The only single pathognomonic sign of scabies is the *cuniculus*, furrow, or burrow (German, *Milbengang;* French, *sillon*), which is caused by the penetration of the female beneath the epidermal layer of the skin in the search of a place where she may lay her eggs; the male seldom, if ever, goes beneath the skin. This cuniculus consists of a minute, dark-colored line, generally somewhat beaded in appearance and curved, appearing much as if a bit of dark sewing-silk had been run beneath the surface; rarely, it is as long as a fourth of an inch, more often half that length; and generally it may be seen to terminate at one end in an inflamed papule or vesicle, or sometimes to run over a pustule. The female insect will be found at that end of the furrow, and the dark line is her track, which is found to be filled with eggs in various stages of development, and, among them, black particles of fæces. If the skin is washed these dark lines, instead of being removed, become more apparent; but in recent cases, or in individuals who are very cleanly or have undergone treatment, it is often impossible to discover any of these cuniculi, although the disease may still exist, and, if left alone, itwill increase and may be communicated to others.

Scabies is not a very frequent disease in this country, forming only about 1.5 per cent. of a large number of skin cases analyzed. In other countries it is more common, and in Glasgow it formed twenty-five per cent. of ten thousand cases analyzed by McCall Anderson.

Diagnosis.—Considerable care is often required to diagnose a mild or unusual case of scabies, and cases sometimes go unrecognized for a long time. The disease most commonly confounded with it is eczema, which may present almost identical appearances, except that there are no cuniculi; when these latter are positively found the diagnosis is certain. The location and distribution of the eruption, the history of contagion, and the multiform character of the lesions are generally sufficient to establish the diagnosis. Scabies may also be confounded with lichen, pityriasis, prurigo, pruritus, and urticaria papulosa.

Etiology.—There is but one cause of scabies, the presence of the parasite (acarus or sarcoptes scabiei), whose removal or destruction is followed by the cessation of the disease. It often occurs, however, that the treatment employed may occasion an amount of artificial eruption or dermatitis which may mask the true affection, and may even remain after the real cause of the disease has been destroyed; this second eruption may require a very different treatment, of a soothing character.

Pathology.—The only pathologial lesions, aside from the presence of the cuniculus, are those connected with inflammation of the skin. The lesions are simply inflammatory areas of greater or less size, caused either by the direct irritation of the burrowing insect, or by the scratching or other measures employed for the relief of the itching, or by both. When the local irritation is removed the eruption ceases; if the acari could all be removed mechanically, picked out, there would be no eruption. In patients who are paralyzed on one side, or who have been unable to scratch, there is very little eruption on the portions of the skin which are out of reach.

Treatment.—The treatment of scabies is purely local and consists in such measures as destroy the life of the parasitic insects and their eggs. The patient first takes a warm bath, using plenty of strong soap rather alkaline in character, such as the sapo viridis or the common laundry soap, and rubbing the affected parts so as to break the furrows as much as possible. After drying, the affected parts, or even much of the body, should be well rubbed with an ointment of which sulphur is a chief ingredient. The ordinary sulphur ointment diluted once, with the addition of a drachm of liquid storax to the ounce, answers as well as anything. After thorough friction with this for at least half an hour, the patient puts on underclothes which are to remain on night and day until the end of treatment. The ointment should be freshly rubbed in twice daily for several days, and a bath is to be taken on the third day, the ointment being again rubbed in and a fresh suit of underclothes put on. After three days more of treatment another bath may be taken, and it is then to be expected that the cure is complete. But frequently some of the cuniculi will be found to have escaped being broken, or new infection may come from the clothing or elsewhere, and in such case the treatment must be repeated. Sometimes an artificial eruption is excited by the treatment, when soothing remedies are required. The clothing should always be treated; the underclothes should be boiled a long time and very thoroughly ironed; the outer garments may be baked or very thoroughly ironed on the wrong side. Patients should be more or less isolated, although when they are under treatment the chances of communicating the disease are very small.

