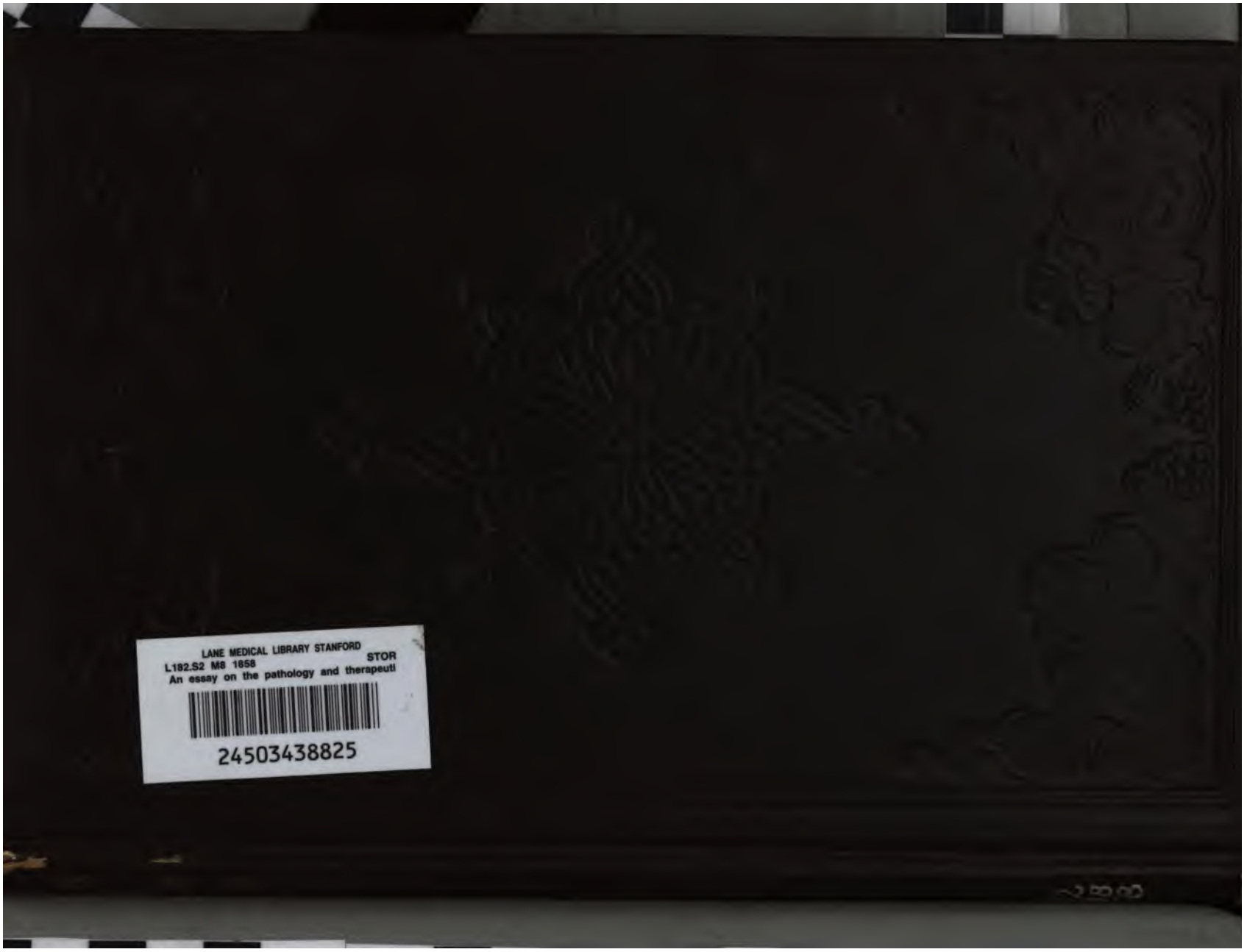

AN ESSAY

ON THE

PATHOLOGY AND THERAPEUTICS

OF

SCARLET FEVER,

BY

CASPAR MORRIS, M. D.,

FELLOW OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA, MEMBER OF THE AMERICAN PHILOSOPHICAL SOCIETY, LATE LECTURER ON THE PRACTICE OF MEDICINE IN THE PHILADELPHIA MEDICAL INSTITUTE, AND CLINICAL LECTURER AT THE PHILADELPHIA HOSPITAL.

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TO HUGH L. HODGE, M.D.,

Professor of Obstetrics in the University of Pennsylvania.

My Dear Friend:

A new edition of this little volume being called for, and he, our mutual friend, under whose auspices the first was issued, having passed away from the scenes in which you and I were wont to follow him with a feeling of filial respect,—permit me to place your name on the new issue; and thus to commemorate a friendship of thirty years, during which we have trodden together the arduous paths of professional life, in the daily interchange of those acts of brotherly regard which smooth the asperities of the way, encourage to patient perseverance in toil, and cheer the spirit when flagging and weary. The time is rapidly approaching for both—even for me, though much your junior in years and yet farther behind you in the race,—when, as the runners of old, we must transmit our lamps to younger competitors. That in their hands they may burn more brightly, and by them be transmitted with increasing illuminating powers to others again, is, I know, your wish and expectation, as it is that of your grateful and respectful friend,

CASPAR MORRIS.

PREFACE TO SECOND EDITION.

The original edition of this work being exhausted, the publishers have requested liberty to issue a second. No apology for complying with this request is needed by the Profession. He who has been longest engaged in the observation and treatment of the disease, will look with respect and gratitude to any one who can throw light upon its nature and furnish hints for its successful treatment; while the younger practitioner will seek for counsel, with an avidity proportioned to the violence of the cases he is called to treat; and will welcome every—even the feeblest—effort to aid him in the management of a disease than which none is more formidable in its character and uncertain in its results. If the following pages lend increased strength to the former, or afford instruction to the latter, I shall be abundantly compensated for the labour bestowed upon it. They are the result of more than thirty years observation in various public institutions as well as private practice; and each year of enlarged experience, confirms me in the truth of the principles here inculcated, however imperfectly they may be set forth.

AN

ESSAY ON SCARLET FEVER.

So fatal have been the results in individual cases, so widespread the devastation caused by the epidemic prevalence of this disease, so interesting the period of life at which it commonly occurs, just as parental hopes are budding with promise, and the tendrils of affection entwining themselves the most closely round the heart, that the very name is a signal of distress, and its introduction into the family circle is looked upon as the entrance of the angel of death with an irreprievable warrant to destroy. The parent sits down in the evening the happy centre of a group of smiling objects of affection, his heart swelling with delightful anticipation as his eye glances around the circle; and ere the next return of the same weekly period, half of them slumber in the embrace of death. The mother's nightly visit is paid to the couch of the only idol, upon which her hopes are concentrated, and to which the sacrifice of anxious love is hourly offered, and leaves it sleeping tranquilly, no forecast shadow giving sign of the coming sorrow; the morning finds it stricken down by disease, and the evening an inanimate corpse given over to the power of corruption. These are neither fancies, nor exaggerated images of wo. There is not a practitioner of any extended experience but must acknowledge that he has not only witnessed

such scenes, but been a miserable participator in their anxieties and grief. Of many such instances it may be said with truth, no skill could avert the result. Alas! of too many, that well meant but ill-directed effort—to use the language of Sydenham, applied by him to this very disease, "nimia diligentia medici," has hurried them needlessly to the tomb.

Nor is it by the rapidity of its course, alone, that scarlet fever is invested with its character of dread. Treacherous beyond all other diseases, cases apparently the least violent, "scarcely deserving the name of disease" in the earlier stages, not unfrequently develop lesions of the most formidable kind in their progress, and result in a fatal termination; while in others, a train of painful and disgusting sequelæ gradually exhaust the strength by long continued suffering, and often entail consequences which remain for years, or even during life. It must be evident that such a disease demands the most careful investigation into its character, cause, and treatment.

I shall not postpone the consideration of these for any discussion of the various names by which it has been called, nor of the propriety of the divisions which have been adopted by different authors. Objections may be brought against, and arguments adduced in favour of, most if not all these terms and divisions. A name it must have, and *Scarlet Fever* will answer as well as any that can be proposed; though it will be found, as we progress in the consideration of its symptoms, that some cases have little and others none of the peculiar eruption from which this term is derived. Divisions we must make in order to classify the cases, and arrange properly our ideas of its character and treatment; and the terms *simple*, *anginose*, and *malignant*, will embrace most cases, though there are others, which, not being reducible within the limits of either of these classes, though evidently derived from the same origin, I shall designate as *irregular*. It must be borne

in mind, however, that these are but various phases of one disease, which fall into each other by imperceptible shades; so that while the cases which may be assumed as types of each class have strong marks of distinction, there are others which it is difficult to distribute to either.

The simple form being the normal condition of the disease, it will disembarrass the subject of much difficulty to turn our attention first to the description of it. There is no disease the onset of which is more unexpected. Rarely, indeed, are there the premonitory loss of appetite, languor, or headache, so generally found in other febrile diseases. So decidedly is this the case, that even when the known presence of the disease in a family leads to anxious watchfulness, no deviation from the usual habits marks the individual subject of the next attack. The invasion is generally in the night. A child spends the day in the most perfect enjoyment of health, runs abroad freely, eats heartily, retires to bed as usual, sleeps soundly during the earlier hours of the night, awakes with sick stomach, vomits freely, throwing off the food taken perhaps at the mid-day meal, becomes restless and fretful, has great thirst and heated skin, and when returning daylight affords opportunity of investigation, is found thickly covered upon the face, neck, and chest with a vivid scarlet rash, consisting of minute points interspersed upon a uniform efflorescence, which disappears under the pressure of the finger, but is instantly renewed on its removal. The physician is sent for, and finds the pulse beating with a rapidity almost pathognomonic of the disease, so that if precluded from any other mode of investigation, he might, with but little danger of error, decide the case to be one of scarlet fever, from the extreme rapidity of the action of the heart. There is no other disease in which there is the same condition of the circulation, with the single exception of the fever of puerperal women. The tongue is red and slightly coated with

a white fur, through which frequent villi project, the surface being white and the protruding points of a vivid scarlet colour. He looks further, and sees the whole mucous membrane of the mouth and fauces partaking of the same intense redness, with stigmata thickly sown upon it. The child is restless and distressed. Such would be the usual symptoms of the invasion of a case of *simple* Scarlet Fever.

Ushered in thus suddenly, the disease pursues a rapid course. Scarcely is the existence of the rash recognised before it is extended to the whole surface of the body; and finally to the extremities, which it reaches by the third day, at which period it begins to fade from the parts on which it first presented itself; the entire course of the disease in its primary stages being sometimes completed in four days, and never extending beyond seven: the common termination is in five days. There is not in this, as in the pustular and vesicular exanthems, a diminution of the febrile symptoms with the appearance of the eruption. The rapidity of the pulse, which is rarely less than 120 per minute, and the heat of the skin, remain unabated throughout the entire course of the fever. There is no disease in which the heat of the surface is greater. Not only does it communicate a peculiar, pungent sensation to the finger, but by actual, measured observation it sometimes rises to 105°, 108°, or 110° of Fahrenheit. There is no elevation of the rash *essential* to this eruption, which is often attended by an itching almost as intense as that of urticaria; but in some cases there are small papular elevations on the arms and legs, and it is not at all uncommon to find sudamina, innumerable clear vesicles of very minute size, scattered over the thorax and abdomen, which are very perceptibly elevated both to the sight and touch. The serum they at first contain is rapidly absorbed, or rather disappears, perhaps by evaporation, leaving the cuticle to form minute glistening scales, separating much sooner than the general desquamation,

which takes place at the close of the disease. These scales lie on the red surface like fine bran, very perceptible from their contrast of colour. The intensity of the eruption does not mark the degree of violence of the disease; some very mild cases having a vivid universal rash, while in others equally benign it is partial in extent and less bright in its hue. It has been a common error to suppose that the more vivid the eruption, the more favourable was the prognosis. Enlarged experience disproves this assumption. Many fatal cases are marked by a rash of an intensely bright colour and universally diffused.

In these cases of simple scarlet fever the condition of the digestive organs varies much. While in some there is an entire loss of appetite, in others there is as constant a desire for food as in health. The bowels are unaffected in the simple form, and indeed in the primary stage of all the varieties of the disease. The kidneys, too, maintain their healthy functions during the first four days, but toward the close of many cases the urine becomes scanty in quantity, and high-coloured, though often destitute of any deposit.

The functions of the skin are impaired in proportion to the intensity of the eruption. In some mild cases I have known it to continue soft, and even perspirable, during the whole progress of the disease.

Peculiar as was the appearance of the tongue in the beginning, it becomes still more marked as the case advances. The fur, which in the variety now under consideration is never dense, is thrown off on the second or third day, beginning generally to clear at the tip and edges, but in some cases it is thrown off the whole surface simultaneously, and it is left more entirely denuded than in health, of a colour varying in intensity in proportion to the violence of the case. Sometimes but slightly reddened, at others it assumes a hue not much differing from that of raw beef, while the papillæ, elongated or swollen, are often seen to rest upon the smooth

and glazed surface. This condition of tongue is doubtless owing to the same process taking place in the mucous membrane as that which is known as desquamation of the cuticle, and it continues about the same length of time.

The symptoms are sometimes so mild, and the regular performance of the functions of the nervous system is so little disturbed by the disease, that the patient may pass through all the stages without requiring any medical treatment. Sometimes the character of an entire epidemic is thus benign; and this must undoubtedly have been the case in that recorded by Sydenham, who does not notice the anginose complication, though he describes with his usual perspicuity the symptoms as we have just given them. It will be found, however, when we come to treat of the sequelæ, that such cases are by no means devoid of interest nor free from danger. It is an important fact in the history of the disease, that in London itself, within the next half century, the epidemics of Scarlet Fever were among the most malignant on record: thus teaching the necessity of avoiding hasty generalization, into which, in this instance, even Sydenham himself was betrayed.

It must not, however, be supposed that all cases of *simple* scarlet fever are thus mild in their character. In some instances from the intensity of the cause, and in others from the peculiarity of the individual attacked, the nervous system feels more decidedly the impression; and we then have symptoms of a more formidable character. The vomiting or nausea, by which, as I before remarked, the disease is almost invariably ushered in, may be preceded, accompanied, or followed by violent convulsions, which are often of a peculiar, tetanic character. When the impression is less severe, there will be frequent contractions of the muscles of the forearm, with startings of the tendons, and twitchings of the fingers; and occasionally there is coma, or even the wildest delirium, manifested by screaming and frequent starting from slumber. On

the third or fourth day, it is no uncommon event to have the patient complain of pain in the ear, or be overcome with drowsiness, either of which conditions, after continuing twenty-four hours, will in all probability be followed by the discharge of a thin serum from the external meatus auditorius, which excoriates the neighbouring skin, and gives rise to a vesicular eruption in the adjacent parts.

As the rash fades it leaves the surface covered with a dry cuticle, which separates in very thin scales successively from the face, neck, chest, arms, and legs. The density of these scales depends upon the part of the body and the violence of the eruption. They are very delicate on the face, neck, and arms, while from the hands and feet, where the cuticle is thickened by pressure, it comes off in large patches, and may even in some instances be brought away entire. This desquamation is considered by some authors as an invariable concomitant of the disease, it occurring even in those cases in which there has been neither eruption nor heat of the surface. Dr. Graves of Dublin relates many cases of this kind as having occurred during an epidemic in that city, and ascribes the desquamation in this disease, and in maculated typhus, to a specific influence of the peculiar miasm, rather than to an inflammation of the dermoid tissue itself. It is certainly one of the most uniform and characteristic features of the disease.

