SCIATICA. See *Neuralgia.*

SCIRRHUS. See *Carcinoma.*

SCLERA. See *Eye.*

SCLERA, DISEASES OF THE.—Although the sclera becomes secondarily involved in various morbid processes originating in other parts of the eyeball, primary disease of this structure is comparatively rare. Scleritis, or inflammation of the sclerotic, as a primary affection, is recognized only as originating in a narrow zone of the sclera, bounded in front by the cornea and behind by the insertion of the recti muscles. In this situation we meet with two varieties of scleritis—simple and complicated.

Simple Scleritis (episcleritis) commences as a localized subconjunctival hyperæmia at a short distance from the corneal margin. As the episcleral tissue becomes infiltrated, a smooth swelling appears, which is but slightly elevated above the surrounding surface, and is usually of a dingy yellowish-red color, sometimes resembling a pustular formation, though ulceration or loss of substance never occurs. The conjunctival vessels over and around the swollen part are more or less engorged, but the conjunctiva in general remains normal. After a few days or weeks the nodule assumes a dull violet hue and becomes flatter, in which form it may remain stationary for a long time, or may gradually disappear, leaving a more or less permanent dull gray or ash-colored spot. Occasionally two or more such nodules are present at the same time, or as one disappears others may develop. The slow progress and tendency to recurrence of these nodules frequently render the disease tedious and protracted. One or both eyes may be affected, or as one recovers the other may undergo the same process.

The subjective symptoms are seldom severe; they consist in an unpleasant sensation of weight or pressure in the eye, undue sensitiveness to light or cold, and perhaps sight headache; rarely there may be considerable photophobia and sharp pain. This disease belongs almost exclusively to adult life, and is most common in elderly people. The gouty, the rheumatic, and the scrofulous diatheses are all credited with lending a predisposition to this form of scleritis.

Treatment.—Any special dyscrasia on the part of the patient must be taken into account and suitably dealt with; and while exercise in the open air is to be enjoined, the eye must be protected from strong light and from sudden changes of temperature. The local use of sulphate of atropine is allowable in the early stages, especially if there be marked symptoms of irritation. In the absence of these, instillations of solution of eserine—gr. ½ or 1 to the ounce—twice daily, are often very efficacious. Massage, with the employment of oxide of mercury ointment (amorphous yellow oxide of mercury 1 part, and fat or vaseline 25–50 parts), has been highly recommended. Dry or moist heat, applied to the eye in the usual way, several times daily, may be beneficial.

In regard to internal medication, the choice of remedies will depend on various circumstances. Mineral waters, iodide of potassium, salicylate of soda, protoiodide of mercury, hypodermic injections of pilocarpine, and many other remedies have been used with more or less success, according to the special indications present in the individual case.

Complicated Scleritis (sclero-keratitis, scrofulous scleratitis).—This is a much more serious affection, owing to the involvement of the cornea, iris, and ciliary region in the inflammatory process, and also to the tendency which exists to disastrous changes in any or all of these parts. Sclero-keratitis, commencing in the sclerotic, begins with one or more dusky infiltrations of the sclerotic, as in simple scleritis, but close to the corneal margin, the cornea being involved from the first, or after the scleral affection has existed only a short time; the pericorneal tissues are more deeply and more generally involved than in simple scleritis, and in some cases the cornea becomes extensively opaque; sooner or later the iris may participate in the inflammation, as is shown by visible changes in its appearance and by the presence of posterior synechia, or the entire ciliary region may become intensely congested and sensitive (iridocyclitis). The special dangers to which the eye is subjected in any given case may be approximately estimated by the severity of the disease in the several parts affected—extensive changes in the cornea threatening permanent opacity of this structure; in the iris, more or less complete posterior synechia, and in the ciliary region, ciliary staphyloma. There may be one or more foci of inflammation; when there are several of these, the entire pericorneal zone may be involved, or the same thing may happen more slowly through repeated relapses, each time a different area of this zone being attacked. The low dusky swelling of the sclerotic, continuous with a patchy opacity of the adjacent cornea, is the characteristic objective sign of this disease, which, as a rule, is subacute in all its manifestations. Occasionally, however, the inflammatory process is more active, and there are intense photophobia, considerable lachrymation, and severe pain. The disease may at any time subside, leaving a dull grayish, thickened appearance of the sclerotic, and a corresponding irregular marginal opacity of the cornea. If several foci have been present, the cornea will have the appearance of being irregularly encroached upon by the sclerotic. With the subsidence of the inflammatory process the dull slaty-gray sclerotic may present a zone of thickened tissue around the cornea, which sometimes looks as if it were pushed forward, giving the anterior part of the eyeball an elongated appearance; or, more frequently, the sclerotic immediately around the cornea yields in certain places, and an irregular, nodular-looking projection (intercalar staphyloma) is formed behind the cornea. This prominence is sharply defined anteriorly, but becomes gradually flattened toward the level of the normal sclerotic posteriorly. After repeated attacks of inflammation the staphylomatous bulging may involve the entire circumcorneal zone of the sclerotic, giving rise to great enlargement and distortion of the anterior part of the eyeball; at the same time the iris may become expanded from the periphery, and the anterior chamber is often considerably enlarged. The development of staphyloma in this class of cases does not often depend on increased intraocular tension, but on a gradual expansion of the softened sclerotic. If the staphyloma is to be regarded as evidence of increased tension we must assume that the softened sclera has yielded more readily than the nerve entrance; otherwise it would be difficult to understand the well-known fact that extensive changes in the form and appearance of the eyeball are under these circumstances not inconsistent with fairly good vision.