Prognosis.—The prognosis is, of course, favorable; there can never be the slightest harm in curing even the most inveterate or severe cases of scabies. In the hospitals abroad it is claimed that a cure is effected in a few hours, but it is questionable if, in the large majority of cases, the relief is more than temporary, a portion only of the parasites being killed. Practically, cases require treatment for a number of days, or even weeks, to make the cure certain; when the skin is delicate the active parasitic treatment may have to be interrupted, owing to the dermatitis excited, and occasionally it will be found difficult to use remedies strong enough to effect a cure.

L. Duncan Bulkley.

SCAMMONY.—(*Scammonium*, U. S. P., B. P.) A resinous exudation from the living root of *Convolvulus Scammonia* L. (fam. *Convolvulaceæ*). This is a perennial herb of the Levant, having a long, thick, cylindrical, several-headed, but otherwise usually simple, milky-juiced root, and numerous twining stems, resembling those of an ordinary morning-glory vine. The root, which is official in the British Pharmacopœia, is up to a metre in length, and a decimetre in diameter, at the crown, light brownish-yellow without, white within, fleshy, and resinous. The scammony is collected by cutting off the living root at the crown and either scraping off the exudation as it appears or placing some receptacle, commonly a mussel shell, at the lower side to receive it as it runs down. It may dry at once, a very high grade of the drug thus resulting; or, as is more usual, the separate collections are laid aside until enough is accumulated to make a "cake," when it is all moistened and kneaded together. In this way the bubbles and sour odor of what is known as "Virgin scammony," are produced.

Scammony is in irregular, angular pieces, or circular cakes, greenish-gray or blackish, internally porous and of a resinous lustre, breaking with an angular fracture; odor peculiar, somewhat cheeselike; taste slightly acrid; powder gray or greenish-gray. The porous, bubbly texture and the sour, cheesy smell are results of fermentation during the process of drying. It is soluble to the extent of three-fourths in ether. The costliness and opaque color of scammony render it especially liable to adulteration. Lime, flour, ashes, gum, etc., are among the common admixtures. The proportion of resin is the best test of purity. This resin (*Resina Scammonii*, U. S. P.) is obtained by digesting the drug with alcohol and evaporating the tincture so obtained, or by treating the root in the same way. It is a brown, translucent brittle resin, with a sweet fragrant odor if obtained from the root; but, as is usually seen, from crude scammony, it is more greenish and dirty in color, and has the odor of scammony itself. In action and value the two products are about the same.

Composition.—The peculiar resin of scammony, unfortunately called *jalapin*, and now known as *scammonin*, first obtained in a state of purity by Johnston, in 1840, differs from the *convolvulin* of jalap by its solubility in ether.

When purified, it is a colorless, translucent, brittle non-crystalline resin, tasteless and odorless, of nearly neutral reaction, and freely soluble in ether. It is a glucoside, and resolvable into *scammonic acid*, a crystalline substance, and sugar. Good scammony contains eighty or ninety per cent. of this resin.

Action and Use.—Scammony and its resin are to be counted among the very active drastics, excelled only by croton oil and elaterium. Their action is similar to that of jalap, but considerably more intense. They are used as derivatives and hydragogue cathartics in cases of cardiac and renal troubles associated with dropsy. The action of scammony resembles that of jalap, but is more intense. Aromatics and carminatives are appropriate adjuvants. Dose, of good scammony, half a gram or so; of the resin, 3 or 4 dgm. The compound extract of colocynth contains fourteen per cent. of resin of scammony.

W. P. Bolles.

SCAPULA, SURGICAL AFFECTIONS OF THE.—Diseases of the Scapula.—Acute periostitis and osteomyelitis of the scapula are rare. When present they are usually the result of traumatism followed by infection, and affect most commonly prominent portions of the bone, such as the spine.