In the *Anginose* variety, we have the same series of events as those just described, generally in an aggravated degree. The rash may appear even more vivid, or it may be present only in patches about the folds of the body and on the back and abdomen, or about the flexures of the larger joints, or sometimes only on the hands and feet. The nervous symptoms are more often manifested, and more violent when present. There is very great tremor of the muscles and disposition to sleep, and when aroused the child is fretful. On looking into the throat there will be found not only the

redness which has been described as marking even the cases which have no anginose character, but also a swollen condition of the tonsils and soft palate. These are sometimes œdematous from the very commencement; and corresponding with the internal disease, we find a tumour under one or both angles of the jaw, which is circumscribed and limited in size, and entirely different both in character and appearance from the diffused swelling which will be noticed hereafter. This tumour is not peculiar to scarlet fever, but is similar to that which occurs in every case of inflammation of the tonsils. The difficulty of deglutition is considerable from the very beginning, and there is often stiffness of the muscles of the neck and soreness on pressure in the triangular space between the ear, the ramus of the jaw, and the sterno-cleido muscle. The pulse has even greater frequency than was noticed before, but generally less force, yielding more before the pressure of the finger; corresponding in this respect with the general want of tone of the whole system, the frequency evidently depending not on inflammatory excitement, but on nervous irritability. From the very commencement of the anginose affection there is an abundant secretion of viscid mucus which adheres to the surface of the tonsils and palate, and occasions much annoyance, disturbing the sleep and causing the patient often to start as though strangling; and when this condition extends, as it very often does, to the mucous membrane lining the nostrils, and they become obstructed also, the interruption to the free access of air not only adds to the suffering, but materially increases the danger by preventing the proper oxygenation of the blood, already vitiated by the influence of the specific poison. I have noticed in these anginose cases, a peculiar odour of the breath resembling that of chloroform; entirely dissimilar to the disgusting putrid odour of the malignant cases which depends on the sloughs in the throat. On examining the condition of the fauces

there will often be seen deposits of lymph upon the surface of the tonsils, sometimes white, at others ash-coloured and even darker, the colour depending upon the presence of effused blood. These exudations have been mistaken for ulcers. In general they may be easily removed either by gargle or other mechanical agency, leaving the surface of the mucous membrane beneath them like the adjacent structure. In other cases they do cover ulcerated spots. This is, however, more especially the case in that aggravated form which will claim our attention hereafter. They are generally confined to the surface of the tonsils, but occasionally extend to the fauces and even to the larynx; giving rise to one of the most formidable complications that can occur. I have seen this deposit lining the nares even to the external orifice. The inflammation, which appears to partake of the same character as that of erysipelas, having, like it, a tendency to diffusion, often extends from the fauces through the Eustachian tube to the membrane lining the inner ear; giving rise to intense otitis. Still more frequently the lining of the external meatus takes on ulcerative action, as mentioned when describing the simple form. In either case the pain is severe, and the ulceration sometimes destroys the soft tissues, and even invades the bony structure of the ear; causing the loss of the ossicula and leaving the patient subject to prolonged offensive discharge and permanent loss of the sense of hearing. As in the case of the simple disease, the tongue generally casts off its coat about the third day, assuming a still more angry appearance than that formerly described. Not unfrequently its edge, as well as the mucous membrane lining the posterior nares and fauces, takes on ulcerative action, and then the lymphatic glands of the neck become much enlarged and exceedingly painful and tender to the touch. I have repeatedly seen both sides swollen, with effusion into the cellular tissue to such a degree as materially to impede the respi-

ration of the child and totally to forbid deglutition. No more pitiable object can be presented than one of these cases. The commissures of the lips so sore that they bleed at every movement of the mouth; the tongue red and polished; the mucous membrane of the fauces turgid and ulcerated; the lymphatics of the neck swollen; and the cellular tissue of the neck infiltrated with serum, till the hollow between the jaw and clavicles is entirely filled, and the skin is stretched and looks as though it were polished vellum; the head thrown back to remove the pressure from the swollen throat and to facilitate the access of air to the larynx; the nostrils distilling an acrid sanies which is puffed out with a sputtering noise at every expiration, and excoriates the lip and cheeks as it flows over them, and even abrades the cuticle from the back of the hands, instinctively applied to remove it from the nostrils, and thus afford more freedom of respiration; the eye balls turned upward and the vessels of the conjunctiva injected; the corners of the eyes ulcerated also, while a loathsome putrid odour contaminates the atmosphere of the largest apartments,—the wretched child lies unable to swallow, (even the smallest portion of liquid taken into the mouth being rejected through the nose,) and suffering all the pains of hanging; till the most earnest prayer of the fondest parent is for its death. Yet even from such condition we may hope for recovery.

In those epidemics in which the typhoid tendency is very strongly marked, large abscesses are formed in the cellular tissue of the neck, and gangrene and sloughing may take place. This is especially likely to occur when leeches have been applied or blisters, under an erroneous impression that active inflammation was the cause of the swelling.

In the *anginose form* the stages of the disease are as regular as in the simple variety. They are not, however, always so perceptible. This is caused by the accession of these secondary sources of irritation which give rise to a fever even

more intense than that which has already been described, which naturally terminates on the fifth day. In the most favourable cases the subsidence of the primary symptoms is followed by the decline of the ulceration and consequent glandular disease, and convalescence is established, until the occurrence of some of the sequelæ, which will be noticed hereafter. In other instances these secondary results develop themselves before the crisis of the primary disease has been safely passed, and the febrile disturbance to which they give rise, is mingled with that of the primary impression, and the case is prolonged indefinitely. Cases are often met with in which, instead of the extreme symptoms just mentioned, there is only a slight ulceration of the mucous membrane of the nares, which gives rise to symptoms resembling coryza, while the rash is imperfectly developed in points about the flexures of the limbs and folds of the body, sometimes taking even a maculated appearance, and the whole case may be mistaken for a cold with rash, and its true nature, not being suspected in the primary stages, is first proven by the development of more formidable symptoms in the second stage; or, if the rash be better developed, there is sometimes difficulty in distinguishing the case from one of measles, as I have known highly intelligent and experienced physicians at a loss. This is more especially likely to occur in those instances where an impeded respiration gives a darker hue than natural to the eruption, which is thus assimilated to that of rubeola.

In *Malignant* Scarlet Fever there are all the indications of great oppression of the vital force. There are vomiting, stupor, jactitations, violent pains of the arms and legs, with only a partial development of the eruption, which is often found on the hands and feet before it appears on the body or about the head. The temperature of the body varies. In those cases in which the prostration is extreme, it is cold; and the rash, if it appear at all, has a livid hue, and may assume the sem-

blance of purpura, and even be mingled with petechiæ and vibices. In some cases the rash comes out imperfectly for a time, and then disappears, re-appearing again so late even as the seventh day. Instead of the general flush like the efflorescence of the simple scarlet fever, there are only points about the flexures of the limbs, or those parts of the body which are kept the warmest. Often it does not appear at all, the whole body being rather of a *waxy paleness;* at other times there is an intense lurid erysipelatous flush, which is even occasionally of a livid hue.

The condition of the throat and brain varies also; I have seen the brain intensely excited from the very onset of the disease, though in general there is coma more or less profound. The throat is swollen so as almost to render deglutition impossible. The tonsils, uvula, and soft palate lie flaccid, looking more like portions of purple velvet than living tissue; coated with black lymph in large portions, which, slightly loosened at the edges, betray an ulcer beneath; a horrible ichor discharges from the nostrils, and the room is filled with the most offensive fetor. In many instances the powers of life are totally prostrated from the very beginning. A child will be running about in apparently perfect health one hour, "feeling its life in every limb," and manifesting its power in untiring gambols, and the next may be found with a glassy and sunken or upturned eye, feeble and frequent pulse, cold surface, great jactitation, and will sink steadily to death in despite of every effort; the sedative influence of the miasm being so intense that no reaction takes place. The disease is not in fact fully developed in these cases, and its real character might elude detection were it not that the subsequent discovery of an imperfectly formed eruption about the neck, or the occurrence of other cases in the same family or neighbourhood, afford sufficient evidence of its true nature. Scarlet Fever, which, in London, at the time at which Sydenham records his observa-

tion, was "scarcely to be called a disease," at the period at which Dr. Fothergill wrote had assumed this malignant form. Dr. Fothergill thus describes that epidemic: "It comes on generally with such a giddiness of the head as commonly precedes fainting, and a chilliness or shivering like that of an ague fit; this is soon followed by great heat; and these interchangeably succeed each other during some hours, till at length the heat becomes constant and intense. The patient then complains of an acute pain in the head, of heat and soreness rather than pain in the throat, stiffness of the neck, commonly of great sickness, with vomiting or purging, or both. The face soon after looks red and swollen, the eyes inflamed and watery as in measles, with restlessness, anxiety, and faintness. The disease frequently seizes the patients in the fore part of the day. As night approaches, the heat and restlessness increase, and continue till towards morning, when, after a short and disturbed slumber, (the only repose they often have during several nights,) a sweat breaks out, which mitigates the heat and restlessness, and gives the disease sometimes the appearance of an intermittent. If the mouth and throat be examined soon after the first attack, the *uvula* and *tonsils* appear swollen; and these parts, together with the velum pendulum palati, the cheeks on either side near the fauces, and as much of them and of the pharynx behind as can be seen, appear of a florid red colour. The colour is commonly most observable on the posterior edge of the palate, in the angle above the tonsils, and on the tonsils themselves. Instead of this redness, a broad spot or patch of an irregular figure, and of a pale white colour, is sometimes to be seen surrounded with a florid red, which whiteness commonly appears like that of the gums immediately after being pressed with the finger, or as if matter ready to be discharged was contained underneath.

"Generally, on the second day of the disease, the face,

neck, breast, and hands to the finger's ends, are become of a deep erysipelatous colour, with a sensible tumefaction; the fingers are frequently tinged in so remarkable a manner that from seeing them only it has not been difficult to guess at the disease. A great number of small pimples, of a colour distinguishably more intense than that which surrounds them, appear on the arms and other parts. They are larger and more prominent in those parts of the same subject, where the redness is least intense; which is generally on the arms, the breast and lower extremities." In a later edition of his works, 1754, Dr. Fothergill adds a note which is perfectly characteristic of the disease. He says, "The *redness* and *eruption* have not accompanied this disease so regularly, during the latter part of this winter, as they did in the preceding seasons; in some cases they did not appear at all; in others not till the third or fourth day; and, as I have heard, in some not till the fifth, and even later."

"As the skin acquires this colour the sickness commonly goes off, the vomiting and purging cease of themselves, and rarely continue after the first day. The appearance of the fauces continues to be the same, except that the white places become more ash-coloured, and it is now discoverable, that what at first might have been taken for the superficial covering of a suppurated tumour, is really a slough, concealing an ulcer of the same dimensions. All the parts of the fauces above mentioned are liable to these ulcerations, but they generally are first discoverable in the angles above the tonsils or on the tonsils themselves; though they are often to be seen in the arch formed by the uvula and one of the tonsils, and also on the pharynx behind, on the inside of the cheeks, and the base of the tongue, which they cover in the manner of a thick fur. Instead of these sloughs where the disorder is mild, a superficial ulcer, of an irregular figure, appears in one or more of these parts, scarcely to be distinguished from the sound, but by the inequality of su[illegible]"

"The parotid glands on each side commonly swell, grow hard, and are painful to the touch; if the disease is violent, the neck and throat are surrounded with a large œdematous tumour, sometimes extending itself to the breast, which, by straightening the fauces, increases the danger. Towards night, the heat and restlessness increase, and a delirium frequently comes on. This symptom, which appears in some even on the first night, seems to differ considerably from the like affection in other diseases. The sick commonly answer the questions put to them properly, but with an unusual quickness; they talk to themselves incoherently when left alone, and frequently betray the first tendency to this disorder by affecting too great composure. This, for the most part, happens to those who sleep but little, for some are comatose and stupid, and take little notice of any thing that passes. In this manner they continue dozing two, three, or more days; they commonly grow hot and restless towards evening, which symptoms, and the delirium, increase as night comes on; a sweat more or less profuse breaks out towards morning, and from this time they are easier during some hours; a faintness only continuing, of which they frequently complain more than of the rest of their sufferings. The disease seems to have no stated period which can properly be called its Ἀκμη or height. Some grow easier from the first day of the attack, but in general the symptoms of recovery appear on the third, fourth, or fifth day, and proceed in the following manner. The redness of the skin disappears, the heat grows less, the pulse, which was hitherto very quick, becomes slower, the external swellings of the neck subside, (sometimes they continue to increase and suppurate,) the sloughs on the fauces are cast off, the ulcerations fill up, the patient sleeps without confusion, is composed when awake, and his appetite begins to return."

"The *pulse* during the whole progress of this disease is generally very quick, frequently 120 or more in a minute; in

some hard and small, in others soft and and full, but without that strength and firmness which usually accompany equal quickness and heat in genuine inflammatory disorders."

"If a vein be opened soon after the distemper is come on, the blood generally appears of a fresh florid red; the crassamentum is rather of a lax gelatinous texture than dense or compact; the serum yellow and in large proportion."

"The *urine* is at first crude, and of a pale whey colour. As the disease advances it turns yellower, as if the bile was detected in it, and soon after the patient shows any marks of recovery, it grows turbid and deposits a farinaceous sediment."

The various phases assumed by this disease in its malignant character; the uniform severity of the individual cases, and the wide-spread devastation which it causes by its prevalence, all demand a more extensive notice of this form than of the milder. The vomiting and purging noticed by Dr. Fothergill, have in some cases been so strongly marked as the prominent features of local endemics of this disease, that it has been mistaken for cholera, or thought to have derived a mongrel character from the presence of the cause of that epidemic combined with that of scarlet fever. Such instances are recorded in our medical journals as though of modern occurrence only. More careful investigation exhibits the fact, that these varying symptoms have often before arrested the attention of careful observers.

Dr. Benjamin Rush, in his Medical Observations and Enquiries, thus describes the occurrence of this form of the disease in the years 1783 and 1784, in Philadelphia:—"In most of the patients who were affected by it, it came on with a chilliness and a sickness of the stomach, or a vomiting which last was so invariably present that it was with me a pathognomonic sign of the disease. The swelling of the throat was in some instances so great, as to produce a difficulty of speak ing, swallowing and breathing. In a few instances, the speech

was accompanied by a squeaking voice, resembling that which attends the cynanche trachealis. The ulcers on the tonsils were deep, and covered with *white*, and in some instances, with *black* sloughs. In several cases there was a discharge of a thick mucus from the nose, from the beginning; but it oftener occurred on the decline of the disease, which not unfrequently happened on the fifth day. Sometimes the subsiding of the swelling of the throat was followed by a swelling behind the ears."

"An eruption on the skin generally attended the symptoms which have been described. But this symptom appeared with considerable variety. In some people it preceded, and in others it followed the ulcer and swelling of the throat; in some it appeared only on the outside of the throat, and on the breast; in others it appeared chiefly on the limbs; in a few it disappeared on the second or third day of the disease, and never returned afterwards. I saw two cases of eruption without a single symptom of sore throat."