The subjects of this disease are usually young adults, and it affects women far more frequently than men. "It is not known to be associated with any special dyscrasia, but generally occurs in persons with a feeble circulation and a liability to 'catch cold'; in some cases there is a definite family history of scrofula or phthisis" (Nettleship).

Treatment.—During the irritative stages soothing remedies are indicated. Protection from cold air and strong light is always advisable, warm fomentations are generally beneficial, and instillations of atropine are useful if there is much irritation, especially if the iris is at all involved.

In the more acute forms of this disease the writer has seen great improvement follow the use of antipyrin in doses of fifteen grains several times daily. Mercury may be used in moderation if the patient is not too anæmic. If a distinctly rheumatic or gouty tendency exists, the usual constitutional treatment for these conditions is indicated; in some cases colchicine is very useful, in others diaphoretics, such as pilocarpine hypodermically, give excellent results. Iridectomy may be performed if there are extensive adhesions of the iris and a tendency to the development of staphyloma. If vision is destroyed and the eyeball is greatly enlarged, an operation for the removal of the staphyloma may be indicated.

Staphyloma of the sclera (ectasia) occurs under the most varied conditions, but usually as the result of prolonged increase of intraocular tension.

As a *congenital* anomaly of rare occurrence there is sometimes a partial bulging of the sclerotic, associated with congenital coloboma of the choroid (scleral protuberance of von Ammon).

Extensive destruction of the cornea from suppurative keratitis is commonly followed by more or less complete corneal staphyloma, and this may extend to the sclera, giving rise to more or less general enlargement of the eyeball. Iridocyclitis and iridochoroiditis, followed by occlusion of the pupil, give rise to increased tension of the eyeball, and this in the course of time, if not relieved, causes scleral staphyloma, usually in the ciliary region. Protracted increased tension from neglected glaucoma (glaucoma consummatum), or from dislocation of the lens, is a common cause of scleral staphyloma. Under these circumstances the bulging is usually far back, behind or between the insertions of the recti muscles.

In an ectasia following inflammatory or glaucomatous processes the protruding part is lined by a corresponding portion of the stretched and attenuated uveal tract. Bulging of the sclerotic may occur at any part, during the course of suppurative panophthalmitis, prior to rupture of this tunic and the escape of the contained pus.

Intraocular growths likewise cause bulging of the sclerotic, either by softening of the tunic in the vicinity of an intraocular growth, by the increased tension which such growths induce, or by simple expansion from excessive development of the growth. For the diagnosis of these conditions, see article *Eye, Tumors of.*

Ectasia of the sclerotic at the posterior pole (sclerectasia posterior), as met with in axial myopia, is a condition of frequent occurrence. (See *Myopia.*) Its presence is easily determined, by means of the ophthalmoscope, by the existence of a crescent or irregular circle of choroidal atrophy, which nearly always commences at the temporal side of the optic papilla. *Frank Buller.*

SCLEREMA NEONATORUM.—This rare disease of early infancy, to which a number of other names have been given at various times, such as *algidité progressive, induratio telæ cellulosæ, l'endurcissement athrepsique*, was first described by Underwood as a hidebound condition of the skin occurring in new-born infants. At birth, or shortly after, a peculiar induration of the skin appears, usually first upon the lower extremities, whence it spreads rapidly to other parts of the integument, involving the entire surface of the body in a few days. When the disease is fully developed the infant appears as if frozen; the surface of the body is cold; the skin is hard and wax-like at first, but later usually becomes somewhat livid; the limbs are fixed and rigid, and, owing to the stiffness of the cheeks and lips, suckling is impossible. The respirations are weak and shallow, and the circulation is feeble. Death commonly occurs within eight or ten days. The disease may be congenital, in which case the infant is either stillborn or dies within a day or two.

The affection is most probably due to malnutrition arising from improper or insufficient food, poor hygienic surroundings, or previous exhausting disease. It may follow cardiac disease, gastro-intestinal affections, disease of the lungs, or any other malady which greatly lowers the vitality of the infant. The congenital cases or those which occur a day or two after birth are of unknown origin.

According to Langer, the induration of the skin arises from solidification of the fat, brought about by the abnormally low bodily temperature, the fat of infants, owing to differences in composition, solidifying at a much higher temperature than that of adults. This explanation, however, is not entirely adequate. Parrot, who first distinguished the affection from œdema neonatorum, with which it was for a long time confounded, believes it to be a drying out of the tissues brought about by the draining off of the fluids of the body by previous debilitating disease. This author finds the skin thinner than normal, the fat diminished, and the vessels, especially of the papillary layer, greatly contracted. Ballantyne agrees in the main with Parrot's conclusions.

