stage of attempted repair, the loosened pellicle having been removed by friction or otherwise, and the surface beneath forming a new epithelial envelope. They may form upon a chancre when undergoing its so-called "transformation *in situ*," already described. When located in quasi-mucous situations, viz., those portions of the skin in the vicinity of the mucous outlets subjected to friction and kept moist and warm (inner faces of the thighs, inside of the toes, etc.), they may vegetate and produce the condyloma, a lesion frequently seen about the anus and genital region, more particularly in syphilitic women of filthy habits. These are usually circumscribed, multiple, roundish, or irregularly shaped, wart-like elevations, smeared with a whitish mucus, highly contagious, and of especially disgusting odor when seated about the ano-genital orifices. In the same situation they are remarkable for the production of a sensation of itching, rarely awakened by other syphilitic lesions. Occasionally they are dry. They are, as a matter of fact, merely papular lesions, flattened by apposition of the surfaces between which they are developed, or vegetating, as the clefts in these same surfaces permit of such a growth, secreting because moist and macerated, and itching because irritated by the same agencies. When exposed, as about the bearded lips and nares, they are dryer, and browner, or duller red in hue. They occur in and about all the mucous outlets, and affect all mucous surfaces, with a marked predilection for the neighborhood of the muco-cutaneous borders. They are common in both infantile and inherited syphilis. They may become cracked, eroded, and superficially or very deeply ulcerated. Their excessive proliferation may produce enormous masses of secreting, wart-like, softish growths, described by authors as framboesioid condylomatous syphilodermata.

The mucous patches of the mouth are less elevated and more opalescent than others, and appear upon the inside of the lips and cheeks, gums, uvula, palate, tonsils, and pharynx. They should never be confounded with the transitory, minute, usually distinctly circular, aphthous ulcerations to be seen in healthy adults after a fit of indigestion; nor with the persistent, much firmer, leathery discs, or striated or ribbon-like streaks, described as psoriasis linguæ, leukoplakia buccalis, etc., which, as is now well known, may be the earliest epitheliomatous transformation of a mucous membrane; nor with lichen planus of the mouth; nor, lastly, with the so-called "smokers' patches" (plaques des fumeurs, etc.), which many cases, it can scarcely be questioned, represent buccal lesions in a veteran of syphilis.

The tongue may display a wide variety in the lesions of syphilis. In the order of gravity may be named: Multiple, macular lesions, the size of a pinhead, abundantly spread over its upper surface; mucous patches in all forms, particularly over the edges and tip, often forming where the organ is rasped by the rough edge of a carious molar tooth; flat, circular papules, the size of a bean and larger, elevated a millimetre or two above the general level; circumscribed and diffuse, superficial or deep (parenchymatous) scleroses, usually developed upon the upper surface of the organ and near its mesian line, characterized by irregular increase of bulk and almost cartilaginous density, which may result in resorption and atrophy or ulceration; and, lastly, superficial or parenchymatous gummata, submucous or muscular in site, occasionally single, often multiple, which also may disappear by resorption or degenerate by ulceration. One of the remarkable features of disintegrating syphilitic, as distinguished from other neoplasms, of the tongue is the relatively slight damage apparent after completion of repair. These all are to be distinguished from epitheliomata, which are more voluminous, more hemorrhagic, less deeply excavated, more irregular in mass, and more painful; as also from colloid lingual tumors (so-called "hygroma" of English authors), with the appearance of vesicles on the upper surface and enormous asymmetrical increase in the bulk of the organ in childhood; and, lastly, from tuberculosis of the organ, rare of occurrence, to be recognized only by its histological characters.

The *maxillary bones* may undergo necrosis as a result of syphilis. The most common site of the accident is the central part of the dome of the hard palate. There is first a dull-red erythematous swelling of the membrane and submucous tissue, which in severe cases may seem to give way like wet paper, leaving a conical perforation through which communication is opened between the oral and nasal cavities; in other cases an abscess forms and bursts, after which the bone is laid bare and exfoliates in larger or smaller masses from time to time. Necrosis of the alveolar processes usually occurs in the upper law. Gummata of the soft palate often form insidiously, are circumscribed or diffuse; at first firm, later softish, tumors, varying from the size of a pea to that of a small nut, or in patches of thickening. Absorption or ulceration may result, and the latter often rapidly, in consequence of the lax and unsupported tissues involved; the process in grave cases opens (by destruction in whole or in part of the uvula, pillars of the fauces, and velum) a wide chasm between the fauces and the posterior nares. Interference with the Eustachian tube often produces temporary deafness. The voice is disagreeably nasal, deglutition is often difficult in the erect posture (patients with extensive tissue-loss will often assume unusual postures, by which they can even succeed in swallowing liquids without the passage of the latter into the nose), and the pain in general is quite disproportionate to the severity of the damage. Marvellous are the reparative results when, as is usually the case under sound management, repair ensues. The remaining fragments of the velum palati contract adhesions to the posterior pharyngeal wall, the chasm contracts, and the expert can trace the picture of the mischief that has occurred when inspecting only the narrow and distorted chink left after contracture is complete.