"The fever which accompanied the disease, was generally the typhus mitior of Dr. Cullen. In a few cases it assumed symptoms of great malignancy. The disease frequently went off with a swelling of the hands and feet. I saw one instance in which the swelling was absent, but the patient complained of very acute pains in the limbs, resembling those of rheumatism."

"In two cases which terminated fatally, there were large abscesses; the one on the outside, the other on the inside of the throat. The first of these cases was accompanied by troublesome sores on the ends of the fingers. One of these patients lived twenty-eight, and the other above thirty days, and both appeared to die from the discharge which followed the opening of the abscesses.

"Between the degrees of the disease which I have described, there were many intermediate degrees of indisposition which belong to this disease.

"I saw in several cases a discharge from behind the ears and from the nose, with a slight eruption, and no sore throat; all three patients were able to sit up, and walk about. I saw one instance of a discharge from the inside of one of the ears in a child, who had ulcers in the throat, and the squeaking of voice. In some, a pain in the jaw, with swellings behind the ears, and a slight fever, constituted the whole disease. In one case the disease came on with a coma, and in several patients it went off with this symptom. A few instances occurred of adults who walked about, and even transacted business until a few hours before they died.

"The intermitting fever, which made its appearance in August, was not lost during the month of September, (the time at which the scarlet fever became prevalent.) It continued to prevail, but with several peculiar symptoms. In many persons it was accompanied by an eruption on the skin and a swelling of the hands and feet. In some it was attended by a sore throat and pains behind the ears. Indeed, such was the predominance of the scarlatina anginosa, that many hundred people complained of sore throat without any other symptoms of indisposition. The slightest occasional or exciting cause, particularly cold, seldom failed of producing the disease.

"The epidemic prevailed in Philadelphia, from September throughout the winter. In the Spring it disappeared, but spread afterwards through the neighbouring States of New Jersey, Delaware and Maryland."

It will here be observed, that while the prevailing type of the epidemic thus described is of that severe character which brings it under that form of the disease which now claims our notice, the occurrence simultaneously of cases of a milder degree proves their dependence on the same cause. Were it necessary further to enlarge these quotations, I might add to them similar descriptions of the disease, given by distinguished

writers upon medicine in each succeeding generation, and of every nation which possesses a medical literature. But sufficient has been said to enable the careful observer to recognise it and its relation to the other milder forms of Scarlet Fever, if called upon to combat its malign influence: we will pass on to the consideration of the last of the four classes or groups of cases, into which I have proposed to distribute the disease.

While the *anginose* and *malignant* are the predominating types during every severe epidemic prevalence of the disease, and the *simple* form that which is generally found in sporadic cases, though it is occasionally the prevailing character of the disease in wide-spread epidemics and through a long series of years, those which I am now to describe are most often found associated with the two former classes, occurring at the same time, and either in the same households or in such circumstances as to prove their dependence on the same cause. The very term *Irregular*, by which I have designated this division, will at once convey the suggestion that it must be impossible to give any general description which would embrace all the varieties included under that term. By far the largest number of these cases owe their peculiar features to the condition of the nervous system which gives rise in other febrile diseases also, to that collection of symptoms which marks what are erroneously called *congestive* cases. The vital forces are overwhelmed by the intensity of the morbid impression, and the patient dies without time being afforded for the disease to develop its essential features; or, if the duration of the case be more prolonged, so extreme is the force of the cause of disease, or so inadequate the power of resistance, that the development is only partially accomplished. The suddenness of the invasion has been noticed already as one of the peculiarities of scarlet fever. These cases are marked especially by this sign. I have known an infant which had left home, apparently in perfect health, for its usual morning airing,

brought back within an hour with stupor and general muscular relaxation, cold surface, feeble pulse, and total insensibility; no remedies that could be applied produced any reaction, and it died within twelve hours. Two other children in the same family were seized, within a few days, by scarlet fever, which manifested the usual signs, and ran a regular course, and thus placed beyond cavil the true nature of the case which preceded them. In another instance, while visiting a lady labouring under a chronic malady, my attention was drawn by the mother to the unusually healthful condition of an only child of two years old, gambolling on the floor. Within twelve hours I was called to see it lying comatose and convulsed, and within twelve hours more it was dead. A maculated appearance of the skin after death, and the known prevalence of scarlet fever in the vicinity, were here the only grounds for assuming this to be the nature of the disease, as there were no other children in the house to be subjected to the poison. Dr. Rush, you will remember, reports "a few instances of adults, who walked about, and even transacted business, until a few hours before they died."

It is not many years since a Judge in one of our Courts was seized with nausea while on the bench, and retired to his home, where for two days he remained, scarcely willing to admit himself to be sick, and reluctant to confine himself to his chamber, though the rapid, feeble pulse, and an imperfect eruption, too plainly indicated the nature of the affection; and on the third day he died, while in the act of shaving himself. A near relative, also advanced beyond the middle term of life, who had not visited the house even, during the illness of this gentleman, stood some time beside the corpse prior to its interment, and himself died with similar symptoms within a fortnight.

Dr. George Gregory, in his lectures on Eruptive Fevers, delivered at St. Thomas' Hospital, London, reports the obser-

vation of cases of a somewhat similar kind. He says: "In some extreme cases, the nervous system shall be so completely depressed and subdued by the virulence of the miasm, and the mass of the blood so thoroughly poisoned and disorganized by it, that all the ordinary appearances of scarlet fever are masked; petechiæ, coma, and a sloughy state of the throat, alone appear. Life rapidly yields under such an attack." In confirmation of this assertion, he reports, as having passed under his own notice, the case of a family in which "a mother and two grown up daughters died. In each of the three cases the nervous system was utterly prostrated, and in a state of collapse. There was no violence, no delirium, no struggling for breath; but the pulse was small, the skin cold, and the whole system depressed by the intensity of the poison. Neither wine, brandy, nor capsicum could put any life into them. They sunk, one after another, without any attempt to rally. It was difficult to believe the disease Scarlatina, but the eldest son took it in the usual form, and put the matter beyond doubt."

A lady, near the close of gestation, after fatigue and exposure, had the usual symptoms which result from "taking cold," by which she was confined to the bed during two days, and from which she apparently quite recovered. After an interval of twenty-four hours, she was seized with a chill, followed by fever, with exceedingly rapid pulse and slight swelling and redness of the soft palate and uvula. There was never, in the progress of the case, any great degree of internal swelling of the throat, and not the least about the neck externally; cough and dysphagia, with an entire inability to lie down, from the danger of suffocation, were the urgent symptoms. The heat of the skin was very great, but without any redness of the surface; the circulation continued exceedingly rapid throughout the entire course of the case, and the countenance was expressive of the greatest distress. The power of uttering sounds was lost, and there were some slight

deposits of lymph on the uvula. The difficulty of swallowing, (amounting to absolute impossibility, so that an eminent practitioner observing the shudder with which she turned from water, though parched with thirst, suggested a resemblance to hydrophobia,) loss of voice, *rapid pulse*, and great heat of skin, were the prominent symptoms, which continually increased in spite of the most energetic treatment, until she died, on the fifth day of the disease, about twelve hours after having given birth to a living child. I was assisted in the treatment by three of the most eminent physicians of the city, none of whom suggested scarlet fever as the nature of the case. Examination of the body, after death, exhibited with sufficient clearness the cause of the symptoms. A small abscess between the posterior walls of the pharynx and the vertebræ had caused the difficulty of swallowing, while minute deposits of pus beneath the mucous membrane on the arytenoid and cricoid cartilages, destroyed the voice. These lesions could not, however, have caused death so promptly, nor would they have given rise to the excessive rapidity of pulse, and heat of skin. Within a week after her death, two well marked and violent cases of scarlet fever, with severe anginose symptoms, occurred in the same house: one in the person of the nurse who had waited upon the case I have thus described, and the other in that of a child.

There is an exceedingly interesting paper on this subject in the N. A. Med. Chirurg. Rev. for Nov., 1857, by Dr. Sutton, of Illinois, in which he refers to the frequent occurrence, during one epidemic, of cases in which the irritative action fell with such violence on the alimentary canal that the children died as though from cholera, to which disease the symptoms bore so close a resemblance that Dr. S. would have considered them such, had that disease been epidemic instead of scarlet fever. Dr. Sutton states, that, simultaneously with the occurrence of these cases, there was an epizootic disease

which proved rapidly fatal among the hogs, which are raised in immense numbers in that State; and he says this affection of the animals was an eruptive disease somewhat analogous to erysipelas, but attended by violent purging. The coincidence is an interesting fact, and valuable in the history of epidemics. Dr. Fothergill records the observation of similar cases, in which the force of the disease fell on the stomach and bowels.

As an instance of another variety, I may mention the case of an infant, endowed with great vigour of constitution, taken ill with febrile symptoms, accompanied by slight difficulty of deglutition. No appearance of disease of the fauces was manifest to the most careful examination, beyond a very slight redness of the edge of the half-arches. Soon the voice became enfeebled, and the respiration impeded, but without cough. The pulse was very rapid, the skin hot and dry, but bloodless, presenting a wax-like paleness. The glands about the base of the jaw became swollen, the cellular tissues of the neck infiltrated with serum; the difficulty of swallowing increased; the voice became stridulous. These symptoms grew progressively worse till the child died, exhausted by the violence of the febrile reaction. Inspection of the body after death exhibited a superficial ulceration of the mucous membrane lining the larynx and upper part of the trachea, which had given rise to the glandular swelling and œdema. The rapidity of the pulse, heat of skin, and peculiar condition of the neck, all combine to induce me to class this case, without hesitation, with scarlet fever, which was prevalent at the time. I have no doubt that well developed cases would have followed, had there been other children in the family. Many similar instances have fallen under my notice, which have been so evidently connected with this disease as to forbid a doubt on the subject.

Among this class of *irregular* cases must be included those noticed by Dr. Graves, of Dublin, and Dr. Copland, of Lon-

don, as latent cases, in which there is neither eruption on the surface, nor sore throat, but merely febrile disturbance, followed by desquamation and anasarca. Such frequently occur in certain epidemics. It is by no means unusual to meet with cases where all the constitutional symptoms are well marked, though the eruption is confined to the wrists, or flexures of the joints, and is there limited to a small number of *red points* only. I have met with many such, in families where other cases were well marked. They are frequently fatal.

The course of the disease in the *Malignant* and *Irregular* forms, cannot be reduced to the regularity which marks the *Simple* and *Anginose*. In the simple, uncomplicated form, the fever subsides from the 5th to the 7th day; and in favourable cases of the anginose variety, the primary lesions disappear with it, and convalescence is fairly established. When the ulceration of the throat and posterior nares is more severe, the primary fever is, on the contrary, merged insensibly into the fever of irritation produced by these lesions, and the case may run an uninterrupted course of many weeks; or, which is more common, there may be twenty-four or forty-eight hours of interval between the subsidence of the primary symptoms and the occurrence of the secondary. The patient is apparently convalescent, the pulse resumes its normal character, the countenance recovers its expression of comfort, the breathing is regular. Suddenly the skin becomes hot and dry, the pulse quick; there is great prostration of strength, and the submaxillary glands are found swollen and tender, and there commences œdema of the neck, which increases rapidly and extends to the face. An acrid serous discharge commences from the nares, excoriating the parts over which it flows, and, increasing steadily, obstructs respiration. Delirium and restlessness supervene; the swelling of the neck becomes greater and greater; and the patient dies, worn out by irritative fever. This train of symptoms depends, I be-

lieve, on extensive superficial ulceration of the mucous membrane of the nose and pharynx, the external swelling being caused by the irritation of the lymphatic glands, and consequent œdema of the cellular tissue adjacent. In the malignant form, the patient may either sink into a comatose condition and die from the first force of the disease between the 3d and 9th day, or, if there be reactive force sufficient to carry the case over these periods, there still remains the irritation resulting from sloughing ulcers of the throat, abscesses beneath the jaws, and ulceration of the nares and ears, to be added to the depressing influence of the primary disease; and, not unfrequently, acute meningitis supervenes, and causes death, with the usual symptoms of that disease superadded to those already described. Croup is also an occasional complication, either caused by the extension of the deposits already described as frequently occurring on the tonsils, or by the active inflammation of the larynx without any exudation. I have seen it in one instance prove fatal when the anginose symptoms had been very slight indeed, and where the most careful investigation could not detect the smallest exudation in the fauces. In the anginose malignant forms, the extension of the disease to the larynx and trachea is by no means uncommon, and I believe more careful observation will confirm the suspicion I entertain, that the disease known as Diphtheritic Croup—which begins with inflammation of the tonsils and exudation of lymph, gradually extending to the larynx—is one of the forms of the disease now under consideration. To this conclusion I am led by having observed that such cases are particularly prevalent at the times when we know the scarlet fever influence to be most active, and from their evident dependence on some other cause than the mere vicissitudes of temperature which give rise to the inflammatory croup. The rapidity of the circulation, the tendency to gangrene of the throat, the general similarity of all the symptoms

to those cases of undoubted scarlet fever in which the disease extends to the larynx, the frequent occurrence of several cases in immediate succession in a family, and its occurrence simultaneously with the prevalence of malignant scarlet fever, all tend to the confirmation of this impression.