The only affections with which sclerema neonatorum is likely to be confounded are scleroderma and œdema neonatorum. From the former it may be distinguished by the early age at which it occurs, no case of scleroderma having yet been observed in the first few months of life. From œdema it differs in the waxy appearance of the skin, the absence of pitting on pressure, the rigidity of the limbs, and the more general distribution of the cutaneous changes, œdema being most marked in the dependent parts of the body.

The *prognosis* is extremely unfavorable, death occurring in almost all cases. In the exceptional cases in which the entire surface is not involved, recovery may take place.

Treatment consists in the employment of measures to increase the temperature of the body, which is always much below the normal, and the administration of easily digested food and stimulants. As the infant is unable to nurse, it is necessary to administer the nourishment with a flexible tube through the nose, or by enema.

Milton B. Hartzell.

SCLERODERMA.—Scleroderma (σκληρος, hard; δερμα, skin)—also known as *sclerodermia, sclerema, scleroma adultorum, scleriasis*—is a rare, chronic disease, characterized by a peculiar hard, leather-like condition of the skin occurring in diffuse areas or in sharply circumscribed patches. The circumscribed form, sometimes called *morphœa* and regarded by some authors as a distinct affection, has been fully described elsewhere and will not be considered here. Diffuse scleroderma begins either acutely or insidiously with slight stiffness of the skin, which usually presents a certain amount of swelling and hardness. Vague pains in the joints and muscles may precede the alterations in the skin, but marked or characteristic prodromal symptoms are usually wanting. The induration and stiffness of the skin spread slowly or rapidly (more commonly the former) over considerable areas, and in rare cases the entire integument becomes involved.

When the disease is fully developed the skin is remarkably firm and inelastic, smooth or slightly scaly, no longer susceptible of being picked up between the fingers, and more or less adherent to the underlying tissues. While the color of the skin is usually white or yellowish-white, a considerable amount of pigmentation is often present in the shape of streaks and macules of various shades of brown.

Subjective symptoms are, as a rule, slight. There are a feeling of tension and occasionally more or less itching. Tactile sensibility is as a rule unaltered, but in exceptional cases there may be slight hyperæsthesia or anæsthesia.

The functional activity of the glands of the skin in mild cases is usually unaltered, but in advanced or severe ones the excretion of sweat and sebum is diminished to a greater or less degree.

When the skin about the joints is affected movement is more or less interfered with, and in atrophic cases ankylosis with consequent complete immobility may result. When the face is attacked, the features are motionless, as if covered with a mask; the nose is pinched; the mouth contracted so that it is opened with difficulty; the eyes are only half-open or staring, owing to the immobility of the lids. If the skin of the thorax is involved extensively, the movements of respiration may be considerably impeded.

The parts most commonly affected are the face, the neck, the upper portion of the trunk, and the upper extremities, but no part of the integument is exempt, although the palms and soles are rarely affected.

In some cases the morbid process is not confined to the skin, but attacks the mucous membranes of the mouth, pharynx, larynx, and vagina.

In the great majority of cases constitutional symptoms are absent, but in those exceptional ones in which the affection begins acutely with marked œdema of the skin, spreading rapidly over a considerable surface, constitutional disturbance, such as chills and fever, may precede or accompany the alterations in the skin.

The course of the disease varies within considerable limits. When it has reached its acme, it may remain unchanged for months or years, and then the induration may slowly disappear, the skin resuming its normal suppleness and softness; or, after the disease has progressed toward recovery for a time, relapses may occur and new areas be invaded. On the other hand, the skin may become more tense, thinner, and parchment-like; the subcutaneous cellular tissues and fat may disappear, and the underlying muscles atrophy. When this atrophic process affects the extremities they are greatly reduced in size, distorted, and the joints ankylosed. When the hands are affected great distortion of the fingers with marked wasting occurs, a condition which has been described as *sclerodactylia*.

Owing to the extreme tension of the skin ulceration readily occurs, especially over bony prominences. The general health is, as a rule, but little if at all affected; but in very extensive cases with atrophy, especially if accompanied by ulceration, death may take place from exhaustion.

But little is known concerning the immediate causes of scleroderma. It occurs much more frequently in the female sex than in the male. In the cases collected by Lewin and Heller (four hundred and thirty-five in number), two hundred and ninety-two, or sixty-seven per cent., were women. Age seems to have but little influence upon the frequency with which the malady occurs, although it is most frequent between twenty and forty years of age. Exposure to cold and damp appears to exert a predisposing influence. In a certain proportion of cases the affection has followed some disease of the nervous system, and in a number of instances (sufficiently numerous to indicate more than an accidental association) traumatism of some kind has immediately preceded it. In many cases, however, if not in most, the patient has been in good general health at the time of the beginning of the morbid changes in the skin.