Fournier only has reported a case of syphilitic involvement of the sublingual gland.

The *pharynx* may become the seat of macules, papules, mucous patches, gummata, and ulcers, which in many cases are formidable. The latter may spread from the posterior nares and extend downward into the œsophagus, or backward, so as to produce destructive effects upon the periosteum of the vertebræ and the structures they protect. Occasionally, patients long neglected or badly treated, exhibit gigantic caverns, including what were once the nasal, buccal, and pharyngeal cavities, the whole lined with a granulating or secreting and ulcerated membrane. Even in those extreme cases in which one is disposed to wonder even at the prolongation of life, repair ensues and emphasizes the striking, almost pathognomonic, distinction between the damages inflicted by syphilis and many other destructive diseases.

The *œsophagus* is said to be very rarely the seat of syphilitic lesions which, after ulceration, may produce stricture, either spasmodic or organic, resulting in serious danger to life.

The *treatment* of all these lesions is practically the same. Internally, mercury and the iodide of potassium are essential, the latter often in the largest permissible doses, to save important organs. Care of the patient's nutrition is in most cases imperative. Locally, the nitrate of silver, sulphate of copper, chlorate of potash, tannin, resorcin, acid nitrate of mercury, nitric acid, and tincture of iodine may be employed in strength varying according to the requirements of each case—the first named in solid stick or solution of a strength of from five to sixty grains to the ounce (0.33–4.0 to 32.0). By spraying, pencilling, dusting, washing, and gargling, these preparations may be used, with the greatest advantage, a number of times throughout the course of the day. The following are excellent formulæ for gargles:

℞ Potass. chlorat................ ʒ i. (4.0)
Mel. despum.,
Myrrh. tinct...............āā fl ℥ ss. (16.0)
Aq. des...................ad fl ℥ iv. (128.0)
M. S. Gargle. Use diluted as required.

℞ Potass. chlorat.................. ʒ i. (4.0)
Infus. lini...................... O i. (500.0)
[Bumstead and Taylor.]

℞ Acid. carbolici................ ʒ i. (4.0)
Glycerin,
Spts. vin. rectif............āā fl ʒ ij. (8.0)
Iodin. tinct.................. fl ʒ ss. (2.0)
Aq. dest..................ad fl ℥ i. (32.0)
M. Five to fifteen drops in a third of a tumbler of water for gargle or lotion.

The toothbrush, in all cases, is to be regularly employed twice daily; if the patient is unaccustomed to its use the mouth should be well cleansed and the gums rubbed with a bit of soft muslin on the finger, dipped in water to which a few drops of the tincture of myrrh and cinchona have been added. Tobacco is to be, in every form, absolutely interdicted; and all very hot and very cold, and irritating articles of diet are to be excluded (*e.g.*, hot coffee, ice cream, vinegar, spirits, spices, etc.).

The stomach and intestinal canal may become the seat of syphilitic lesions of the type seen upon the other mucous surfaces. Huet, Cornil, Klebs, and others report gummata of this part of the digestive tract; Leudet, Virchow, and Fauvel describe diffuse infiltrations of portions of the tube; Engel, Fioupe, Cullerier, and others, perforating ulcers (probably due to gummata) as also scleroses resulting in contracture, even productive of irritation sufficient to light up a peritonitis near a stric-

ture of the colon. It should not be forgotten that a long list of functional disorders of the alimentary canal might be enumerated as of occurrence in the syphilitic subject, which are often due to the toxic influence of the disease (cachexia, etc.); to the effect of certain of the medicaments ingested or externally applied for its relief; and to improper alimentation or hygiene.