There has been some diversity of opinion as to the *cause* of Scarlet Fever. That it depends on some unknown agency, producing what is called epidemic influence, no one denies. In what this influence consists it is impossible to determine, with our present limited knowledge and means of observation. Telluric emanations, sidereal, animalcular, and fungous influences, have all been invoked in their turn. In the present state of our knowledge, and with our necessarily imperfect means of observation, it were vain to attempt to decide between these rival claims; a more important question demands our attention, and should be carefully examined. Is it ever propagated by contagion? Is this disease, like Typhus Fever, Variola, &c., capable of producing a materies morbi, which communicates to the persons around, the same disease as that under which a given subject is already labouring? Is it self-propagating? The evidence in the affirmative is so positive that I cannot retain a doubt; so many well marked cases have passed under my own notice, and so many more are reported on authority quite beyond question, that I see not how any one can hesitate. It is asserted by those who disbelieve the contagiousness of the disease, that the instances in which single cases occur in a large family or school, without extension to others, even where no precautionary measures are adopted, are sufficiently numerous to disprove the influence of contagion; which, if characteristic of the disease, must operate equally at all times where it meets with subjects not protected from its attacks; and they aver that its extension, when this does take place, may be ascribed with greater propriety to a general exposure to the epidemic influence, the operation

of which is acknowledged by all, than to contagion. Those who thus reason, however, overlook the fact, that even the diseases which all confess to be possessed of a power of propagating themselves are liable to the same uncertainty, and prevail at times as epidemics; the same individuals who escape during one or more such seasons, falling victims at a subsequent period at which the cause is operating with even less apparent intensity. I have more than once known a single case of small-pox to occur in a large family, without spreading, though no precautionary measures were employed; and what physician is there who has not been annoyed by the necessity for repeated insertions of vaccine virus, the susceptibility to the impression either wholly absent, or too feeble to be kindled into activity? This question of contagion is not one of merely speculative interest. Its practical bearings are highly important. Life, and interests only second in importance to life itself, are involved in it. Facts, which prove beyond a question that it may be communicated both directly and indirectly, will be mentioned in the course of this discussion, and many more might be adduced. Reference has already been made to the case of a gentleman who died of scarlet fever; a relative who had been alienated from him for many years visited the body, and died, within a fortnight, of the same disease. Those engaged in nursing cases of scarlet fever, and often all the adult members of a family in which it is present, are liable to sore throat and fever, without any eruption, called by some authors *Scarlatina Faucium*. The wife of a medical friend of mine, who was aiding in the care of the children of a relative, was seized with this modified affection, and communicated scarlet fever in all its integrity to her own children. It frequently happens that children who have had the disease while absent from home, communicate it to others on their return during convalescence. This brings naturally to our notice another question. Can the principle of

contagion attach itself to the clothing or persons of those who are not themselves affected by it? or can the disease be conveyed or communicated by them? Dr. Tweedie says he has known many instances in which convalescents have communicated the disease on their removal to a distance, "though several weeks had elapsed from the period of desquamation." I should in such cases rather suspect the clothing as the vehicle by which the disease was carried, than the person. But though I thus express my belief in the transmission of the disease by clothing *worn* by patients, or saturated with the miasm by long exposure to it, my own observation leads me to deny the possibility of the communication by *mere transient intercourse.* I have never, in long continued and extended practice, known the disease to occur in a family which I was visiting for other complaints, during my attendance, nor have I ever heard of an authenticated instance in which this has occurred. I have, however, known an instance in which a family had abandoned their dwelling immediately after the occurrence of two fatal cases. The house was left uninhabited and closed during several months; when a family, from a distant city in which the disease was not prevailing, took possession of it, and the furniture which had been allowed to remain. Within two weeks the disease made its appearance in the family, and proved fatal to several children. Dr. Percival, of Dublin, than whom we can have no higher authority, in writing to Dr. J. Mason Good, says, "*Cynanche Tonsillaris* and *Maligna*, I consider with you a species of Roseola. (This is the term applied to scarlet fever by Dr. Good.) All have been produced by the same specific contagion, which in one instance was imported here from England in a Pandora's box containing plumed soldiers, which had served to beguile the convalescent hours of a young family, and were sent by them as a present to their quondam playmates in this capital." Dr. Chapman refers, though incredulously, to the report of

Hildebrand, who believed himself to have carried the cause of this disease to Padolia, in a cloak which he had worn during the prevalence of it in Vienna, and which had been shut up in a chest during a whole year. That greater intensity is thus given to the cause of disease, I am quite confident. To this I ascribe the prolonged retention of the power of production by the furniture, in the case to which I have just alluded. Dr. Copland remarks: "When fomites are shut up, and excluded from imparting the retained miasm, the disease may be thereby conveyed to distant or remote parts, and even without the source of infection or the media of transmission either being recognised or admitting of recognition." A very strong case occurred under my own observation in the year 1845, proving most conclusively the capability of transmission by fomites. A new dress was sent from a house in the city of Baltimore, in which scarlet fever was prevailing, to a family in a secluded district of country in which the disease was not known. Several children who were present at the opening of the box containing the dress, were seized simultaneously with the disease, which spread from them in the neighbourhood. Dr. Elliotson asserted that every child admitted into one of the wards of a Hospital in London under his care, during a period of two years, was attacked by scarlet fever, notwithstanding the utmost care in ventilation and cleansing.

The late Professor Hosack, of New York, in supporting the doctrine of its contagious character, mentions the instance of a family who deserted their house after a fatal attack of scarlet fever. It was thoroughly cleansed and whitewashed, and the family remained absent six weeks. Immediately on their return, the disease re-appeared. There is one source of fallacy in this case. The period of *incubation*, as it is termed—the time which elapses between the exposure to the sources of the disease and its development, during which the cause is supposed to lie latent in the system, but preparing to exhibit

its characteristic features—is more uncertain in this than any other disease of the same class. It is therefore not impossible that the germs of the disease may have been imbibed before leaving the house, either directly from the same source as the first case, or mediately through it. No such suspicion throws a shade on the instance I have mentioned before. The following cases will prove as well the contagious character of scarlet fever, as the uncertain duration of this latent period. A lady came from a section of country wholly exempt from this disease, to assist in nursing the child of a brother. Within forty-eight hours after her arrival, she was herself seized with a well-marked attack. This is the shortest interval between exposure and sickening I have seen or read of. The longest I have known was twenty-eight days. This case was equally well marked. A gentleman, designing to spend the summer in Europe, had engaged passage for himself and family, to sail on the 1st of May. One of his three children was seized with scarlet fever on the 1st day of March. Desiring that all should have the disease, and be quite recovered before they should leave home, no interruption of intercourse with the other children was attempted; the two children who were well were allowed free access to the room in which the sick one lay. The second seizure occurred on the 16th of March, and the third not until the 28th. Dr. Maton reports a case in which twenty-six days intervened. From eight to fourteen days is, however, the usual interval; and though occasionally several cases may occur simultaneously in a large family or school, it is much more common that one should be first taken sick, and another after an interval of greater or less duration, rarely beyond ten days; and then the other members of the family or household, who have not previously had the disease, are seized at about the same time, or in more rapid succession; while the adults are all more or less brought under the influence of the disease, with sore throat and fever. This mode of

invasion by successive cases is almost uniform, and is certainly more easily accounted for on the presumption of contagion, than in any other manner.

The attempt has been made to impart the disease by *inoculation*, but without success. This was to have been anticipated, as there is no analogy between this disease and variola, which would lead to the presumption it could be thus communicated; and the failure of this experiment cannot be cited as evidence of the non-contagious character of the disease.

Whether introduced by contagion, or originating in some unknown atmospheric changes, scarlet fever is very often *epidemic*. In this respect it manifests a peculiarity as decided as in other points of character. It is often bounded by very narrow limits. Not only will one part of a large city be exempt while it prevails in another, but I have known it confined to a single block of houses, while all the neighbouring squares were healthy. Sporadic cases are frequently occurring, but these are always mild, and generally of the simple form, or with slight anginose symptoms. It often prevails in this mild manner, or entirely disappears for several years, until its malignity is almost forgotten, or may be even doubted. This was decidedly the case in our city for many years before 1830. Dr. Emerson says: "It is a remarkable fact, that in the twenty-one years from 1807 to 1827, inclusive, the total mortality from scarlet fever was only 102 out of 53,000 deaths. Doubtless some cases were reported in the bills of mortality under the vague title of sore throat, of which the amount during the whole period referred to was 355; but, with such additions, the proportional mortality from scarlet fever would be trifling, compared with its ravages in more recent years. *Only one death was reported in* 1827, *not one in* 1828. In 1829 there were 9, in 1830 there were 40. Since the last named year, the mortality from this source has very much increased, as will be apparent from the number of deaths reported in the subsequent ten years, viz.:—

1831,	200.	1836,	240.
1832,	307.	1837,	205.
1833,	61.	1838,	134.
1834,	83.	1839,	225.
1835,	205.	1840,	244.

Making a total mortality from this cause in ten years, of no less than two thousand and four cases." Dr. Emerson's conjecture that some scarlet fever cases were included in the 355 deaths from sore throat, is undoubtedly correct, as I know there was an epidemic angina during the period embraced in those returns.

It was in the year 1828, in which only one death from scarlet fever is reported, I received an appointment in the Dispensary; and the district allotted to my care was that in which the epidemic, which began in 1829, and increased so fearfully till the year 1832, first exhibited its ravages. The contrast afforded by the comparison of the three years—1827, '28, '29—with the three which followed, exhibits the point I wish to illustrate. So remarkable is this feature of scarlet fever, that repeatedly it has been described as though it were a new disease—a whole generation of medical practitioners passing without the appearance of an epidemic. In the year 1831, a highly respectable physician, very extensively engaged in practice, told me he had never seen a fatal case of scarlet fever; his testimony thus corresponds with that of the bills of mortality for the period during which he had pursued his professional career. There is no fixed term of duration of these epidemic periods. In some instances a grand epidemic cycle appears, composed of series of minor epidemics. Thus, for instance, the table furnished by Dr. Emerson, through the entire ten years, may be considered one epidemic period, in contrast with the twenty which preceded; and yet it will be observed that during that period there are two marked interruptions to the otherwise regular

average mortality. Though, as I have before remarked, the epidemic visitations of this disease generally partake of the typhous or malignant character, it occasionally happens that one may assume the sthenic form, and be attended with active inflammatory complications. In this respect the history of the past is instructive, as we shall find when we come to consider the treatment appropriate to the disease.

The influence of seasons of the year and temperature in favouring the origin of this disease or promoting its diffusion, is very uncertain. By some writers the winter, and by others the summer, is mentioned as peculiarly liable to its prevalence. The most fearful epidemics which have fallen under my own observation have been during the damp and changeable weather of the spring and autumn months, extending itself from the latter into the winter. In this respect, scarlet fever manifests its affinity with measles, erysipelas, varicella and other febrile eruptive diseases with which it is frequently associated. We much more frequently, however, meet with isolated cases of scarlet fever, which cannot be traced to any source of contagion than of the other diseases mentioned: such cases do not propagate the disease in others even when brought most closely in connexion with it.

I have seen quite recently, during the intense heat of July, one well marked and fatal case, in a large family of children, without spreading to any other members, though no attempts at isolation were made. Similar cases are familiar to every physician. The access to the chamber was as free, and the visits of the other children were as frequent, as the warmest affection could dictate. The subject was the youngest child, and an only daughter, and therefore the least exposed to external influences; it were vain to attempt any solution of the question from whence the miasm was derived which gave rise to this case. Such instances are of frequent occurrence in the history of scarlet fever, and if received without any inves-

tigation of the circumstances which modify them, and without regard to others of an opposite tendency, would shake the faith of the most devoted believer in the contagious character of the disease. There is, however, some peculiar want of susceptibility to the impression of morbid poisons in this family, as they had escaped with equal impunity, a few months previously, when varioloid was brought into the house by a relative, taken into it without the adoption of any precautionary measures, from a boarding-house where he had sickened with that disease. It is a remarkable feature in the case, however, that the servants enjoyed the same immunity as the other members of the family on both occasions.

Some eminent teachers of medical science are disposed to solve the difficulty growing out of the frequent observation of such cases, in a very summary manner. Whilst they admit them to be characterized by all the symptoms of scarlet fever, so that we cannot in any way distinguish them from that disease, they think the mere absence of the power of propagation, and the inability to trace them to any connexion with a previous case or epidemic influence, sufficient reason to consider them an entirely distinct disease. Such is the opinion of Professor Mitchell, and such appears to be that of Dr. Chapman, who, in his lectures on exanthematous fevers, says, "Moreover I have repeatedly met with in the winter, and uniformly, I think, when snow is on the ground, an affection bearing a still closer resemblance to scarlatina. Children acquire it, mostly, or perhaps exclusively, by becoming heated from playing in the snow, and then suddenly chilled. The collapse is often very considerable, followed by febrile reaction, much cerebral disturbance, delirium, stupor, and sometimes convulsions, sore throat, nausea and vomitings, and by an eruption so scarlatinous in its aspect, that it may readily be mistaken for that disease. Nor is it scarcely less fatal. Death I have known to take place from it in a few hours,

from an inability to arouse the system out of its torpor, or by convulsions."

High as is the authority of Dr. Chapman, I cannot admit the correctness of this view. While we know, on the one hand, that the cause of this as of other diseases may lie long dormant in the system, only waiting for exciting circumstances to develop its activity, and, on the other, that even the most contagious diseases occur occasionally as sporadic cases, it appears to be more in accordance with analogy to consider such cases as scarlet fever, failing to diffuse itself, from some unknown cause, than to erect a new form of disease distinguished from scarlet fever by no symptom, but this one negative characteristic.

In the month of December, 1832, the disease appeared among the inmates of the House of Refuge for juvenile offenders. It was prevailing in the city at that period, as will be proven by reference to the table furnished by Dr. Emerson, which exhibits the mortality of that year as the highest in the ten years from 1830 to 1840. The discipline of this institution is such as secludes the children almost entirely from communication with persons beyond its walls. This might therefore be supposed to afford an unusually valuable field for observation on its introduction and mode of diffusion. The difficulty we encounter, however, in determining the manner in which it was introduced, is one which exhibits the obscurity in which the question is enveloped. I was at the time the attending physician, and made a daily record of every case of sickness requiring my care, in a book kept for that purpose. A few cases of sore throat had been noted, within the fortnight which preceded the breaking out of scarlet fever, one of erysipelas, and several of varicella, all on the boys' side of the institution.

The first well marked case of scarlet fever, however, occurred in the person of a visiter to the family of the matron.

The second was that of a sister of the first; and the first cases among the permanent inmates occurred at the time of the convalescence of the first patients, in the matron's family. Had no cases of sore throat among the children preceded the first well developed case, the presumption that the disease had been introduced by her from without, would have been strong—nay the proof might be called positive—especially as the apartments occupied by the matron's family, were in that part of the premises appropriated to the females, and it was among the females the disease first diffused itself. The buildings are extensive, surround a very large enclosure, and are so arranged as to effect a separation of the sexes at *all times*. The disease spread rapidly among the girls, five cases occurring simultaneously on the 25th of December. It did not reach the male apartments until the 29th of that month, on which day one boy sickened. Two other boys were taken on the 11th of January, 1833. On the 19th a case of varicella was presented among the boys, followed by several others within the following week. Scarlet fever and sore throat without eruption, continued to prevail among both boys and girls till the end of March, amounting in all to sixty cases, without one fatal termination. If no case of sore throat with fever among the children had preceded the sickness of the visiter, this history would have been very decidedly favourable to the idea of the dependence of the disease on contagion, and its introduction from without by direct communication. That this was the true history of the case, I am quite confident. This view is confirmed by the manner in which it spread to her immediate attendants, and the inmates of the apartment in direct communication with her sick room. The interval also between the first case and those which followed, was such as is most conformable to the idea of its contagious character; and this is confirmed by the number then seized simultaneously. But any positive decision as to the mode of introduction, is for-

bidden by the previous prevalence of sore throat, with fever, among the children. The small proportion of those attacked, only sixty in more than two hundred, may be attributed to the discipline of the institution, which has an infirmary to which every case of sickness is promptly removed, while the healthy inmates always sleep in isolated cells, containing each only one bed. It would not be possible to determine what proportion of the inmates had been protected by a previous attack. MM. Rilliet and Barthez, in recording their observation of the disease, in the wards of the Hospital for sick children in Paris, appear to be able to trace every period of its prevalence in that institution, that came under their notice, to the introduction of a patient suffering with it, from whom it spread to the children who had been brought in with other diseases.

Among the circumstances which favour the idea of some influence which is generated in the person of the sick, and thus diffused from one individual to another, no slight degree of importance is due to the fact that it is said to be unknown in those distant colonies settled by Europeans, the voyage to which is so long that the influence of the specific poison is exhausted before the arrival of the vessel in which it might be transported to their shores. Thus it is said to be unknown in the thickly peopled and civilized colonies of Australia and Van Dieman's Land; and Dr. Gregory asserts that there is no record of its prevalence in the Indian possessions of Great Britain. If direct contagion, or the transportation of some "materies morbi," eliminated in the progress of a case, be necessary to act as a ferment in diffusing the disease, and its epidemic prevalence has never an independent origin, places thus far removed from the old centres of civilization may for ever remain exempt, unless we adopt the extreme view of Dr. Elliotson, as quoted by Dr. Chapman, who believes the infecting cause may be retained in the apartments where the dis-

case has once existed, a much longer period than that occupied by these voyages. He asserts that "all the children admitted into a particular ward under his care, in one of the London Hospitals, were seized with scarlet fever for two years, in consequence of a patient with the disease having been in the ward at that remote period, and this, in despite of white-washings and other cleansings." The want of any regular medical reports from those countries, leaves a doubt as to the accuracy of the statement, that scarlet fever is unknown there. The point is one well worthy of investigation, and our own new settlements on the Pacific, will afford an excellent field for careful observation.