Although the pathology of scleroderma is quite obscure, there is much in favor of the view that it is primarily an affection of the nervous system, a trophoneurosis; this, however, yet remains to be demonstrated. According to Crocker the various symptoms are produced by obstruction to the arterial and venous blood supply, and by interference with the flow of lymph, these being responsible for the alteration in the nutrition of the skin which characterizes the malady. Unna finds the chief pathological alterations in an hypertrophy of the collagenous tissues affecting all parts of the cutis, and consequent atrophy of the blood-vessels and the epidermis. The changes in the epidermis are slight, consisting of occasional deposits of pigment and mechanical alterations due to pressure. A considerable exudation of small round cells surrounds the narrowed blood-vessels, the sweat and sebaceous glands, and the hair follicles. The lymph spaces are narrowed, and, in the cases in which atrophy occurs, an obliterating endarteritis is present.

The symptoms of a typical, well-developed case of scleroderma are usually so characteristic that the *diagnosis* is readily made. The peculiar induration of the skin characteristic of the malady is found in no other disease except sclerema neonatorum; but this latter affection is met with only in the new-born and the induration of the skin is accompanied by marked coldness of the surface.

The *prognosis* is decidedly unfavorable. While it is true that a certain small proportion of cases end in recovery, the disease usually lasts for years even when recovery does take place. When atrophy occurs, a return of the skin to its normal condition is not to be expected. In cases in which a considerable part of the integument is involved, interfering greatly with movements of the limbs, death may eventually take place with symptoms of marasmus; or, owing to his debilitated condition, the patient may fall an easy prey to some intercurrent affection.

Treatment.—Patients with scleroderma should be given an abundance of easily digested, assimilable food, such as milk, eggs, and butter. The clothing should be warm and abundant, so that there may be no danger of chill. Such tonic remedies as iron, quinine, arsenic, cod-liver oil, may be given with the view of improving the patient's general health. Massage and frictions with bland oils and fats should be systematically and persistently employed for the purpose of improving the nutrition of the skin. Mild galvanic currents may be applied to the indurated skin to improve the circulation and nutrition. Drugs have little, if any, direct influence over the course of the disease. Thyroid extract has been given with asserted good effect, but its value is doubtful. Hans Hebra has reported marked benefit from hypodermatic injections of thiosinamin, one-half a Pravaz syringeful of a fifteen-per-cent. alcoholic solution being given every second day; and more recently Neisser has recommended the same treatment. Liebreich found considerable improvement follow the internal use of cantharidin in doses of 0.0002 gm.

Milton B. Hartzell.

SCOLIOSIS. See *Lateral Curvature of the Spine.*

SCOPOLA.—(*Scopola Belladonna;* incorrectly, "Japanese belladonna.") The dried rhizome of *Scopola carniolica* Jacq. (fam. *Solanaceæ*).

This drug is chiefly of interest at the present time because of the very extensive use of its extract, like that of belladonna root extract, to substitute belladonna leaf extract, which last is officially directed to be used in the manufacture of belladonna plaster (see *Belladonna*). Scopola is, however, likely to be introduced into the forthcoming edition of the Pharmacopœia. The very similar species *S. Japonica* Maxim., of Japan, is the real *Japanese belladonna*. The Japanese Pharmacopœia is said to authorize its use, as an alternative, whenever belladonna is prescribed. This species is not with us a commercial article.

S. carniolica is a native of Central and Southern Europe. The plant somewhat resembles the belladonna plant. The leaves, which are considerably used for adulterating belladonna leaf, are not so large as the latter and are narrowly obovate, instead of broadly ovate, and have a tapering base. The underground portion of the plant is very different from that of belladonna, consisting of a tortuous horizontal rhizome from which descend, vertically, numerous roots, quite closely resembling belladonna roots, though averaging only half the size or less, and of a rather bright yellowish- or brownish-red, instead of the dull gray color of belladonna root, and usually rather evenly marked with small, transversely oblong, light-colored scars. The rhizome, of which the drug almost wholly consists, is usually from two to four inches in length, as thick as the fingers, sympodial in development, shortly and sharply flexuous, and marked on the upper surface with rather closely set large shallowly cup-shaped stem scars. The outer surface is gray-brown, mostly darker than that of belladonna root. Its fracture is accompanied by the emission of the same puff of dust that accompanies that of belladonna root, and the internal color is much the same, though usually somewhat darker than that of the latter.

The important constituents of scopola are its alkaloids, of which the total amount averages about the same as in belladonna root, namely, a little more than a half of one per cent. The composition of this alkaloid is as yet uncertain. It has been believed that about one-tenth of it is hyoscine (which see), but some recent analyses appear to indicate that there is much less. The remainder is a mixture of hyoscyamine and atropine. It has been believed that it is composed mostly of the former, but our ideas of the relations between these two alkaloids, both

here and in belladonna, must be regarded as in a transition state.