Tuberculous osteomyelitis of the scapula is much more common and may give rise to extensive caries and necrosis. Cold abscesses may form and reach the surface at some distance from the focus in the bone. In rare cases the shoulder-joint may become involved.

The treatment of tuberculous disease will depend upon the extent of the local process. Small foci may be scraped out with the Volkmann spoon and treated later by iodoform injections. Larger foci may require resection of a part of the bone, such as a portion of the body or the spine. Complete excision of the scapula is seldom indicated.

Tumors of the Scapula may be either benign or malignant, the latter being the most common. A recent collection of 64 cases made by Langenhagen showed the following relative frequency: Exostosis, 8; chondroma, 14; fibroma, 5; carcinoma, 23; sarcoma, 12; uncertain tumors, 2.

The tumor may reach an enormous size, and in case of the malignant varieties the surrounding parts may become invaded. Some tumors grow into the axilla, others spread to the adjacent muscles, and may eventually ulcerate through the skin. Metastases may occur in the pleura, lungs, vertebræ, or some other internal organ.

The treatment of malignant neoplasms consists in excision of the scapula provided that the tumor has not involved the arm. In the latter case removal of this as well may be indicated (interscapulo-thoracic amputation).

Benign tumors, when circumscribed, may be removed by partial resection of the portion of bone involved. The usual incision for excision of the scapula begins over the acromion, runs along the spine to its inner border and there descends to the angle. Through this incision the muscular attachments are divided close to the bone, and the whole bone is removed. If possible that part of the acromion should be preserved which receives the insertions of the trapezius and deltoid muscles. Otherwise the function of these muscles will be lost.

Fractures of the Scapula.—These are comparatively rare injuries (according to various authors from one to four per cent. of all fractures), and occur chiefly in adult males.

The following varieties of fractures occur:

1. Fracture of the body of the scapula (including one of the angles).
2. Fracture of the glenoid cavity.
3. Fracture of the neck.
4. Fracture of the acromion and spine.
5. Fracture of the coracoid process.

1. *Fractures of the Body* are the most common. They occur usually in the infraspinous fossa, and the line of fracture is most commonly transverse. The cause is blunt violence, such as a blow or fall, and there may be considerable contusion of the overlying soft parts. In case of multiple fractures, there may be several fissures radiating from a central point. Fractures of the lower angle form a comparatively common group of fractures of the body, and may be accompanied by considerable displacement of the small lower fragment. Fractures of the upper angle are far less frequent.

The objective symptoms of fractures of the body are, as in other fractures: crepitus, false motion, and localized tenderness. These signs are not always easy to make out, especially in muscular subjects or in case of marked swelling. The scapula can be brought into prominence and thus be easier to palpate if the elbow is drawn inward in front of the chest or the arm carried backward and inward. Dislocation of the fragments is most marked in fractures of the lower angle, and is then due to the combined action of the teres major and serratus magnus muscles upon the lower fragment.

The prognosis of these fractures is good. Bony union usually takes place promptly under proper immobilization, and the function of the arm is not impaired. In the rare cases of compound fracture suppuration may occur, and the pus may burrow downward between the scapula and the muscles of the back.

The treatment consists in immobilization of the shoulder and scapula in that position which overcomes the deformity. The arm can be kept in this position by means of a Velpeau bandage to which may be added some turns of a plaster-of-Paris bandage. In about four weeks the fracture should be solid and movements of the arm may be begun. König recommends in some cases suture of the fragments.

2. *Fractures of the Glenoid Cavity.*—These are rare fractures which may involve chipping off of some portion or of the whole of the articular surface (fractures of the anatomical neck). They are sometimes associated with dislocation of the humerus. The symptoms are very obscure, and it is doubtful if a diagnosis can be made. As a dislocation of the humerus is often present, the treatment would be that of the dislocation.