The rectum may become the seat of a series of important changes due to syphilis. Women are more liable to be thus affected than men in the proportion of eight to one, a preponderance which has been referred to the anatomical differences between the sexes, to the physiological fluxes of women, previous pregnancies, and to unnatural or excessive coitus. Chancroids, occurring as they do frequently about the anus of women, may result in induration of the submucous tissues, accompanied by purulent and sanguinolent discharges, constipation, or looseness of the bowels, and painful defecation. This condition is to be carefully distinguished from syphilitic stricture of the rectum.

The syphilitic affections of the rectum may, perhaps, include the category of syphilitic lesions of mucous surfaces in general. The most important, however, are those characterized by ulceration or gummatous changes. The former may extend from without inward, from the perianal region to an inch or more within the sphincter; or may begin by one or several points of ulceration in the latter situation. The so-called "ano-rectal syphiloma" is a cylindriform, gummatous, non-ulcerated infiltration of the entire circumference of the ano-rectal walls, capable of producing stricture by transformation into fibrous tissue. It is, however, an error to suppose that stricture of the rectum not due to chancroids, but syphilitic in character, always conforms in type to the syphiloma. The author has treated a middle-aged woman, whose husband and two children are victims of severe syphilis, and whose left lower extremity is extensively seamed with perfectly typical syphilitic cicatrices. There are in this case four abscesses in the nates, communicating by fistulous sinuses with the bowel and vagina, the syphilitic stricture of the rectum being represented by a sharply defined, thin, annular coarctation of the rectal wall, with a submucous gummatous infiltration strictly limited to the ring of the coarctation. It is evident that only in exceptional cases, probably during the period before contracture has set in, can internal medication accomplish practical results in these cases. Dilatation or division of the stricture by the knife or galvano-cautery is usually required, with free opening of all abscesses and sinuses, and observance of strictest antiseptic precautions with bichloride dressing. Often the production of an artificial anus in the abdominal wall is imperative. The future is, however, often unpromising for these cases, many women who are the victims of the disorder having their health profoundly impaired by previous suffering and disease.

The liver, like the intestinal canal, may suffer, when invaded, from functional disorders, which may depend upon slight structural changes participating in the process which results in the cutaneous exanthem. The icterus probably originating in this way, which may somewhat precede or accompany the first syphiloderm, has already been described. It may be accompanied by hepatic congestion and by symptoms of malaise, hebetude, cephalalgia, and even slight pyrexia. The late forms of syphilitic involvement of the liver are well marked. General, more commonly partial, interstitial hepatitis, affecting chiefly the capsular and ligamentous attachments of the organ, produces a distortion of the gland by contracture of fibrous bundles which, springing from these attachments, penetrate the hepatic parenchyma and divide it into uneven lobulations and irregular masses separated by furrows. There is at first increase, and later diminution, in the bulk of the organ, with the usual symptoms of cirrhosis. Hepatic gummata are of more frequent occurrence, and in "galloping" cases may be seen within six months after infection. They are usually grouped in clusters of from six to a dozen lesions, varying in size from a large pinhead to a small nut. Centrally they contain roundish cells and granules in a delicate connective-tissue reticulum, surrounded by a fibrous envelope, and embedded in dense hepatic tissue. The symptoms in mild cases are probably scarcely sufficient to indicate the nature of the affection. In others, disturbance of the alimentary canal (icterus, constipation, dysentery); pain in various degrees, limited to the hepatic region or radiating from it; and, very rarely, morbid changes perceptible on palpation of the enlarged, or previously enlarged and subsequently shrunken, organ, may first point to the precise nature of the trouble.

Gummata of the liver are to be distinguished from hydatid cysts; carcinoma (of advanced years); hepatic abscess (in persons who have been long resident in tropical countries); tubercles (usually softer, more cheesy, more purulent in the centre); and the rare forms of sarcoma of the liver. The prognosis of hepatic syphilis is usually not grave.

Amyloid degeneration of the liver may be the result of syphilis as of other diseases. There is increase in the bulk of the waxy-looking organ, the hepatic cells becoming enlarged after involvement of the swollen hepatic capillaries. Often there are coincident amyloid changes in the heart and spleen. The symptoms of hepatic gummata are as obscure in many cases as in syphilitic cirrhosis. There may be ascites, hemorrhage from the portal vein, and dyspnœa. The treatment is largely that of syphilis in general.