I have made inquiry on this subject of several medical officers of the army who have been stationed in California. Those with whom I have conferred have never met with the disease in any of its forms. An intelligent non-medical resident of San Francisco has informed me, that about two years since, that town was visited by a fearful epidemic putrid sore throat, affecting children, attended by "the formation of membranes" in the throat and causing great mortality. Whether this was diphtheritis, or scarlet fever of the malignant form, could only be decided by the presence or not of cases of the disease of the anginose variety.

Reasoning upon the probabilities of the case, we should be disposed to the conclusion that it would be found to exist in all parts of the world. The constituents of the atmosphere, the physical arrangements of the material creation, the nature of man himself, his tendencies and susceptibilities, have ever been the same; it would be therefore but a natural presumption, that the diseases to which he is subject should undergo no greater modification than results from the varying habits which mark different stages of refinement or circumstances of wretchedness. Yet there is every reason for believing small pox was unknown on this continent until intro-

duced from Europe; and we have the distinct history of its introduction to Western Europe detailed by the Arabian writers.

True it is, that diseases supposed to be new, have from time to time made their appearance, and diffused themselves in a manner as mysterious as scarlet fever. Black death, sweating sickness, cold plague, cholera, have each in successive ages, performed their ministry, by thinning out the teeming population of the earth, and then disappeared from observation. But the imperfect records of these visitations, which have been transmitted to us, leave room for the doubt whether they have not been mere modifications of the same disease, or the revival of plagues, the records of which have escaped from the grasp of history. The great diversity in character, presented by different epidemics of scarlet fever, when taken in connexion with the known dependence of these several forms of the disease on one common cause, appears to favour such an assumption. Were it not so entirely established by testimony beyond contradiction, who could believe that forms of disease so apparently dissimilar as those assumed by scarlet fever in its different epidemic visitations, depend on a common cause? So frequently does this disease disappear from observation in a given district, (and occasionally, as we have seen, even from large cities,) so varying are the phases in which it presents itself, and so uncertain are the traces of the mode by which it has been introduced, that until further light is thrown upon it, we must be content to believe that it does at times commence anew from the operation of unknown influences.

Far from us be the worse than pagan infidelity, which would overlook the interference of Divine Providence, in the ordering of times of sickness or of health. If heathen moralists and heathen poets could recognise the interposition of the gods, or seek to appease the rage of an incensed Apollo, it were surely shame for those who live in the light of revelation,

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Each medical prac-
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... Pestilential fevers
...e means of prevent-
... human reason and
...e evils of lightning

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tion of our time, too limited already for the investigation of matters of greater importance. It is not uninstructive, however, to know that this same uncertainty, as to its origin and mode of extension, has marked its character in every age; and hence, before the free diffusion of knowledge, through the agency of the press, put the members of the profession in possession of more extended information as to what was passing elsewhere, or had occurred in previous ages beyond the sphere of their own observation, it was frequently reported as a new disease. The earliest trace of its existence which has fallen under my own notice, dates in the first century of the Christian era, and is found in one of the tragedies of Seneca, where a chorus describes the devastation of Thebes by the plague, with which that city was visited on account of the involuntary incest of Œdipus, in the following terms:—

O dira novi facies leti!
Gravior leto! Piger ignavos
Alligat artus, languor, et ægro
Rubor in vultu, maculæque caput
Sparsere leves: tum vapor ipsam
Corporis arcem flammeus urit
Multoque genas sanguine tendit.
Oculique rigent, et sacer ignis
Pascitur artus. Resonant aures,
Stillatque niger naris aducæ
Cruor: et venas rumpit hiantes.

To those who have retained their familiarity with classic literature, it were an ungracious act to attempt to point out the admirable adaptation of this description, to the malignant form of the disease now under consideration. No poet or philosopher of the present day could furnish a more accurate delineation in the same number of words, unless himself familiarized with the disease by personal observation. Every lineament traced by the poet, is admirably correct. The adjuration of the *new* form of mortality more dreadful than death itself; commencing with languor of the limbs, while red-

ness appears upon the face, and light spots are diffused over the head, from whence the influence extends to the trunk, while the parts about the jaws are distended with blood, and the eyes are distorted and a red flush is diffused over the limbs, the ears disturbed by ringing sounds, a black discharge flowing from the nostrils, and gaping ulcers are formed in the passages, all are highly characteristic. But that which Seneca in the first century of the Christian era, considered a new disease, has been called such many times in succeeding ages, disappearing for a period of longer or shorter duration, only to reappear in one of its several types. By the earlier medical authors, whose works have been handed down to us in imperfect fragments, all epidemic diseases were concluded under the general term of Loimos or Pestilence; the whole family of epidemics was thus grouped together. Slowly, one after another was singled out for more accurate description, but it was not till the beginning of the seventeenth century, that scarlet fever was separately described, and then by the Spanish and Italian authors under the terms Garotilla and morbus strangulatorius, names in themselves sufficiently descriptive to designate the disease.

Even long since that period, it was, by many, confounded with measles, to which fact we may ascribe the mortality of some nominal epidemics of that disease. The accounts given by these authors refer to epidemics which prevailed in the interval between 1610 and 1650, during which time it was marked by fearful mortality. How completely it had lost its formidable character when Sydenham describes its appearance in London, in 1690 to 1695, may be inferred from his assurance that it is "a disease more in name than reality." It is true he refers to the possibility of the occurrence of coma and convulsions, though he does not describe any angina. Had Fothergill's reading been confined to Sydenham's account, he might well have regarded the epidemic, which came under his notice in the same metropolis in less than a century, as a

new disease. Equally great have been the subsequent changes as recorded by the European writers, to whose works I must refer for additional information on this point, and especially to the elaborate article by Dr. Copland in the Dictionary of Practical Medicine, and by Dr. Tweedie in the Cyclopedia of Practical Medicine.

The earliest record I have been able to trace of its existence on this continent, reaches back to the year 1734–5, at which time it was prevalent in America and Europe simultaneously; and so great was the mortality caused by it in Boston, that we find the number of deaths in those years raised from 458, the number of the year 1733, to 528 in '34, and 617 in '35. At the same period the interments in the burial grounds of Christ Church and St. Peter's in Philadelphia, rose from 96 to 144, and a like increase occurred in the same places from a similar cause in 1742. When we recall to mind the difficulty of communication between the colonies at that early period, and the consequent infrequency of intercourse, and reflect on the small probability that those who were sick or so recently convalescent, as to carry about them a contagious influence, could endure the fatigue and exposure necessarily incident to the only modes of conveyance then known, we shall be disposed to adopt the solution afforded by the prevalence of a wide-spread epidemic influence, as the means of propagation. I have derived these statements respecting the prevalence of the disease in this country, chiefly from Webster's elaborate work on Epidemic Diseases, which exhibits the dates at which it prevailed, and the general mortality of each year, without giving any minute detail.

There is an exceedingly interesting paper by Cadwallader Colden, Esq., of New York, published by Dr. Fothergill in the 1st volume of the "Medical Observations and Inquiries by a Society of Physicians in London," dated Coldenham, in New York, October, 1753, which throws unexpected and important

light on the history of the disease on this continent. The whole document is one of great merit, and deserves to be borne in mind as a favourable specimen of our earlier medical literature. Mr. Colden remarks, "I have seen it only in my own family, and in a few neighbours in the country, to whom I sometimes give advice when they cannot obtain assistance otherwise, having laid aside the practice of physic, upwards of twenty years. What I chiefly learned was from the late Dr. Douglass of Boston, a gentleman of great skill in medicine, and an accurate observer, having corresponded with him while this distemper was frequent in the part of the country where I live."

"The first appearance of the throat distemper was at Kingston, an inland town of New England, about the year 1735; and as this town has no foreign trade, it may be concluded that the disease was not imported. It spread from thence, and moved gradually westward, so that it did not reach Hudson's river till two years afterward. It continued some time on the east side of Hudson's river before it passed to the west, and appeared first in those places to which the people of New England resorted for trade, and in the places through which they travelled. It continued to move westerly till, I believe, it has at last spread over all the British colonies on the continent."

"Though what I have mentioned seems evidently to show that the disease was propagated by infection, yet it did not spread in the same manner contagious distempers usually do; for children and young people only were subject to it, with a few exceptions of some few above twenty or thirty, and a very few old people who died of it: neither did it spread equally in all places that were equally exposed to the infection. The poorer sort of people were more liable to have this disease than those who lived well, with all the conveniences of life. It has been more fatal in the country than in the great towns.

People of a scorbutic habit were most subject to it, and they who fed on pork or lived in wet and low grounds. In some places only a few persons or families were seized, while in others all escaped. In some families it passed like a plague through all their children, in others only one or two were seized with it. Some were seized with it at such a distance from the infected, that it could not be conceived in what manner they could receive the disease by infection. Some families had the disease mildly, while others, in the same place and at the same time, had a most violent sort."

"Ever since it came into the part of the country where I live (now about 14 years) it frequently breaks out in different families and places, without any previous observable cause; but it does not spread as it did at first: sometimes a few only have it in a considerable neighbourhood. It seems as if some seed or leaven, or secret cause, remained wherever it goes; for I hear of the like observation in other parts of the country.

"In different years, and different persons, the symptoms are various. In some seasons it has been accompanied with miliary eruptions all over the skin; and at such times, the symptoms about the throat have been mild, and the disease genenerally without danger, if not ill treated."

Such is the earliest record I have seen, by an actual intelligent observer, of the disease on this continent; and it tallies accurately in all respects with more recent observation. As now, so then, it varied in the violence of its attack, in the absence or presence of eruption, and the degree of mortality; and then, as now, the different forms prevailed simultaneously and separately, and there were periods of epidemic prevalence with occasional cases occurring sporadically. The same uncertainty marks its commencement and mode of propagation.

Through the kindness of Dr. N. B. Shurtleff of Boston, I have been favoured with a MS. copy of the tract of Dr. Douglass, which I have placed in the appendix as an interesting link in

the chain of the history of the disease. It is evidently the production of an actual observer of the events chronicled, and as the cotemporary record of the earliest occurrence of the disease in the New World, is possessed of permanent value.

The next earliest notice of the disease on this continent by a medical author that has met my eye, is an interesting manuscript tract on the subject, by Dr. John Kearsley of this city, now in possession of Dr. George W. Norris. He says: "In the spring, summer and autumn of 1746," nearly ten years from the time of its first appearance at Kingston, "and indeed some part of the winter of the same year, this disease, since called, by the learned Huxham, Fothergill and others, the angina maligna, or the putrid and ulcerous sore throat, prevailed in this and neighbouring provinces, and spread itself with mortal rage in opposition to the united endeavours of the faculty. Like to some new diseases, till their nature and constitution are known, it swept away all before it. It baffled every attempt to stop its progress, and seemed by its dire effects to be more like the drawn sword of vengeance to stop the growth of the colonies, than the real progress of a disease. In the New England Governments, as their annals no doubt will show, the stroke was felt with great severity. Villages were almost depopulated, and parents were left to bewail the loss of their tender offspring, till Heaven, at last, whose almighty power we all must own, graciously checked its baneful influence. This disease as it then appeared, and since within these few years, had most of those symptoms to characterize it which those learned gentlemen, we have mentioned, have handed down to us. With us it generally affected children, or those under puberty, whose lax solids and spongy habits were more fitted to receive the floating miasmata of a putrid atmosphere, than those whose textures are more solid. It also affected those who lived in low, wet, marshy places, more than those who lived in higher situations. It happened

with us, as it did with them in England, after much cold wet weather, succeeded by heat." At this period we find the burials in the grounds of Christ Church, Philadelphia, then the principal place of interment for our citizens, except the "Society of Friends," rising to a number even greater than those in the year 1741, in which a pestilence, the nature of which is not recorded, prevailed in the city: and by the law that more than one form of epidemic disease is never prevalent at one time, we are justified in attributing this great increase of mortality to scarlet fever.

That this disease should affect both sexes equally, might be reasonably inferred from the want of any circumstance, which should cause one to be more liable to its influence, than another. From partial observations, varying conclusions on this point have been reached by different authors. No accurate results can be obtained by the most carefully arranged tables, unless the observations be conducted on an extensive field. Unhappily for humanity, as well as for the scientific character of our country, the efforts made by the medical profession to arouse attention to the importance of a uniform system of Registration, have not yet accomplished an object so earnestly to be desired. We are, therefore, compelled to resort for extended statistical statements to foreign states. Thus while the private observation of Dr. Tweedie in London leads him to assert that it is more common in girls; and from the same source, Rilliet and Barthez reach the conclusion that it is more common in boys, and Dr. J. F. Meigs thinks it "probable that while under puberty, it attacks the two sexes with about equal frequency, and after that age it is most common in females," the reports of the Registrar-General of England and Wales, quoted by Dr. Gregory, show that in 1838, it destroyed, in London, 747 males, and 777 females; in 1839, 1214 males, and 1258 females. Throughout England and Wales (exclusive of the metropolis) in 1840, 8927 males, and

8935 females. Though in each of these statements there is an excess of females over males, it is so small a fraction of the whole number, that it cannot fairly be ascribed to any especial liability of one sex to the complaint. If the one sex were more subject than the other to the disease, the difference would be more marked. Extended observation would in all probability change the result. Dr. Tripe furnishes us with the following exhibit of a different proportion derived from the same source. In the year 1848, the deaths from scarlet fever in London were 2473 males and 2294 females; being an excess of males of 179. During ten years the aggregate mortality of London of children under fifteen years, from all causes, was 161,628; of which 85,028 were males, and 76,600 females, being an excess of males over females of 8,428.

But while I believe sex exerts no influence over this disease, the relations which *age* bears to it are very important. It is decidedly a disease of childhood, and that, not because all persons are exposed to it in the earlier years of life, and those who are susceptible take it then and lose their liability, but because there is something in the condition of the system during infancy and adolescence, which renders those periods of life especially subject to the disease. Thus Dr. W. Douglass, Dr. Kearsley and Mr. Colden all refer to the fact, that the force of the epidemics they witnessed fell upon children, and attempt to account for this fact, by reference to the supposed lax state of the solids of the infantile state: though it is supposed the disease then first invaded the colonies, and of course the entire native born adult population was then first exposed to the miasm.