Since the publication of our article on belladonna and atropine, a very remarkable discovery concerning this subject has been made, the conclusions having been reached independently by a chemist at Marburg and by Cushny and Schlotterbeck at Ann Arbor, the latter working along physiological lines. It has been found that hyoscyamine presents two forms, one dextrogyre, the other lævogyre, the one inert physiologically, the other acting precisely like atropine, but with exactly twice the energy. These two, combined, make atropine, of intermediate strength and optically inactive. It now remains for the percentages of these alkaloids and of the respective forms of hyoscyamine to be determined anew.

From what has preceded, it is apparent that the action of scopola will be practically that of belladonna in kind, and that their relative strengths cannot be stated positively until questions regarding the constituents shall have been more definitely settled. The present indications are that they are almost equal in strength, and that scopola can be used, in the same doses, for all the purposes for which belladonna root is used.

Henry H. Rusby.

SCROFULA.—Precisely analyzed from the standpoint of modern pathological anatomy and bacteriology, scrofula or scrofulosis may be defined as tuberculous lymphadenitis (see *Lymph Nodes, Diseases of*). Clinically it should be considered as the chronic form of tuberculosis of lymph glands. As thus defined it is evident that the term has no excuse for existence *per se*, and deserves recognition only in a synonymous sense. In fact, because of the confusion attending its proper usage, and because the principal condition to which it is applied can be more specifically designated, it would be better definitely to abandon the word scrofula as has already been advocated. In consideration of its historical interest, and on account of the persistency with which it adheres to popular parlance, scrofula still claims a passing notice.

Strictly speaking, then, scrofula is a morbid state whose chief anomaly is a tuberculosis of lymph glands, more especially the nodes of the cervical region and of the mesentery, occurring commonly in childhood, though not confined to this period. Accompanying this adenitis is a constitutional disorder formerly regarded as a distinctive dyscrasia (the "*scrofulous*" or "*strumous*" *diathesis*), but which is now known to be the anæmic, cachectic, or debilitated state attending tuberculous infection or intoxication. A broader and more ancient conception included as scrofulous such affections as tuberculosis of bones and joints, of the skin (*scrofulodermas*, or more properly, *tuberculides*), and of the mucous membranes, and even the various forms of visceral tuberculosis. A more serious misuse of the term is that which would comprise all disorders accompanied with hyperplasia or hypertrophy of lymphatic glandular structures. Thus the adenitis of other chronic infections, like the atypical pyogenic, the syphilitic, that of glanders and that of actinomycosis have been regarded as scrofula. Leukæmia, and more particularly pseudoleukæmia (Hodgkin's disease), have been classed with it at times, and the error still persists of confounding status lymphaticus (see *Status Lymphaticus*) and scrofula. So far as Hodgkin's disease is concerned, there may be some justification for its having been regarded in the same light as scrofula, especially in view of the researches of the last five years, which tend to show that the diffuse lymphadenitis of so-called pseudoleukæmia is occasionally, at least, the result of an infection with the bacillus of tuberculosis in which the morbid changes have pursued an anomalous course.

Besides the more pronounced manifestations such as pertain to the glandular system, other minor affections which we now regard as secondary complications, were included among the evidences of scrofula. Examples of these are the scrofulous keratitis, conjunctivitis and blepharitis, various forms of otitis media, nasal and pharyngeal catarrh, and eczema or other skin diseases. The constitutional types once the subject of much attention, by which scrofulous individuals were classed as the "sanguine," "phlegmatic," and "pretty," are no longer regarded otherwise than indicative of a tuberculous taint either hereditary or acquired.

In fine, used in its most exclusive sense as indicating a tuberculous lymphadenitis, scrofula claims distinction only in that it refers to a sluggish, chronic tuberculous infection in which the exciting agent, the bacillus of tuberculosis, frequently seems to exist in a state of attenuated virulence. Or, it may be, that some of these infections result from other atypical members of the ray-fungus group of parasites allied to the tubercle bacillus in morphology and tinctorial reactions, but endowed with diminished pathogenic powers.

Otherwise scrofula is tuberculosis, as manifested not only by its morbid anatomy and histology, and its bacteriology (as concerns the presence of the specific bacillus both in the diseased tissues and in cultures), and also by the results of inoculation experiments. This conclusion was reached by the more astute pathological anatomists, particularly of the German and Austrian schools, even before the advent of the bacteriological era, and there is no disposition to question it to-day after the critical modern studies in which the more precise methods of histological and bacteriological analysis have been employed. Hence a discussion of scrofula is based upon a study of chronic tuberculosis of the lymphatic glands, variously complicated with such anomalies as cutaneous, osseous, and synovial tuberculosis; and the scrofulous or strumous diathesis becomes the dyscrasia attending local or general tuberculosis either in its latent or in its chronic state. For the elucidation of such phases of the question as pathology, etiology, diagnosis, prognosis, and treatment of scrofula, therefore, the student is referred to the treatises upon tuberculosis in its various aspects and more especially those which refer to chronic tuberculous lymphadenitis. An exhaustive résumé of the bibliography of scrofula, mostly of interest from the historical standpoint to-day, is presented by Cornet (Nothnagel's "Specielle Pathologie u. Therapie," Bd. xiv.).