The spleen often enlarges in those early periods of syphilis when the lymphatic glands tumefy. Commonly the enlargement subsides as the disease progresses or is modified by treatment. Syphilomata of the spleen (gummata) are rarely observed, but have been recognized in both circumscribed and diffuse forms. Splenic gummata are yellowish, softish nodules, from the size of a pinhead to that of a small nut, set in a dense splenic tissue of unusual dryness. In diffuse forms, the organ appears to be in part hypertrophied and dark brown in color. Later, islets of grayish sclerosed tissue become apparent in this mass, the involution of which leaves cicatriform depressions. Rarely a perisplenitis may be lighted up by these changes, leading to the formation of whitish patches of almost cartilaginous density. The clinical symptoms of syphilis of the spleen are obscure.

The pancreas is said to be occasionally the seat of changes supposed to represent the circumscribed and diffuse syphilomata recognized in the liver and spleen.

AFFECTIONS OF THE CIRCULATORY ORGANS.—*Myocarditis*, recognized chiefly in post-mortem examinations, may be a late complication of syphilis, which affects men more often than women in the proportion of six to one. Softish, yellowish gummata, from the size of a nut to that of an egg, as well as circumscribed and diffuse sclerosis, have been recognized in the ventricular walls and auricles of both sides. Plastic or fibrous metamorphosis of the muscular tissue about any of these lesions may occur. Whitish diffuse infiltrations, firm, or of the consistence of a sarcoma, with round-celled infiltrations and vegetations, may affect the endocardium or muscular tissue; and the same changes in the pericardium may result in partial or total obliteration of its sac. These commonly originate in subendocardial or subpericardial gummata. Wagner, Lancereaux, and a few others have reported gummata limited to these serous membranes. The symptoms excited by these changes are dyspnœa, palpitation, cyanosis, præcordial distress, and angina pectoris. The prognosis is naturally grave, since all the identified instances of this affection were recognized in the bodies of the dead. It is reasonable, however, to suppose that syphilis here, as elsewhere, exhibits its usual amenability to treatment in the case of patients with symptoms not diagnosticated in life.

Arteries and Veins.—The femoral, jugular, saphena, and other veins may be affected with a phlebitis due usually to the pressure exercised by a gummatous tumor in the vicinity. A sclerous phlebitis, in which the inti-

ma was first attacked, has also been recognized post mortem.

The capillaries and arteries also may be primarily or secondarily involved. In the latter case the result is commonly due to compressive or destructive effects exerted by syphilitic processes upon adjacent organs. Syphilitic endarteritis, however, is much more common; and investigation by Virchow, Heubner, and others has revealed its pathology with sufficient clearness. The lesions are more commonly observed in the smaller cerebral arteries, but the carotids and other vessels are occasionally involved. The definite limitation of the disease to a single patch is declared by the rapid appearance of whitish, opaque nodules, the size of a millet-seed, composed of small, roundish, or spindle-shaped cells, which may be agglomerated into a firm, fibrous mass, from the size of a pea to that of a nut, obliterating the lumen of the invaded artery by thickening of all its investing coats, and producing eventually either rupture or an atrophic or cicatriform relic of its existence. This infarction is remarkable for the indirect results which it produces, including cephalalgic, aphasic, paretic, paraplegic, and even comatose symptoms.

THE GENITO-URINARY ORGANS.—Symptoms of syphilis are disclosed in the genito-urinary tract of patients of both sexes, early and late in the course of the disease.

The penis may become, in one part or another, the seat of circumscribed syphilitic infiltrations and gummata.

Lesions of this nature may be subcutaneous, or there may be nut-sized masses deeply lodged in the substance of the corpora cavernosa, or in the submucous tissue of the urethra. Some of the lesions discovered post mortem, and described as "chancres of the deep urethra," are really tertiary ulcers resulting from broken-down gummata of the prostatic or membranous urethra. Jullien figures a cavern of the cutaneous surface of the penis originating in this way in one of Langlebert's patients. Tubercles of syphilitic origin may be developed near the furrow at the base of the glans.

Each part of the *testicles* may be affected with syphilis.

The epididymis, when involved, may display either an early or a late form of syphilitic epididymitis.

The early form, first described by Dron, in 1863, may be observed at any time between the third and thirtieth months after infection. The disorder bears no relation to gonorrhœal epididymitis. The globus major, or head, of the organ, much more rarely the globus minor, is attacked and either insidiously or acutely affected, producing a roundish or squarish, circumscribed tumor, from the size of a bean to that of a small nut, which has been compared to a "monkey-nut screwed to the testicle." One or both organs may be involved, successively or simultaneously, and the globus minor may be attacked later. The affection is amenable to treatment, and commonly disappears without unfortunate sequelæ.

The late form is often connected with gummatous changes in the testis proper, but very rarely arises independently of the latter. Here also the globus major is more often attacked; and resolution, as is the case with deposits in the testis proper, may be followed by atrophic changes.