Though it be true that scarlet fever is in an especial degree a disease of infancy and childhood, all ages are, to a certain extent, liable to it. I some years since attended the family of an officer of the highest rank in the U. S. Navy, in which every member was ill simultaneously with the most malignant form

of the disease, including his wife who was then fifty years old, and died of the disease, a son who was more than twenty-five years old, the servants and nurses, all of course beyond childhood. Parents and nurses often take the disease from children. The reports of the Registrar General of Great Britain are exceedingly interesting from the extensive field of observation they cover, and furnish us with the most important information on this and similar points. Thus, with regard to that which now claims our notice, we find that during the months of January and February, 1840, there were 345 deaths from the disease in London. Of this number 326 were under thirteen years of age, and 19 only were adults. And of 2614 deaths included in his fourth report for the kingdom, 2429 were children, 182 adults, and 13 aged persons. Of 21,304 deaths by scarlet fever in England and Wales, there were under 1 year, 1291; 1 year old, 3102; 2 years, 3705; 3 years, 3386; 4 years, 2677; from 5 to 10, 5400; 10 to 15, 1056; 15 to 20, 268; 20 to 30, 228; 30 to 40, 130; 40 to 50, 56; thus proving that the period of greatest susceptibility is from 5 to 10 years.* This proportion is even greater than appears on the face of the table, since we must take into our calculation the consideration of the large number of children who have died of other diseases before they reached the fifth year. Infants under one year are less liable than those who are older, as is proven by the statement just presented. Now, when we take into view the commonly conceded fact that the proportionate mortality of adults is much greater than of children, the real difference in liability will be found to exceed that which appears to be represented by these numbers, great as this is. The able and interesting digest of the mortality of Philadelphia prepared by Dr. Wilson Jewell, exhibits a similar result. That for instance for second quarter of 1857, exhibits as the total mortality from scarlet fever 153 cases, of which one

* See Dr. Tripe, in London Medico-Chirurgical Review.

cond and third attacks. When occurring in the case of a child with enlarged tonsils, which are liable to acute inflammation from cold, or disordered stomach, the resemblance to scarlet fever is very close. Such cases run a shorter course, are not attended by delirium, nor is there the free secretion of acrid mucus discharging from the nares. The pulse is not so frequent, nor is the prostration so great. They are not followed by desquamation or anasarca.

Secondary attacks may, however, occur, though less frequently in this than some of the other exanthematous fevers. A medical friend of great eminence has informed me that he lost a member of his own family by a second attack. The first was, when the child was but four years old, was irregular in its character, the eruption imperfect, and not followed by desquamation. There was an abscess in the neck, and long continued ill-health succeeded. After an interval of five years, the second and fatal attack supervened. There was but little affection of the throat, but the rash was very vivid and extensive, and death occurred from exhaustion of the vital forces by the intensity of the febrile reaction. The absence of desquamation after the first, and the occurrence of the second, induce me to believe that the first was of the same nature as those referred to above. Another medical friend has assured me that a well-marked second attack occurred in his family.

In this disease, as in variola and measles, second attacks are more frequent in those who have suffered from it in its most severe forms, than when in the first instance it has been mild. It would appear as though, in these persons, there was a greater degree of susceptibility to the influence of the contagious principle or epidemic miasm, while there are others in whom this liability exists but slightly at any period of life. This difference of susceptibility to the influence of the causes of disease, is one of those mysteries which it is but little likely we shall ever be able to solve. That of a given number of

persons, equally exposed to an epidemic influence, only a small number yield to the impression, is well known; and contagion itself finds the same exemption in kind, though not in degree. More extraordinary still is the fact that this susceptibility varies in the same individual, at different times, without our being able to recognise the circumstances on which the fluctuation depends. Present exemption affords no security from future liability. Thus it can hardly be supposed probable that the two gentlemen who fell victims to it when more than forty years old, to whose cases I have already referred under another head, had never been exposed to the cause previously. About the same period, one of our most respectable physicians died from the disease. He had been many years engaged in a large practice, and must have encountered the complaint frequently, and been subject not only to the epidemic influence, but to direct contagion. In such cases the susceptibility must either have been recently developed, or some unknown power had caused it to lie dormant for years.

In this respect the laws of scarlet fever are perfectly consonant with those which govern the diffusion of other kindred diseases. Thus, Dr. Watson records an instance of fatal smallpox in the person of a lady beyond 70 years of age, who had nursed two generations of her descendants in the disease, and was therefore very naturally thought to possess an entire exemption from liability to it. There is a certain amount of susceptibility which is always present even in the persons of those who have formerly had the complaint, as is evidenced by the sore throat which affects them when engaged in nursing persons sick with this disease. Such cases may indeed be considered as instances of secondary affections of a partial character, especially as I have already proved that they are capable of propagating the disease. There is one fact connected with this branch of the subject which deserves to be impressed upon our minds, as it will naturally suggest important precautions.

We often find an error in diet, exposure to cold, or undue fatigue, proves the direct agent in exciting the disease. In such instances it is manifest that the specific cause was present in the system, but kept in subjection by the conservative force, until some accidental circumstance disturbed the balance of health, and afforded the opportunity for development which was needed. To caution persons against such exciting causes when the disease is prevalent in a neighbourhood or has invaded the family circle, is, therefore, the duty of the physician.

The mortality of scarlet fever varies greatly, in different epidemics, occurs at different periods of the progress of the individual case, and depends on various causes. Death may occur from the first impression of the miasm, from depression of the vital forces, or from disturbance of the cerebral functions, within the first twenty-four hours. If this danger be surmounted, the case will probably be prolonged at least to the end of the first week. The largest proportional mortality is in the second week, and depends as the immediate cause, on congestion of the brain and lungs, or the exhaustion of the vital force. The *prognosis* is therefore necessarily indefinite. So treacherous is the disease, and so liable to serious complications and fatal sequelæ, that it is best always to give a guarded opinion as to the result. We may say, with safety, that no case is so desperate in its symptoms as to shut out the hope of recovery; but must at the same time admit that none is so benign as to exclude anxiety. I still remember perfectly a lesson learned in the earlier part of my professional career. I was attending the child of a clergyman; of course, therefore, an object of attention for a whole congregation. The case was one of the mildest I had ever seen; scarcely any anginose affection, the rash florid, the nervous centres unaffected. The progress of the disease was regular till the fourth day. It was a Sydenham case, "scarcely worthy the name of disease." Under these circumstances I

ventured to congratulate the mother on her happiness. The disease was making fearful havoc in many families; she would be exempt thenceforth from the apprehensions in which she had participated with all parents. The case became complicated with laryngitis, and, forty-eight hours after, the child was a corpse. I have, on the other hand, seen patients lie utterly unconscious of surrounding objects, with a livid eruption, entire loss of the power of deglutition, constant discharge of putrid sanies from the mouth and nostrils, and uncontrollable jactitation—and others with convulsions and croup,—and yet recover. It is therefore, my uniform habit to speak cautiously of the lightest, and to encourage hope in the gravest cases.

There is no doubt that the mortality among adults is greater in proportion to the number affected than among children. To pregnant and puerperal women, it is almost inevitably fatal. This is not only the result of my personal observation, but it is also the opinion of those whose experience is most extended. Dr. Copland speaks of the *pregnant* and puerperal states, as conditions most unfavourable, "for the pregnant are prone to abortion, and when that occurs the disease often assumes a most dangerous form; and if the disease occurs soon after parturition, recovery rarely takes place, especially as observed in some epidemics. In these latter cases the scarlet fever assumes the appearance of, and can hardly be distinguished from the most malignant forms of puerperal fever." Dr. C. quotes also Malfatti, an Italian author, to the same purport. The character of the prevailing epidemic should always be taken into consideration in forming an estimate of the probable results of any case, as in no disease is the mortality more variable. This is proven by the personal experience of every practitioner. We may, however, refer to the report of the London Fever Hospital, given by Dr. Tweedie, as offering an illustration which cannot be questioned; 644 cases were treated in that

institution during the twelve years from 1822 to 1833 inclusive. Of this number, thirty-eight died, being at about the rate of 6 per cent. upon the whole series of cases. But when we descend to the investigation of the annual mortality, we find that while, in 1829, the rate was as high as one in six, in 1832 it fell as low as one in forty. Dr. G. Gregory refers to the observations of a Mr. Ward of Bodmin, who reports four hundred and forty-two cases with thirty-six deaths; of these cases, three hundred and twenty-four were accompanied by the eruption, and of these, twenty-six died. While of one hundred and eight without eruption, ten died, thus making but a small difference in favour of those cases in which the skin is involved. Dr. Condie, of this city, reports two hundred and sixty cases, of children under 12 years of age, occurring during three epidemics of considerable extent and severity, with 45 fatal results. Dr. G. Gregory states that 6 per cent. may be assumed as the medium rate of mortality.

Nothing can be more destitute of foundation than any attempt to draw a justification for a particular mode of practice from the proportion of the recoveries to any such *average* rates of mortality. Widely various in intensity, as well as in type of character, this disease must of necessity require different treatment under these different circumstances: and this treatment must be directed and governed by common sense and good judgment acting under the influence of a knowledge of the pathology of the disease, derived from the recorded experience of other observers.

Though it be true, as I have before remarked, that the general character of the prevailing epidemic will throw light upon the probable result of the individual cases, there are exceptions to this rule. Not only do we find some cases of a very mild character occurring at the time when the disease is generally malignant, but the reverse also takes place, though less frequently. As the general rule, whatever may be the

prevailing type, the character of the first case which is seen in a family or school, will attach itself to most of the subsequent cases; or rather, when the first are sthenic and regular, the others will be so likewise. We often, however, meet with slight and regular cases during an asthenic or malignant epidemic. Thus the disease in the House of Refuge, was certainly very mild, no death having occurred, though the type of the epidemic, then prevailing in the city, was severe.

The extent of the eruption affords no criterion by which to determine the degree of risk or intensity. I have frequently seen cases in which the whole surface was covered with a vivid rash, prove fatal, and equally often have known the ready recovery of those in which there was none, or but little around the joints or on the body.

Simple scarlet fever is certainly much less likely to result fatally than the anginose, and this less so than the malignant and congestive, or irregular. The occurrence of convulsions in any stage, or either form, is always an indication of great danger. I at one time believed them a certainly fatal sign, because I thought they indicated a necessity for bleeding, either local or topical; but I have known several cases to recover under a more rational treatment. Violent delirium, manifesting itself by shrieks like those of meningitis, is also of bad augury, no matter how slight may be the affection of the throat; so also is stupor with grinding of the teeth. Croup is a very serious complication and should cause the physician to watch the case in which it occurs, narrowly. The enlargement of the neck without a corresponding degree of swelling of the tonsils and adjacent mucous membrane, is also of evil omen; especially when there is the acrid discharge from the nostrils, which indicates the existence of ulceration of the posterior nares. The continuance or increase of the febrile symptoms, after the fifth or sixth day, is also a bad sign, as it proves the existence of some local lesion. A dusky or livid

colour of the eruption is always a bad sign, whether it result from the deficient aeration of the blood, or from a depraved condition of that fluid, caused by the detention of effete matters which should have been excreted either by the skin or kidneys; and so are great sighing, and a feeling of faintishness, and hurried respiration. Ulceration of the commissures of the mouth and eyelids are unfavourable events, and so is coldness of the surface, whether it be dry, or bedewed with moisture.

The subsidence of the frequency of the pulse, and the diminution of the redness and swelling of the parts about the throat, in the anginose variety, are circumstances which should afford encouragement. Among the favourable signs, none should be hailed with greater satisfaction than a warm perspiration; whether it is found in the simple, anginose, or malignant form. Next to this is the diminution of the heat of the skin, with or without moisture, provided it do not descend to a degree of coldness less than the standard of health.

It is impossible to attach too great importance to the *urine* as an exponent of the condition of the patient and the probable result of the disease. So long as the quantity is nearly normal, and there is no deposit of blood or epithelial scales, and no albumen is detected by the usual tests, there can be no risk in giving a favourable prognosis. When it becomes scanty and turbid, depositing blood corpuscles and casts of the tubuli uriniferi, or epithelial cells, it is necessary to be more cautious. The mere occurrence of anasarca with fever is not of itself a cause of great apprehension, since a large proportion of such cases yield to proper treatment. When the effusion takes place in the ventricles of the brain, as manifested by coma, or in the pleura, or pericardium, or cellular tissue of the lungs, as exhibited by oppression of the breathing, there is more cause for alarm. The previous health of the child is also to be taken into consideration, as the peril is greater in the

cases of scrofulous, leuco-phlegmatic children subject to catarrhal affections, than in the sanguine and robust. An obstinate continuation of the œdema, while the urine is abundant in quantity and of a low specific gravity, is a bad symptom, indicating serious lesion of the kidneys. Such cases generally terminate in fatal convulsions.

Death may result from various causes, and at several stages of the disease. The violence of the primary shock may be such that the system may not react from it, or the reaction may be so severe as to prove fatal. The nervous centres may be so deeply impressed that death shall ensue from the destruction of the balance necessary to their healthy action. From any of these causes it may occur within the first week of the disease; nay, even within the first twenty-four hours. Dr. G. Gregory thinks sixty hours, or the third day, the period of greatest danger. But even when the first week has passed, and the primary symptoms have yielded, the causes of mortality still stand thickly around the course of the patient. Inflammation of the larynx, the pericardium, or the kidneys, may be developed and produce a fatal result; or the patient may die from effusion in the ventricles of the brain, or the thorax, or from the long continued exhausting effects of abscesses or disease of the bones.

Each of these latter causes of death will of course leave a corresponding lesion in the organ affected. But in those cases where death has occurred in the early stages, it would be irrational to expect to find any morbid appearances in this more than other pure febrile diseases. The fatal impression has been made on organs which express their changes by signs which pass away with life and leave no trace behind; but by some authors the brain is said to be more vascular than natural in cases where there has been very violent delirium; and instances are reported of increased vascularity, and others of opacity of the arachnoid, with effusion of lymph or

serum into the ventricles, or gelatinous matter on the arachnoid. In the malignant and anginose forms we shall of course find the traces of the disorganization of the mucous membrane of the fauces and adjacent parts which has been noticed during life, and I have seen ulceration of the mucous membrane lining the larynx, and abscesses about the cartilages. Dr. Southwood Smith and Dr. Copland both refer to a diseased condition of the solitary glands of Brunner and the agminated glands of Peyer in cases of scarlet fever, with great vascularity and ulceration of the ilium, and enlargement of the mesenteric glands. MM. Rilliet and Barthez report the same lesions. "The alimentary canal exhibits prominent patches with an areola, somewhat effaced by the thickening of the membrane, softened, and here and there of a bright red colour. In some cases we have even met with a slightly inflammatory enlargement of the mesenteric glands, and have found the spleen enlarged and much softened." They declare, however, that the kidneys, "though red and congested sometimes, occasionally bleached, are not increased in size, and are evidently healthy." They sum up the morbid appearances as follows: "Congestion of the brain, of the serous membranes, of the spleen, of the patches of Peyer, and of the follicles of the intestines." Dr. Copland says, "The kidneys are always congested, tumid, and often of a dark mottled colour externally." Dr. Copland also adds: "I have seen the vertebræ of the neck, their ligaments and intervertebral substance seriously affected, caries of the former, with chronic inflammation, thickening, &c., of the theca, supervening, and occasionally cervical paraplegia or general palsy."

Though there can be no doubt that the blood during life is much changed from its healthy condition, there is nothing peculiar in its state after death. It is reported to have been found sometimes fluid, at others abounding in coagula, sometimes collected in especial organs, and at others more equably

distributed. The proportion of fibrine is said to be slightly in excess in some instances. This would result from any local inflammation which might be set up on the progress of the case. The spleen in some instances has been found enlarged, soft, and reddened.

From a very elaborate article in the British and Foreign Medico-Chirurgical Review for 1854–5, by Dr. Tripe, of London, we derive the following facts. He describes the causes of death in 128 cases.