A. P. Ohlmacher.

SCROFULODERMA.—This form of tuberculosis of the skin includes those cases in which the skin is involved by infection from diseased lymph channels and nodes. Playing as it does only a secondary part, the cutaneous tissue is involved only when the breaking-down glands or nodules are evacuated. This gives rise to both openings and sinuses in the skin which lead to the necrosed material. The discharge is thin and contains cheesy matter and leucocytes. The tubercle bacilli have been demonstrated both in the discharge and in the walls of the sinuses.

Oscar H. Holder.

SCROPHULARIACEÆ (the Figwort family).—A large, widely distributed and diversified family, comprising more than one hundred and seventy-five genera and about twenty-five hundred species. It yields the important drugs Leptandra and Digitalis, besides which quite a large number are or have been employed to a lesser extent. Several of these, as follows, are of sufficient importance to be entitled to brief mention. The active constituents of this family appear to be chiefly glucosidal.

Mullein is a title commonly applied in this country to the fresh or dried leaves of *Verbascum Thapsus* L., an exceedingly coarse, stout herb, with a simple and erect stem, native of Europe, and now growing everywhere as a weed in the Eastern United States. The large, obovate, thick leaves are densely woolly, and are sometimes applied as a mild counter-irritant, usually in the entire condition, but sometimes made into a poultice. They are mucilaginous and very slightly bitter. They are sometimes made into a tea and used as a demulcent in irritating cough. They possess slight laxative properties. In Europe the name mullein is more commonly applied to the flowers of this and related species. They

possess constituents similar to those of the leaves and are similarly employed, though they contain a little volatile oil and coloring matter. Olive oil in which they have been macerated has quite a high domestic repute in many localities as an emollient.

Hedge Hyssop is the common name of a little perennial herb, *Gratiola officinalis* L., of Europe, which contains one or more glucosides, the very bitter crystalline one, *gratiolin*, being apparently the active agent. Its medicinal properties entitle it to a thorough investigation, since it is so active as to constitute a rather powerful emetico-cathartic poison, with marked diuretic properties. Its use, in doses of 0.2–1 gm. (gr. iij.–xv.), has been wholly unscientific, applying especially to gout and rheumatism.

Figwort is the dried herb of one or more species of *Scrophularia*, the genus from which the family takes its name. Like the last, the drug has not received any scientific investigation. Its bitter crystalline contituent, probably a glucoside, has been called *scrophularin*. There is also a very small amount of a volatile oil. Figwort appears to have some slight anthelmintic powers, but has been chiefly used, like mullein, in the form of a poultice. Its use is far more common in Europe than in this country. *Henry H. Rusby.*

SCURVY; SCORBUTUS.—(Including Barlow's Disease.)—Definition.—Scurvy is a systemic disease dependent upon an improper or ill-balanced dietary, characterized in its general expression by anæmia (secondary), hemorrhages into the skin and subjacent tissues, spongy or ulcerating gums, progressive debility and emaciation, resulting in death unless checked in its course by the necessary dietetic and medicinal treatment. The word scurvy is probably of Scandinavian origin, the Swedish *skörbjugg*, Danish *skojærbug*, being equivalent to the German *Scharbock*, meaning soft or relaxed stomach.

General Considerations.—Throughout all ages scurvy has been one of the classical diseases of mankind, and although it has been successfully eliminated as one of the social and sanitary problems of civilized life, yet it would be a great mistake to infer that, by reason of our better knowledge of its causation and character, it has ceased to be a possibility in our modern surroundings. Cases continue to be reported in our most recent journals. The ancient writers abound in references to it, giving in fanciful terms their theories as to its nature and cause. In his work on "Airs, Waters, and Places," Hippocrates describes the disease in an unmistakable manner, and Pliny and Strabo give us satisfactory accounts of scurvy as it appeared among the troops in the campaigns of Cæsar Germanicus and Ælius Gallus. Indeed, it has been from time immemorial the scourge of armies, ravaging the ranks of the crusaders, the soldiers of the Middle Ages in their long sieges, the cohorts of Napoleon in Egypt, and even the troopers of the last decade of the nineteenth century, in all parts of the world where warfare is carried on under climatic or dietetic conditions new and strange to the soldier. In our own country it has invalided half a garrison, at Council Bluffs (1820) resulting in a mortality of over thirty per cent., and later during the Mexican war our troops suffered from its appearance while in that country. During the civil war the statistics of this disease show a total of 46,910 cases in the Union army, of which 771 proved directly fatal, a small relative ratio, but it undoubtedly expended its force indirectly as a contributary factor in the termination of other cases with which it was concurrent. The same experience is recorded in the Crimean War, where 23,365 cases occurred in the French army, and 17,557 in the British army, while the numbers in the Turkish army were almost countless, as that force was practically decimated by its ravages. The Franco-Prussian war again recorded its appearance, though with a much lessened ratio of invalidism, and the Russo-Turkish War repeated the story. In the German army, as late as 1897, there were seventy-four cases of scurvy, and in the Russian and Austrian armies, the same year, a ratio of over one per thousand strength. But in the popular conception, as well as in the professional mind, scurvy is looked upon as a disease of the sea, and of those "who go down to the sea in ships and have their business in great waters." Beginning with the first known geographical explorations of the fifteenth century, involving long voyages in unknown oceans, the records of those famous discoverers always included with their marvellous tales of "new-found lands" the story of sufferings and death among their intrepid seamen from the disease then known as scurvy. Pierre Quirino, Vasco de Gama, and Jacques Cartier all record the ravages of this disease among the crews of their vessels. As late as the eighteenth century Anson lost more than four-fifths of his men while sailing round the world. Coming down to modern times, the experience of the Marine-Hospital Service of the United States, whose function is, in part, to care for sick and disabled seamen of the merchant marine, is the most accurate index to its prevalence among American sailors, as well as a few of other flags who are treated in our marine hospitals. From the statistics compiled for a period of twenty-eight years (1872 to 1899 inclusive) the following table has been constructed to show its occurrence and frequency:

Cases of Scurvy Treated in United States Marine Hospitals from 1872 to 1898 Inclusive.

Year.	Number of cases scurvy.	All diseases treated.	Year.	Number of cases scurvy.	All diseases treated.
1872.....	18	13,156	1888.....	17	48,203
1873.....	47	13,529	1889.....	32	49,518
1874.....	59	14,356	1890.....	28	50,071
1875.....	25	15,009	1891.....	32	52,962
1876–77.....	89	31,983	1892.....	30	53,610
1877–79.....	24	39,155	1893.....	34	53,317
1880.....	39	24,860	1894.....	27	52,803
1881.....	42	32,613	1895.....	14	52,643
1882.....	55	36,184	1896.....	24	53,804
1883.....	43	40,195	1897.....	20	54,477
1884.....	27	44,761	1898.....	6	52,709
1885.....	34	41,714	1899.....	3	55,489
1886.....	18	43,822		824	1,066,887
1887.....	37	45,314			

This is less than one per thousand cases treated for the period stated. Dividing the twenty-eight years into three periods, the following result is obtained: 1872–1880, 301 cases; 1881–1889, 305 cases; 1890–1899, 218 cases.

These figures require but little explanation beyond stating that about half of the cases of scurvy treated by the service is reported from the stations on the Pacific coast, principally San Francisco. These cases are taken from vessels coming "round the Horn" from England or elsewhere, a long voyage of several months, in which the conditions of diet, confinement, lack of exercise, etc., aid the development of the disease. While on duty at San Francisco the writer had opportunities to study and treat about seventy-five cases of scurvy in the course of three years, and it is from this experience that he has derived his practical knowledge of the disease.

Etiology.—Scurvy—speaking in general terms—is a disease dependent on diet and occupation. It exists either in epidemic or in endemic form whenever persons subsist for a prolonged period on a dietary which does not contain fresh vegetables, or vegetables in a properly preserved state. This condition, when aggravated by an unsanitary environment, is thereby accentuated. It is still a subject of controversy what may be the precise elements in this vegetarian problem, to the lack of which are logically due the scorbutic symptoms. Everything, however, tends to the conclusion that the disease is dependent upon the insufficient ingestion or the deprivation of the potassium salts of fruits and vegetables. These salts, in which potatoes, for example, are so rich, must have a very potent influence in maintaining the alkalinity of the blood and preventing acid intoxication. When to this lack of vegetables, with their organic and inorganic

elements, is added the enforced adhesion to a meat diet, especially if salted, or preserved by other similar processes, we have the ideal conditions under which scurvy begins and maintains its invasion. Resulting from this is a probable hyperacidity of the blood through the loss of the carbonates derived from the vegetable salts and the following loss of coagulability, with progressive anæmia. In this state of theoretical acid intoxication there is an increase in the ammonia-neutralized acid excreted as compared with the free acid. The blood is found to be dark and thin. The morphological changes are those of secondary anæmias, as from hemorrhage. Various observers have noted the changes in the count of red cells in proportion to the severity of the disease, the duration, and the hemorrhages. Megalocytes and shrunken microcytes have been seen in grave cases. Red cells in solution in the plasma are reported by Albertoni. The Hb index is low, according to White, while several other investigators have made conflicting statements as to the relative ratios of iron, sodium, and potassium salts and leucocytes. Altogether, the present state of knowledge of the morphology of the blood is not enlightening, and further studies are necessary to determine the significance of the conditions which are claimed by them as pathognomonic.

A recent contribution to the discussion on this portion of the subject is that made by Albertoni, who has shown in some studies of the chemistry of the blood and of digestion that there is a serious deviation from normal in the free HCl of the gastric juice, that intestinal putrefaction is excessive and that the urine furnishes abundant evidence of the absorption of toxins, while the absorption of fats and carbohydrates is deficient. He concluded that the greenish-yellow color of the serum and the excess of pigments in the urine were proofs of active destruction of the blood cells.