3. *Fractures of the Neck of the Scapula* are of considerable practical importance. The line of fracture runs downward from the incisura scapulæ. The causes are usually some form of direct violence applied to the shoulder region, such as a blow or fall.

The symptoms resemble somewhat those of dislocation of the head of the humerus. There are a flattening of the shoulder and abduction of the arm; the acromion is prominent, and the axis of the arm is not directed toward the shoulder-joint. The chief point of difference is that the fractured piece can be felt in the axilla as an irregular object not resembling the smooth head of the humerus. By grasping the coracoid process with the middle finger and the posterior aspect of the shoulder with the thumb, crepitus can be felt on rotation of the arm. Crepitus can also be felt by palpation in the axilla. The deformity of the shoulder can be readily overcome by upward pressure on the fragments within the axilla, but recurs again as soon as pressure is stopped. In dislocation of the shoulder, on the other hand, the deformity is made to disappear only by special movements for reposition of the head of the bone.

The treatment consists in replacing the fragment by upward pressure and maintaining it in place by a pad in the axilla. The arm is secured to the body by means of a Velpeau bandage. Plaster bandages may be applied as an outside dressing. The fracture sometimes requires as long as from ten to twelve weeks for consolidation.

4. *Fractures of the Acromion and Spine* are produced by direct violence upon these prominent portions of the bone. The line of fracture is usually transverse. The most important symptoms are the irregularity in the outline of the bone, localized tenderness, and occasionally crepitus. In case of the acromion, the fracture lies either in front of the acromio-clavicular joint or near the base of the acromion. The outer fragment may be displaced downward from the weight of the arm. The treatment of fractures of the spine consists in immobilization of the arm in a flexed position. In fractures of the acromion the outer fragment is elevated by pressing the humerus upward. It is retained in position by means of a bandage

bound around the shoulder and body or by an adhesive plaster strip supporting the elbow and crossing itself over the point of fracture.

5. *Fractures of the Coracoid Process.*—These are very rare and are usually combined with some other fracture or dislocation in the vicinity. The fracture is usually near the base of the process, and results most commonly from direct violence, although muscular contraction has been known to produce it.

The chief symptoms are local swelling, ecchymosis, abnormal mobility, and crepitus. Pain can be elicited by flexion of the forearm in a supinated position, as this brings the short head of the biceps muscle into action.

The treatment consists in immobilization of the arm in a flexed position by means of a Velpeau bandage.

Benjamin T. Tilton.

SCARLET FEVER.—Synonyms: *Scarlatina* (English and Italian); *Scharlach* (German); *Scarlatine* (French); *Escarlatina* (Spanish).

Definition.—Scarlet fever is an eruptive contagious fever. Its incubative period is brief, rarely less than twenty-four hours, usually lasting for from four to six days, and not often exceeding this duration. This period is succeeded by a period of invasion, which is ushered in by fever, usually of considerable intensity, and by sore throat. A scarlet eruption begins to appear before the end of the second day, and marks the end of the prodromal, and the beginning of the eruptive, period. The eruption rapidly becomes general, and the tongue becomes stripped of its coating and assumes a raspberry-red color. The eruption slowly fades after the first few days. The fever persists until the sixth, seventh, or eighth day, or longer. As the eruption fades, desquamation begins and continues for from eight to fourteen days or more. It is peculiar in being lamellar, sometimes occurring in very large shreds and exfoliations. During the attack, and for weeks subsequently, there is an especial predisposition to renal inflammation. Scarlet fever attacks children more especially. It usually affects an individual but once.