Brain and Spinal Cord. Affections of these organs were the cause of death in 14 cases out of the 128. Of these 14, meningitis was the cause in 6. Passive effusion into the cerebral cavities in 7. Hemiplegia, (cause unknown,) 1.

The Larynx was diseased in three cases: 1 laryngitis, 2 croup.

Lungs and Pleura. Diseases of these organs were fatal in no less than 40 out of the 128 cases. Of these, 3 were bronchitis, 14 pneumonia, 4 pleuro-pneumonia, 7 pleuritis, 2 pleuro-pneumonia, with *peritonitis.* There was one case of phthisis, 1 of œdema of the lungs, and 7 of non-inflammatory effusion into the thoracic cavity.

Heart and Pericardium. Of the 128 cases, 12 were fatal from diseases of the heart and pericardium, 4 being pericarditis, 3 endocarditis, and 5 effusion into the pericardium, without dropsy of the other cavities. There was jaundice in one case, but none exhibited any disease of the liver.

Stomach, Bowels, and Peritoneum. Of 13 cases in the 128, in two there was ulceration of the colon, with diarrhœa during life, 2 ulceration of intestines, (what part not stated,) also with diarrhœa during life; 4 cases were fatal from peritonitis. There was one case of disease of the mesenteric glands, and three of ascites, without effusion into any other cavity.

Gangrene, Sloughing, Abscess, and Erysipelas, were fatal in 9 cases out of the 128: 3 cases of abscess, (2 of the neck

and 1 of the joints,) 1 case of gangrene of the feet, 1 of mortification, (part not mentioned,) 2 cases of suppuration of glands of the neck, and 2 cases of erysipelas.

Uræmia. The prominent symptoms of uræmic poisoning were manifested in 37 cases out of the 128. There were convulsions in 27, (or convulsions and coma together,) 5 of coma, 1 of tetanic convulsions, 1 of epileptic convulsions, 2 of complete suppression of urine, (convulsions and coma enumerated as symptoms of these cases,) 1 of uræmia.

There are several *complications* which are met with in the different forms of scarlet fever. Among these, the most prominent place is due to the sore throat, which in the anginose forms varies in degree, and is often attended by swelling of the glands of the neck, impeding deglutition, even in some cases to the extent of entire interruption. It is by no means an uncommon event for the food and drink to be returned through the nostrils, instead of passing into the œsophagus. Ulceration of the mucous membrane, and even sloughs of the subjacent parts are found in extreme cases. Delirium is by no means an unfrequent attendant of all the forms of scarlet fever, and may be either wild and violent, or low and muttering. In the former case, which is confined to the simple and anginose varieties, I have seen it amount to phrensy like the most violent acute mania: it is frequently associated with convulsions; in the latter, which belongs to the malignant, with coma. Laryngitis is another serious complication which may occur in either form of the disease, and at any stage of its progress, and is always a formidable symptom. Especially is this the case when it is attended by the exudation of false membrane, which sometimes extends into the bronchia, and sometimes spreads upwards into the nasal passages, and even to the outer opening of the nostrils, lining the reddened mucous membrane with a white firm layer of fibrinous deposit. Violent rheumatic pains in the limbs are occasionally found in

the earlier stages, as well as among the sequelæ, and there is often more or less muscular rigidity of the neck. This may even become a permanent lesion.

Ulcerations of the mucous membrane of the nasal passages, and the extension of the inflammation through the Eustachian tube to the internal ear, are also met with in some cases, giving rise to the most intense suffering at the time, and involving the disorganization of the organ of hearing. Pneumonia also occurs in this disease, but more frequently violent affections of the heart, indicated by laboured respiration and distress in the præcordial region. Dr. Gregory describes the case of a lady "who was seized with scarlet fever at the time of parturition. The labour was long and severe; she perspired profusely; the heart laboured violently. The next day, scarlet fever appeared. The heart, exhausted by previous efforts, gave way, and, in about fifteen hours from the appearance of the eruption, became engorged. A frightful feeling of suffocation supervened, and the pulse for a few minutes was imperceptible at the wrist. This feeling subsided, but the heart never regained its natural condition. Dyspnœa increased, and in twenty-four hours more the blueness of countenance and incipient delirium showed that the lungs were implicated, and that waves of ill oxygenated blood were permeating the brain. Twelve hours longer of this semi-asphyxiate state closed this sad and painful scene."

The *Diagnosis* of scarlet fever is not devoid of difficulty, and is yet always important. The anxiety of parents is excessive. Often, very often, have I been called at a late hour in the evening to see a child, suddenly seized with fever between the time at which it had been put to bed and the hour at which the parents retired. The flushed cheek and restless sleep had excited the apprehension of a mother, some of whose friends had suffered from this devastator of the nursery. The power of allaying these fears by the positive assurance that

no such danger was impending, is one of those which will afford the physician as much gratification as any he can exercise. His own satisfaction in the treatment of a case is also much enhanced by certainty as to its character. Circumstances may arise in which it is most important to be able to give a prompt decision. I once, needlessly, caused the dismissal to their homes, of the children of a boarding school, thus interrupting the pursuits and materially interfering with the interests of a most worthy family, and spreading alarm into many others, by the hasty and erroneous determination that one of the children had scarlet fever: founded upon the elongation of the villi of the tongue, and a light fur, in a case which proved to be catarrh fever. The opposite error might have been still more disastrous in its results. The well-marked anginose and malignant forms cannot be mistaken. It is only in the simple and irregular cases that we are liable to error. These, however, may give origin to the most violent and fatal forms, and even the mildest cases may become serious in the results, if not properly treated. In every case where there is a sudden invasion of fever with sick stomach, and the occurrence of rash within forty-eight hours, scarlet fever should be suspected. This suspicion should be retained for his own guidance until the physician has carefully investigated the entire history of the attack, and examined well the symptoms, bearing in mind that important results may follow his decision.

There are several diseases which may be mistaken for simple or anginose scarlet fever. Measles was long confounded with it. Sore throat with fever resembles it in some points. The rash which often accompanies indigestion in children, is very like it; and if these two conditions occur in the same case, they produce a condition which it is difficult to distinguish from scarlet fever. The less frequent pulse at first, and the subsequent absence of desquamation, afford our only means

of discrimination. There is a very mild form of disease, known popularly by the name of "the scarlet rash," which closely resembles it, and roseola has often been taken for it by superficial observers.

There are several points of difference between measles and scarlet fever noticed by authors. The period of incubation is said to differ. When, however, we refer to the impossibility of determining the time of exposure in many cases, and that when this is known the mere fact of exposure will determine the nature of the case, it will at once be evident that little benefit can be derived from such an observation. I have, moreover, already shown how very uncertain is the period of incubation. It is quite certain, however, that measles has never been known to occur so promptly after exposure as scarlet fever.

The time after the development of febrile symptoms, at which the eruption occurs in the two diseases in those cases which pursue a regular course, is very different. The rash of scarlet fever is observed often simultaneously with the febrile invasion, and generally, if at all, within twenty-four hours; that of measles does not show itself in less than seventy-two hours, or on the third or fourth day. The invasion of scarlet fever is marked by nausea or vomiting, thus fixing the stomach and passages which lead to it as the organs involved. The first stage of measles, on the other hand, is indicated by catarrh, sneezing, redness of the conjunctiva, cough, and hoarseness: thus exhibiting the tendency of the disease to fix on the mucous membrane of the air passages. This difference in the local tendencies marks the whole course of the disease and its sequelæ. In scarlet fever the ear, the nose, the fauces, the kidneys, are the organs most commonly implicated; while in rubeola the eyes, the bronchial mucous membrane, and that of the alimentary canal, are most commonly the seat of the complications and sequelæ. And even in those cases of scarlet

fever in which the larynx is involved, there is not the peculiar hoarse cough of rubeola.

There is also a marked difference in the appearance of the rash. The eruption of measles may be first seen about the roots of the hair and behind the ears, in circumscribed well-defined spots, which, as they spread, assume frequently an arrangement which has been called crescentic, several spots being grouped together, and surrounding patches of skin of perfectly natural appearance. From thence it gradually extends itself downward over the whole person. In the regular course of scarlet fever, there is a vivid efflorescence covering the whole surface of the head and neck simultaneously, and often even the whole trunk, leaving no spot unaffected. The body should always be examined where scarlet fever is suspected, as the first faint appearance of the rash on that part of the surface which is habitually covered may be found even before it is fixed upon the face and neck. The papular eruption scattered through the efflorescence of scarlet fever, which gives the appearance of stigmata, noticed in the description of the disease, is unknown in measles. There is a marked difference also in the colour of the rash of the two diseases. In scarlet fever it is of a florid or vermilion tint; in measles there is at the very outset a dull lake colour. The first declines by fading away; the last becomes darker or more dusky.

In the sequelæ of the two diseases, we find the most striking evidence of their diverse origin and nature.

In scarlet fever we have affections of the brain, the kidneys, the cellular tissue, ulcerations of the throat and ears, abscesses about the neck, and rheumatic pains; and if any of the affections of the air passages occur, it is evidently by mere extension from the adjacent parts. In measles we have bronchitis and pneumonia, and sometimes diarrhœa. But while there are these important and well-marked points of difference

between the two diseases, it must be conceded that we occasionally meet with instances in which all our efforts at discrimination will be tasked during the progress of the case; and it is even possible that in some there may be a mongrel disease, as though it were the result of a mixed influence, commencing as scarlet fever and yielding in its course to the influence of rubeola. Such were the cases which occurred with fatal results at the Foster Home in the midst of the intense cold of the winter of 1856–7. Scarlet fever of a malignant type first attacked the children; and immediately on the subsidence of the primary stage, (on the fourth or fifth day of the scarlet fever,) rubeola, with a well-marked crescentic eruption and violent catarrhal symptoms, commenced, and went through its regular stages, followed by severe pneumonia. The children who survived this complicated disease, were then attacked by whooping cough.

There is often in cases of variola or varioloid a diffuse efflorescence on the second or third day, which very closely resembles that of scarlet fever, and the resemblance is rendered more embarrassing by the sore throat which so generally occurs in variola. It may be distinguished from it by the character of the febrile symptoms which accompany it. The restlessness and gastric oppression and pain in the back, of the variolous disease, sufficiently mark its character, and are never present in scarlet fever. Neither is there in variola the frequent pulse to which I have already referred as belonging especially to this disease. That of the variolous impression is less frequent and softer; the absence of the dotted points which are interspersed through the efflorescence on the skin, and always appear in the throat, will afford assistance in determining the nature of the case; in addition to which, the fever of variola subsides on the occurrence of the eruption, while that of scarlet fever is unabated. Attention to the symptoms affords one of the best modes of discrimination in the eruption resem-

bling scarlet fever which occur in cases of indigestion in childhood and infancy; and the best additional diagnostic sign I can furnish is found by looking into the throat. The eruption of scarlet fever is *always* found there, if it affect the external surface. I do not mean the inflammation which constitutes the *anginose* variety. Even in the most simple case the mucous membrane presents an appearance quite analogous to that of the skin. The projection of the elongated papillæ through the white fur on the tongue, once thought pathognomonic, is less to be relied on. I have been deceived by it. Not so, however, the appearance of the tongue on the second or third day. The sudden throwing off of the coat of fur, while the surface is left red and glossy, is decidedly characteristic and will never deceive, as it occurs in no other disease at this early period.

The eruption which occurs about the third day of typhus fever, bears a closer resemblance to that of measles than to the one now under our notice. The age of the patient will in this instance afford aid in forming an opinion, typhus fever being more frequent in adult life, and scarlet fever in infancy and childhood, while the history of the case will always enable us to trace genuine typhus fever to its origin in direct contagion or exposure to the peculiar circumstances which give rise to it.

Such are the phenomena which usher in, and mark the progress of scarlet fever; and such the primary results of its impression on the human system. We are now prepared to arrive at some conclusion as to its character, which may be thus expressed.

Scarlet fever is a febrile disease, dependent on a specific miasm, resulting from unknown external influences; yet capable of re-production, and diffusing itself, both by direct contagion and by the establishment of a peculiar condition of the atmosphere within limited districts: the susceptibility to the influence of this cause varies in different individuals and at

different periods of life, and is generally exhausted by one attack: the morbid impression is made on the nervous system, and transmitted to the circulating fluids through which every part of the organization becomes subject to the influence, while the principal localization of diseased action is in the capillaries of the skin and mucous membrane, which covers the pharynx and lines the kidneys: it has a fixed duration of from 120 to 160 hours, at the close of which period the disease has a natural solution, unless the disturbance of the functions has been so great as to destroy life, or local lesions have been produced which maintain the irritative action.

We may now proceed to the consideration of certain results of this impression, which are more durable than the disease itself; quite distinct in their character, equally, perhaps more, to be deprecated than the primary disease.

These are generally known as the *sequelæ*, and as such, have been occasionally referred to already. They may be divided into two classes. 1st, Those which appear to be a mere continuation of the local lesions developed during the course of the disease, confined to the same vicinity; sloughing and ulceration of the throat, diseases of the ear, often extending to the bony structure, abscesses about the neck, and, in some rare cases, disease of the cervical or dorsal vertebræ, resulting in caries: and 2dly, those which are less directly connected with primary causes and congestion of the kidneys.

It can scarcely be necessary to add any thing to the remarks already made on the subject of the affection of the throat, when treating of that symptom in the description of the anginose and malignant forms of the disease. It occasionally happens, however, that the ulcerative process set up from the very commencement of the case, continues long after the primary disease has run through its regular stages; and extends itself upwards into the posterior nares, or downward

into the pharynx, or even invades the larynx. This condition gives rise to enlargement of the glands of the neck, and often to œdema of the cellular tissue, and interferes sadly with the freedom of respiration as well as with the act of deglutition.

A question has been raised, whether there is ever an actual solution of continuity of the parts about the throat. Of this there can be no doubt on the part of those who have seen the anginose and malignant forms in their greatest intensity. I have known the entire destruction of the soft palate, and extensive sloughing of the adjacent parts even where recovery has followed.

Disease of the internal ear is occasioned by the transmission of the inflammation from the mucous membrane of the pharynx by direct extension through the Eustachian tube to the inner structure of the ear. It may either commence during the course of the primary disease, and be prolonged after that has reached its termination, or may be first manifested even some weeks after the scarlet fever has seemingly disappeared. It is sometimes ushered in by a rigour and deep-seated pain, followed by purulent discharge, and in other cases, is first manifested by discharge from the external meatus of a thin, apparently serous fluid, which soon takes on the appearance of unhealthy pus.

The cases which thus manifestly originate in the membrane lining the external meatus generally yield speedily to appropriate treatment; while those which are dependent either on the transmission of the inflammation along the Eustachian tube, or in which that process has its commencement in the internal ear, are of a much more serious character. In either case permanent deafness may result; if both ears are affected, reducing the child to the condition of a mute. I had a case some years since in the person of a fine healthy boy of about eight years old, in which the primary symptoms were all of the most aggravated character. The swelling of the throat and ulcera-

tion of the mucous membrane of the pharynx and nares were very extensive. As the primary disease subsided the irritative action of these local lesions took its place, prolonging the duration of the case for many weeks. Finally, a chill, followed by intense febrile reaction and extreme pain in the ear, announced the extension of the disease to the internal ear. Stupor, interrupted with violent shrieks, like those which occur in acute meningitis, supervened: suppuration was established, and the matter found its way to the surface by the external meatus, and by an abscess over the mastoid process, evidently connected with the cells of that portion of the temporal bone. Caries of the bone followed, which continued for several years, and though the general health of the child was in great measure re-established, nothing had any influence in arresting the disease of the bone, which continued to extend itself until ultimately it reached the membranes of the brain, and he died of acute meningitis.