As a corollary to this toxic indication may be mentioned the theory, worthy of investigation, that the disease is in reality a chronic ptomaïn poisoning due to putrefactive changes in badly preserved animal food, such as salt beef and canned meats. It is held that if these provisions were properly sterilized there would be no scurvy. It is not an infrequent complaint among seamen suffering from scorbutic conditions that the "salt horse" was of an offensive odor, and this observation was made among the laborers employed on the construction of a transcontinental railroad where scurvy appeared among foreigners who used this tainted meat with a plentiful supply of flour, beans, and peas.

Scurvy is not believed to be contagious or infectious. Thus far no micro-organism has been found to be of determining value in such investigations as have been made by investigators. The field has not proved to be an inviting or fertile one for bacteriologists of admitted skill. Some experiments have been made with the blood of scorbutic patients, with portions of the spongy gums and with material taken from the hemorrhagic lesions, but the results are not satisfying nor constant. It has been noted in epidemics that children suckling scorbutic mothers did not develop the disease, and in a given ship from which cases of scurvy have been taken, except in extreme conditions, only the forecastle, where the diet was restricted to certain kinds of food, would be invaded. Isolated cases of scurvy have been found dependent upon conditions that favor either the nutritional, the toxic, or the infectious theories of the etiology of the disease advanced by various writers, but thus far the deficient vegetable dietary offers us the most practical evidence in our search for a factor that responds to all the tests of probability. Ever since Bachstrom set forth this theory in 1734—viz., the lack of fresh vegetables in the food—it has held its ground through the successive investigations of Garrod, Buzzard, and Ralfe, each carrying on by successive steps the study of this phase of the question. The last-named investigator, last in point of time as well, has formulated this theory in the following terms: The alkaline salts of vegetable acids (malic, citric, tartaric, etc.) are concerned with the normal transformation of the carbonates of the blood; the actual factor is thus a chemical alteration in the quality of the blood, a diminution of its alkalinity; that this follows the withdrawal of salts having an alkaline reaction, such as the alkaline carbonates; that this scorbutic condition is the same as that produced experimentally by injecting acid into the blood of animals, feeding with acid salts, etc., viz., a dissolution of corpuscles, purpuric spots, and other particular signs of the disease. The morphology of the blood is disappointing in so far as it fails to afford any sure index of the condition.

While scurvy is a disease of diet and occupation, it is not a disease of country, race, sex, age, or season. It is found in all zones, among all peoples where the conditions favor it; it knows no sex, though males probably contribute a greater proportion to the statistical tables, for the evident reason that they are more usually subjected to the favoring conditions; and in the matter of age it is met with from infancy to dotage. Naturally, it prevails in those countries and among those peoples whose observances of hygienic laws are "more honored in the breach," but it is found among civilized races as well. Institutions for the aged furnish cases occasionally, but on the whole it can be said that it is a disease of adult life rather than of the extremes of age. The winter season, for obvious reasons, adds to the number of cases when the disease exists in epidemic or endemic form. As to occupation it was once thought to be a disease peculiar to the seafaring life, but it is found more on land than on the sea.

Clinical History.—A progressive upward and downward curve marks the course of a case of scurvy from its onset to its finish. It has no definite attack, no crisis. Unless the patient is under conditions known to him to be causative, as in the case of seamen on a long voyage, the approach is without warning. The preliminary symptoms are those general signs of decreasing strength, mental depression, pallor, loss of flesh, anorexia, and perhaps some gastro-intestinal disturbance. This is gradually followed by the more characteristic features of the disease. The skin becomes dry, there is "pinching" of the features, the complexion becomes of a dirty hue, for want of a more applicable term, and the gingival mucous membrane at the free margin becomes swollen and spongy. This is one of the typical features of a case of scurvy. The gums bleed upon slight pressure, appear bluish in spots, and often ulcerations follow as the scorbutic condition progresses. The gums seem to develop into this soft, necrotic texture around teeth that are broken and decayed, but it is a matter of observation that in the aged who have lost their teeth and in children before the eruption of teeth, these gingival symptoms are practically absent. In severe cases the gums swell, and rising around the teeth partially cover them with a proliferated mass of foul growth, during which time the teeth become loosened in their sockets and dislodgment may follow. The breath becomes intensely fetid as a result, the flow of saliva is increased, the salivary glands sometimes enlarge, and the tongue appears red and swollen. The eating of food is, under these conditions, not only a painful but a disagreeable function, and the sufferer seeks liquid nourishment as a relief. This condition of the gums, which usually begins near the median line at the incisors, is the first characteristic symptom, and hemorrhagic suffusions into the cutaneous, mucous, and deeper tissues is the second typical development of the disease. It is usually synchronous with or later than the gingival symptoms. These subcutaneous hemorrhages appear at first in the lower extremities, about the ankles, in the form of petechial macules, varying in size and most of them having a hair follicle in the centre. They resemble ecchymoses in some cases, in others purpura and similar cutaneous disorders. While they develop spontaneously they may be excited by blows or other injuries. The larger coalesced spots show chromatic gradations of brown, green, and yellow at the periphery similar to the "black and blue" marks following a contusion, but in scurvy there is, in the severe