History.—Scarlet fever is probably a disease of very ancient origin, though until three centuries ago medical writers had not recognized it; indeed, definite knowledge of it as a specific, independent affection dates back hardly two hundred years, although as early as 1589 an epidemic, which we now presume to have been scarlet fever, was described as having occurred in Sicily in 1543 (Paulus Restiva).[1] It was not until 1676 that Sydenham definitely separated this malady, as "*febris scarlatina*," from measles, and gave it an established position. The observations of writers had already been leading them toward similar views, and within a few years scarlatina became recognized all over Europe. Although its place of origin can never be known, it is probably of European birth; for it is a remarkable fact that scarlet fever has never succeeded in gaining a firm foothold in Asia or Africa. According to Hirsch, in whose most valuable work these facts have been recorded, the coast of Asia Minor is the only Asiatic district which is frequently visited with scarlatina in its severe forms. In nearly all other parts of Asia it occurs not at all, or only sporadically. Wernich, in 1871, declared the disease to be quite unknown there. In Africa, Hirsch states that it is only in Algiers and in the Azores that it is at all common. Following the carefully recorded data of Hirsch, scarlet fever appeared first in America, in New England, in 1735. It extended as far south as Philadelphia in 1746, and penetrated to Ohio in 1791. Not until 1851 was it seen in California. In 1830 it began to be generally observed in South America. In the West Indies it was first observed in 1802, in Martinique, as a mild epidemic. Greenland has heretofore escaped with but a solitary case. Australia and Polynesia appear to have escaped until 1848. In the Polynesian islands, except Tahiti, scarlatina has not been known. It is unquestionable that scarlet fever has never occurred in some localities only because the inhabitants have not been exposed to its influence; but there can be no doubt that in other countries influences prevail that oppose the development of the disease. Whether these are climatic or racial, or due to other causes, is at present unknown. The American Indian is not exempt from its ravages, nor can any different degree of susceptibility be observed in the negro race in the United States. Frick,[2] however, noted a somewhat more pronounced tendency in the negro to scarlet fever.

In the epidemic in Baltimore, between the years 1850 and 1854, of every ten thousand inhabitants 13.8 whites and 10.8 negroes died. This would indicate a relatively greater predisposition in the negro, as in the total population the whites were largely in the majority. Frick's observations were too limited to secure an unhesitating acceptance of his conclusions. It must be noted, however, that in this country the negro is rarely of unmixed African descent. He may have inherited from white progenitors some of their especial liabilities to disease. Drake and others have shown that scarlet fever prevails less in the Southern than in the Northern States. It is also probably true that the disease is more frequent in cold than in hot countries. Yet it cannot be determined that the differences depend upon temperature; Greenland has remained without an epidemic, while Algiers has experienced them frequently. In 1873–75 a severe epidemic of scarlet fever appeared in the Faroë Islands, among people who for at least fifty-seven years, and possibly never before, had not been exposed to scarlet fever.[79] The study of this epidemic, to which reference will frequently be made, gives one interesting data as to the natural course of the disease in a community in which each individual may reasonably be presumed to have been exposed, and in which immunity, due to previous attacks, can be excluded.

Frequency of Epidemics.—Scarlet fever at once shows differences from smallpox and measles in not sweeping over localities in great periodic waves. It may, it is true, sometimes invade very wide areas of territory with astonishing rapidity, but the intervals between epidemics are often very great. Without obeying any well-defined periodic law, measles is often known to prevail with noticeable violence every third or fourth year, frequently disappearing completely in the interim; so, too, smallpox usually exhibits unwonted activity at intervals of from five to ten years, or as soon as popular neglect of vaccination renders a large portion of a community susceptible to it. It is not thus with scarlatina. Hirsch has collected very valuable information upon this point. At Münster fifty years elapsed without the disease appearing. At Ulm there was only one small epidemic in seventeen years. At Tuttlingen scarlet fever had not been seen for thirty-five years previous to the epidemic of 1862–63. A number of writers, however, *have* observed an epidemic cycle in scarlet fever. Thus Fleischmann,[3] at St. Joseph's Hospital, in Vienna, observed one of four years. In Dresden, according to Gerhart, there is an epidemic cycle of from four to five years; in Munich, according to Ranke, one of three years. On the other hand, scarlet fever often prevails sporadically for a long time in a locality, finally to disappear or to spread suddenly far and wide. Mayr[4] states that in Vienna the register shows that scarlatina has never absolutely died out in fifty years. Scarlet fever is remarkable in the varying intensity of cases occurring during a given epidemic, and in the differing severity of epidemics. At one time it was regarded as an insignificant disorder, almost never proving perilous to life. Even now epidemics of an exceedingly mild type are frequent. Graves has told how, between 1800 and 1834, whenever scarlet fever prevailed in Dublin, it was so uniformly mild that medical men attributed the bad results of their predecessors to improper methods of treatment, and flattered themselves upon their superior skill, until a change in type brought their death rate quite up to that of former times.