Syphilitic *orchitis*, sarcocele, or albuginitis, may be a relatively early or late symptom of syphilis, involving one or both organs simultaneously or in succession. In these cases, the body of the testicle is involved, often without the production of pain, in a smooth, uniform, and firm swelling, which may be due in part to enlargement of the testicle, and in part to a moderate grade of hydrocele concealing the irregularities perceptible later in the body of the organ. In other cases, this body can be recognized by palpation as the seat of one or several masses, from the size of a pea to that of a small nut, which may be at first isolated and circumscribed, but later become fused into a solid, resisting mass having the general shape of the testicle, but often three or four times larger. Under energetic treatment, resolution of these masses is accomplished; but obliteration of the vasa deferentia and atrophy, or fatty, fibrous, cartilaginous, amylaceous, even osseous metamorphosis of the parenchymatous tissue of the gland may follow the absorption of the neoplasm. In this way the testicle may be, after completion of this cycle of changes, represented by merely a bean-sized mass of fibrous tissue. Suppuration and ulceration of the tunics almost never result, though a few authors have reported a resulting "fungus of the testicle."

Pathologically studied, the glands are found to be the seat of vascularization and proliferation of connective tissue, resulting in the production of fibrous trabeculæ traversing the organ in various directions, but always attached to its thickened investments, resulting by contracture in compression and atrophy of the secreting cells of the tubules. In other cases, true, grayish or yellowish gummata are found in the testis, single or multiple, diffuse or circumscribed, from the size of a pinhead to that of a pigeon's egg, environed by fibrous capsular coats. These commonly disappear by absorption; even in the rare cases of disintegration and the formation of "fungus of the testis," recovery ensues under proper treatment.

All syphilitic lesions of the epididymis and testis are to be distinguished from the gonorrhœal, the cancerous, the sarcomatous, and the tuberculous. The blennorrhagic affections of the epididymis are acute in type, painful, attack the tail of the organ by preference, and are usually preceded by an unequivocal history of urethritis and discharge. The neoplasms of cancer and sarcoma in the testicle, more often occurring in subjects of advanced age as contrasted with the younger victims of syphilis, are usually accompanied by inguinal adenopathy, severe pain, systemic cachexia, extensive damage to the parts affected, and proneness to disintegration. Tuberculosis is more common in young men virgin of all venereal antecedents, usually with tuberculosis of the prostate gland and marked dysuria. The bacillus tuberculosis may be recognized in the secretion obtained by "milking" the prostate. The treatment internally is by the potassium iodide and mercury. Locally, suspension of the organ is to be recommended; hot fomentations for relief of pain when such exists; and applications of salves containing lead, mercury, belladonna, or opium. The oleate of mercury and morphine, mercurial plaster, white precipitate salve, or the compound iodine ointment may be applied. Strapping, as employed for relief of gonorrhœal epididymitis, may be practised with advantage in some cases. The prognosis is not unfavorable as regards the health of the patient; but, after double syphilitic orchitis, the patient may have complete aspermatism. The *prostate gland, vasa deferentia, common ejaculatory ducts*, and *vesiculæ seminales* are all the seat at times of syphilitic changes, the characters of which are not known.

In women the *labium majus*, usually one, occasionally both, may be the seat of gummatous changes due to syphilis. These may be late and unique manifestations of the disease. Often nothing can be gathered in cases of this sort as to the history of syphilis, a not uncommon experience in the infected of that sex. The organ is found, when examined, to be wholly or in part the seat of a dense, smooth or irregularly lobulated, vertically disposed tumor, very closely resembling in size and external appearance a scrotum containing a testicle affected with syphilitic orchitis. Syphilitic gumma of the vulva is usually an exceedingly indolent affection, lasting for long periods of time, rarely occurring at the outset till three or four years have elapsed since infection. It is often diagnosticated as "elephantiasis" of the labium. Disintegration of the mass by ulceration is rare.

The syphiloma of the vagina is similar to the lesion described above in the date of its occurrence, its exceedingly indolent career, and its existence for months without a single coincident symptom of syphilis to substantiate the diagnosis. Many of these cases have been recorded, treated, described, and even illustrated as "lupus of the vulva," or "of the vagina," which disorder is even rarer than this exceedingly rare manifestation of syphilis. When recognized, the vagina is converted into a thickened cylinder of tissue infiltrated with gummatous material, which greatly restricts the distensibility