Etiology.—There is presumptive evidence that scarlatina is due to a specific micro-organism, but the direct and positive proof is so far lacking. Authorities admit

the constant presence of the streptococcus, which may be the direct cause of the inflammatory lesions of the mouth and pharynx, cervical lymph nodes, and probably of the secondary complications, as the heart, kidneys, and other tissues. It is possible that a streptococcus is the specific organism. With the streptococcus, the staphylococcus pyogenes aureus and the pneumococcus are frequently associated. In the light of our present knowledge it is impossible to state whether the toxins which undoubtedly are present are due to the activity of these secondary organisms or to some specific cause.

Class,[76] in a recent paper on the subject, has described a diplococcus, discovered by him, which he believes to be the primary infectious cause of scarlatina. He finds it invariably present in the throat secretions, blood, and scales. He differentiates it from the other micro-organisms because it produces in the pig a disease closely resembling scarlatina, because the blood of patients convalescent from scarlet fever inhibits the growth of the organism, and because it produces nephritis in guinea-pigs. He also shows that a guinea-pig injected with the blood of a patient convalescent from scarlatina may be protected from the pathogenic action of his diplococcus. The coccus in question closely resembles the staphylococcus albus. It is very sensitive to environment and at times is so modified in form as to appear as a diplococcus, a streptococcus, or a streptobacillus, the three forms sometimes being present in the same culture. Its size varies from that of a small point just to be distinguished by a one-twelfth oil-immersion lens to a coccus one-third of the diameter of a red blood corpuscle, as seen in old cultures. For routine work cultures are made in the same way as in diphtheria. It is impossible at present to state the importance of this organism in the diagnosis of scarlatina. The results of animal experimentation are not, however, conclusive.

Recent bacteriological investigations by Pearce[80] and others have not added materially to our knowledge of the specific primary cause of the disease. While we may assume the exciting cause of the disease to be an as yet undetermined germ, in the presence of which alone scarlatina is possible, the question of the predisposing causes is a much wider one and demands careful consideration.

Predisposing Conditions.—There is a widespread impression that scarlet fever prevails more especially during the fall and winter months. There is, indeed, some difference in favor of these seasons, but by no means to the extent that is generally supposed. Hirsch has tabulated the records of 435 epidemics. These prevailed 178 times in the winter, 157 times in spring, 173 times in summer, and 213 times in autumn. The same relative prevalence is shown in his tables of deaths from scarlatina. Of more than 55,000 deaths from scarlet fever in London, from 1838 to 1853, 32.1 per cent. occurred in autumn, 25.2 per cent. in summer, 24.6 per cent. in winter, 22.1 per cent. in spring. These figures, however, cannot be accepted with perfect confidence, as they must have been influenced by the mildness or severity of the several epidemics. Hirsch's data show also the season of prevalence and the severity of type for two hundred and sixty-five epidemics.

Of 77 winter epidemics	42.2 per cent. were mild.	55.8 per cent. were severe.
Of 50 spring epidemics	54.0 per cent. were mild.	46.0 per cent. were severe.
Of 66 summer epidemics	45.5 per cent. were mild.	54.0 per cent. were severe.
Of 72 autumn epidemics	48.6 per cent. were mild.	51.4 per cent. were severe.

The maxima of malignancy fall in winter and summer; but, as Hirsch remarks, the difference is unimportant. It may be concluded, however, that in the spring epidemics are usually less frequent and milder.

Scarlet fever is chiefly observed in young persons, because older people are generally protected by a former attack. Nevertheless, adults who have never had scarlet fever are less liable to take it than children similarly circumstanced. This is not attributable to differences of age, but to feeble individual susceptibility, which probably held as well during the childhood of these persons. The greatest susceptibility appears to exist between the ages of three and six years. Nearly four-fifths of all cases occur in the first ten years of life. In McCollom's table of 1,000 cases of scarlet fever treated in the contagious wards of the Boston City Hospital,[77] 50 per cent. of all cases occurred between two and six years, 78 per cent. in the first ten years, and 90 per cent. before the age of twenty years. It is certain that a not very small percentage of persons successfully resist exposure to the scarlet-fever contagion throughout life. In the epidemic at Thorshavn, Faroë Islands, in 1873–75, from a total population of 930 inhabitants, comprising all ages and not protected by a previous attack against scarlatina, only 38.3 per cent. was infected by scarlet fever. Holt is authority for the statement that not more than one-half of the children exposed take the disease. While, then, it is not difficult to understand why adults seldom take scarlet fever, it is more difficult to account for feeble predisposition observed during the early months of life. Infants less than a year old are rarely attacked, and often escape even when exposed directly and frequently. They do not, however, possess absolute immunity; indeed, scarlatina during fœtal life has been reported. Leale observed such a case, as did also Tourtual. Thomas records several cases occurring in the practice of others. Veit noted scarlet fever in a child fourteen days of age. Numerous similar observations, more or less trustworthy, have been recorded. On the other hand, Murchison saw two new-born infants remain healthy while their mothers suffered from scarlet fever. New-born children are so subject to cutaneous and other disorders that may readily be mistaken for scarlatina, that we may well demand the most definite testimony. Scientific exactness should require that a new-born child must be proven either to have served as the medium of contagion for others, or to have developed characteristic symptoms in the midst of predisposing surroundings. Both sexes are equally susceptible to infection.

The predisposition to scarlet fever is much less universal than that to measles and smallpox. While the two latter diseases will almost certainly attack all unprotected persons exposed to their contagion, scarlet fever often leaves unscathed persons who have been brought into the most intimate personal relations with it. In the epidemic at Thorshavn referred to above, only 38.3 per cent. of the total population proved to be susceptible to scarlatina, whereas in the same population in an epidemic of measles in 1875, 99 per cent. of those not protected by a previous attack was shown to be susceptible to measles. It is consequently much easier to practise isolation with the hope of success. However, the immunity possessed by an individual, as shown by repeated exposures, may not prove perpetual, and well-marked, even fatal, scarlatina may follow a final exposure. A degree of immunity from scarlatina is sometimes exhibited in families, the members of which escape altogether, or have only light attacks. Unfortunately, on the other hand, a decided family predisposition to the disease is occasionally encountered, one member after another falling a victim to its virulence.

Careful observation has failed to show that predisposition to scarlet fever is especially favored by the nature of the soil or the state of the weather; neither can it be proven that the type of the disease is especially influenced by any ordinary surroundings, further than that conditions of life prejudicial to the maintenance of good health diminish the powers of resistance to the onset of the disease. It is important to remember that in the absence of the contagious principle no degree of filth, deprivation, dampness, bad ventilation or drainage, or exposure, no matter how injurious to general healthfulness, can serve as the starting-point for scarlet fever. Indeed, it is remarkable, considering the bad hygienic environment of the poorer classes, that between them and the rich there should be so small a difference in the degree of predisposition to, and in the relative mortality from, scarlatina.

Mode of Infection.—To develop scarlatina an individual