Croup may also occur as a sequela of scarlet fever, as well as during the primary stages of the disease; in either case a most formidable complication. Some years since one of my patients survived an attack of scarlet fever in which every complication and sequela of the disease appeared to conspire for her destruction. The disease was ushered in by convulsions. There was extensive sloughing of the soft palate, and then as late as the tenth day the hard croupal cough gave evidence of the invasion of the larynx. I attempted the application of the solid nitrate of silver to the part, when to my infinite dismay a large portion was broken off by the child in its struggles and swallowed. I said nothing of the accident to the parents at the moment, but calling for the salt cellar, promptly administered a strong solution of the muriate of soda. This not only decomposed the nitrate of silver, but acted as a speedy and efficient emetic, and very probably saved the child's life, by the vomiting induced, as to my great surprise it recovered.

Quite recently I have had under care, in consultation with a neighbouring practitioner, the case of a young gentleman of fifteen years, in which croup appeared to be caused by extension of the inflammation from the pharynx to the larynx on the fifth day of the fever. It yielded to the active use of emetics of ipecacuanha.

Still more frequently, the lymphatic glands of the neck become implicated, and serous effusion into the cellular tissue beneath the jaw impedes the deglutition and respiration, and either accelerates the fatal catastrophe, or terminates in the formation of large collections of pus, which may occasion hectic irritation, and result in death after prolonged suffering.

The 2d class embraces lesions, which are more general in their character; among which the first place in importance as well as in order of time, must be assigned to that destruction of the cuticle by the cutaneous inflammation which gives rise to the process of *desquamation*, to which reference has been already made. The process originally follows the same course as the eruption, commencing about the face and neck and thence extending to the body and limbs. It is first observed upon the face about the sixth day, and extends gradually to other parts of the external surface, occupying in its progress 10 or 12 days. In some cases it is not completed before the 24th to the 30th day. The new cuticle is left very soft and velvety, and exceedingly susceptible to impressions of temperature. Much attention has been bestowed, and very properly on the important question, how far other sequelæ, inflammation of the kidneys, dropsical effusions, and inflammation of the membranes of the heart, may be dependent on this interruption of the functions of the skin. Certain it is, that all these sequelæ are observed to follow more frequently those cases in which the affection of the skin has been most decided. Some authors make a contrary assertion; but my own observation is very positive on this point. Thus in

the malignant and irregular forms of the disease, in which the eruption is often slight and transient, the mortality is greatest in the first week, or results from the injury done to the brain or nervous system, by the direct onset of the disease. While in those mild cases of the simple form in which there is abundant efflorescence, with high febrile reaction, death, if it occur at all, is found to be most frequent during the period in which this desquamative process is being accomplished, and is the result of dropsical effusion, or some of the other secondary affections, as those of the heart or brain. When the rash has been very vivid, and the heat and dryness of the skin correspondingly great, the destruction of the epidermis is most decided; and most writers agree in testimony, that in such cases, there is more reason to apprehend the occurrence of sequelæ; while in those cases in which the rash does not appear, is but slight, or recedes soon after its appearance, the functions of the skin being less disturbed, the convalescence is less frequently interrupted by the occurrence of dropsical effusions, or of inflammation of the membranes of the heart, which prove the most fertile sources of danger after the first stage of the disease has been safely passed through. We must also bear in mind the fact that the disease of the skin is more strongly marked in the simple and anginose than in the malignant or irregular forms, and all writers coincide in the declaration that the sequelæ are more usual in the mild and regular, than in the severe and irregular cases.

It must not be concealed, however, that both Dr. Graves of Dublin and Dr. Copland, mention having met with what they term "latent cases," in which the dropsy has been the first indication of the impression of the scarlet fever miasm, the previous stages having passed unobserved; and, upon this fact, as well as others, Dr. Copland rests his opinion that the primary influence of the original cause of scarlet fever is developed largely on the kidneys themselves.

The importance of the skin, and the influence upon the

whole economy of the mode in which its functions are performed, cannot, however, be too strongly insisted on. We all are conscious of the effect on our own sensations arising from the arrest of those functions, by whatever cause it may be produced; and we know that every feeling of discomfort is only an indication of a deviation from health. This, however, does not make so strong an impression on our minds as the facts which are proven by observation on the results of the healthy action; when, for example, we estimate the influence on the circulating fluids which must be produced by the twenty-eight miles of "perspiratory tubing," with its seven millions of pores opening through the epidermis, discharging daily two ounces of excrementitious matter, and not less than thirty ounces of watery vapour, we can better appreciate the effects which must result from the entire interruption of this excretion, produced by the drying of the cuticle though which those pores are transmitted: nor must we forget that this excretory process is not the only one which is going on through cutaneous agency. Physiology teaches us how large is the amount of influence on the blood, subsidiary to that of the lungs, exerted by the direct imbibition of oxygen through the skin. Now if we bear in mind the activity of the vital processes, and that no one of them is needless, but each absolutely essential to the other, and to the integrity of the whole organization; and then remember that by the destruction of the cuticle not only the depurative action is arrested, but an obstruction placed on one channel, by which the vitalizing influence of oxygen is introduced, we shall be better prepared to appreciate the condition of the blood in scarlet fever, and the consequent danger to the patient, from the interruption of the functions of the skin. It is, moreover, a fact well established by the observation of surgeons, that in burns and scalds, the danger is proportioned less to the depth of the injury and the intensity and duration of the heat applied, than to the extent

of surface involved, thus affording additional evidence of the importance to the system of the cutaneous function. Nor must we overlook the fatal results which have been produced on animals of a lower grade, by coating the skin with some impermeable material. Now in this disease the whole surface is affected, and more decidedly than in any other of the exanthemata, except confluent small pox. In rubeola there are patches of healthy skin; in erysipelas the extent of surface involved at one time is much smaller, and neither of these diseases leaves the dead cuticle to impede the normal action of the new. It may in some instances be compared to the varnish applied to the surface in the experiments of the physiologist. The student will not, therefore, be surprised that when treating of the inferences as to the final result, to be drawn from the symptoms of the disease, we expressed a caution against the common error, of supposing that the freeness and extent of the cutaneous affection was a favourable sign; and will understand why we thus draw attention to the desquamatory process; and place it first among the sequelæ of the disease; and will also be the better able to comprehend why the mortality is often greater in the secondary than the primary stages. So decidedly is this the case, that common observation has taught it. When on one occasion I assured an intelligent mother of a large family, several of the children having been attacked simultaneously, that the crisis of the disease was passed, she replied: "Well, then, this is the period of danger; Mr. ———, who lost several children with it, told me that they all died just as the doctor told him they were getting well."

This, then, is the period in which the anxieties of the physician should be especially active, and his care most vigilant; and the danger to the patient is closely connected with, though not wholly dependent upon, the interruption to the healthy action of the cutaneous emunctories. The process of casting

off the cuticle, which we observe, and to which this term *desquamation* is applied, is not itself a diseased process. It is the result of the previous disease and the natural course by which an impediment to the normal action of the system is removed. Commencing in favourable cases from the time at which the cuticle is destroyed, in others it is postponed, sometimes even for a fortnight, from the 14th to the 20th day; and this third week is the period during which the greatest number of cases of dropsical effusion occur. The peril is always proportioned to the tardiness with which it is accomplished; and until it is completed, the patients are depressed by the poisoned condition of the blood, and liable to the sudden development of cerebral disease or inflammation in some organ essential to life.

But the external cuticle is not the only organ for exhalation the action of which is, in a similar manner, suspended or destroyed by the disease. Every one is aware from observation on his own person, and it is important to apply this observation to its relation to disease, that wherever any influence from *without* arrests the cutaneous transpiration, a corresponding increase is found in the watery constituent of the secretion from the kidneys. This is the cause of the increased secretion of those organs under the influence of fear, and cold externally applied; both giving rise to the contraction of the capillaries of the skin, and thus arresting the cutaneous transpiration. This is not the case, however, in diseases where the same cause certainly operates equally on both kidneys and skin, and produces a similar result in each. Hence we find, that though the amount of urine has been but little diminished during the four or five first days of scarlet fever, it is either wholly arrested or becomes very scant about the same time that the functions of the skin are most impeded. Thus proving beyond controversy that the same cause which interrupts the action of the skin is

operating to produce a similar arrest of the normal functions of the kidneys. The same is true in other febrile diseases, in most of which, we find the excretions through the skin and kidneys are not antagonistic as in health, but are either suppressed or increased in freeness under the influence of some common cause. The occurrence simultaneously of increased discharges from both organs is noted as marking the crisis of febrile diseases. Now it is not at all a forced idea that the same diseased action may be established in the Malpighian bodies and epithelium of the uriniferous tubules, as is observed on the external tegument; and it is well known that the flow of urine is always much diminished about the time at which the process of desquamation is at its height, and epithelial scales are found at this juncture abundantly in the urine. The facts observed, therefore, confirm the suspicion which might be entertained from reasoning only, that there is such a connexion between the diseased condition of the skin and kidneys, in their influence upon the other sequelæ of scarlet fever, as justifies the relation which I have ventured to suggest before; and indicate the latter organs as equally interested with the skin in the production of some of the results which will claim our attention immediately. The diseased condition of the kidneys is not dependent on the interruption of the functions of the skin: both organs are simultaneously affected by one common agency. In this opinion I find myself supported by the highly important authority of Dr. Copland, who says: "I cannot hesitate to state my conviction, that in many cases which terminate fatally at an early period of the disease, whether the eruption be abundant or scanty, or altogether suppressed, this issue is in great measure owing to the early implication of the kidneys having been overlooked, for I have remarked in many instances, as respects both the symptoms during life and the appearance of the kidneys after death, sufficient evidence to convince me

that these organs are remarkably congested, and their secreting and tubular surfaces are the seats of a similar vascular injection or efflorescence to that existing in the vascular rete of the skin, and that this efflorescence on the surfaces of the uriniferous tubes, &c., and the associated swelling and congestion of these organs during the early stages of the malady, either impede, or interrupt, or altogether suppress the function of the urinary excretion, and thereby occasion an accumulation of excrementitial and contaminating materials in the blood; and, consecutively an increase of the poisonous action of the infected blood upon the nervous system, and on vital organs and parts, thereby producing further complications."

"In this early period of the disease, the interrupted functions of the kidneys, produced in the manner now stated, has the effect not merely of preventing the discharge by these emunctories of the usual excremental matters in the blood, but also of arresting the evacuation of those morbid materials evolved in the blood from the action of the infectious miasm upon the nervous and vascular system. The obstruction of the kidneys arising, as just explained, during the early stage of the disease, produces a more immediate, and a more intense or acute effect than the obstruction so frequently caused subsequently and during, or after the process of desquamation by the accumulation and infarction of the epithelium scales thrown off from the uriniferous tubes. The obstruction of the uriniferous tubes, caused by the accumulation in them during this latter period of epithelium scales, is entirely the result of a species of desquamation, as respects those tubes, consequent upon the vascular action, congestion and tumefaction, of which they with other parts of the kidney are the seat in the eruptive or early stage, and which in this stage frequently becomes, as just stated, the source of the most acute and fatal complications. The obstruction of the kidneys in the early stage, arising, as now shown, is often more complete and rapid in its

accession, than that which follows in its last stage as a process of desquamation; and hence the consequences are generally not so severe, nor so fatal in this last stage, especially when due precautions are used during the period of desquamation."

Some cases reported by Dr. Graves, of Dublin, give strong support to the opinion here advanced, that the kidneys partake of the diseased action in scarlet fever from the beginning of the attack. In these instances there were desquamation and anasarca in members of families in which scarlet fever was prevailing, though there had been none of the primary symptoms of the disease in some cases, and no eruption in others. Certain it is, that dropsical effusions occur in a very large proportion of cases of regular scarlet fever, frequently in despite of all precautions, always if care be not taken to prevent exposure to atmospheric vicissitudes or errors of diet. The more regular the course of the case, the more vivid and abundant the eruption, the more certainly may this desquamation as well internal as external be expected, and its consequences, dropsical effusion, be looked for. There are, however, cases in which there has been no eruption whatever, the scarlatinous nature of which is proven by subsequent anasarca.

The external cellular tissue affords the most common seat for the serous effusion. It may take place, however, into any or all the cavities of the body from the ventricles of the brain or pericardial sac, the pleural sac, or the cellular structure of the lung, to the tunica vaginalis testis. The internal effusions are almost always preceded by that of the external cellular tissue, especially of the face.

The actual effusion of fluid is generally preceded, a longer or shorter time, sometimes only four or five hours, in other cases, for a day or two, by feelings of languor and drowsiness, and loss of appetite; and not unfrequently by nausea and vomiting, coated tongue, and great heat and dryness of the skin: the

pulse is tense and corded, with a return of the frequency, if that had subsided. In every case that has passed under my notice there has been suppression of urine, preceding the serous effusion. From the end of the first week to the beginning of the third, is the period at which these symptoms are most frequently developed. By far the largest number of cases occur about the end of the second week. Though no amount of precaution can wholly remove the liability to the result, it is by no means uncommon to find it brought about by improper exposure to atmospheric vicissitudes, or some error in diet; and it has been supposed by many that it is to the neglect of care in these points, resulting from the idea that the disease has been too mild to require it, we may ascribe the greater proportionate frequency of dropsy after the mildest cases of simple scarlet fever. These irregularities or exposures, act merely as the disturbing causes which derange the normal actions of the organism, and thus overcome the power of resistance; which would otherwise have been sufficient to carry the patient safely through the period of disturbance consequent on the primary impression of the cause of disease.

The present will probably be as appropriate a place as any that may offer to exhibit the importance of enforcing the greatest care with regard to this exposure and the indulgence of appetite, since it is sometimes very difficult to make those who have not purchased their own experience by a severe lesson, fully aware of its necessity.

In the year 1830, I was sent for late at night, by the late Dr. Dewees, to see the family of an officer of the Navy, in which five of the children had been under the care of an infirm superannuated physician, with mild scarlet fever. He had seen them in the morning, pronounced them well, and had given his consent to their being allowed the free range of the house and the usual diet of the family. When I reached the house, two of the children were already dead from convulsions,

and the others were saved with difficulty, having fever followed by anasarca, depending, in all probability, on inflammation of the kidneys, the result of the exposure of the day and very improper indulgence in food. No examination of the bodies was permitted. Dr. Chapman describes similar results as having occurred under his own observation.

In another instance I was attending a child from South Carolina at lodgings here, which was carried happily through a mild attack, with but little treatment except of a palliative character. An older daughter of about eighteen was taken sick after I had ceased my attendance on the first case. The symptoms were so benign, and the treatment I had adopted had been apparently so inert, that the parents were induced to believe the disease was but little to be dreaded, and required no care whatever. They, therefore, did not seek medical advice in the second case, and permitted her to pursue her usual habits, as regards diet and exposure; at the end of a fortnight I was sent for to prescribe for general anasarca, for which they were at a loss to account. Warned by these and similar instances in which the most serious consequences have followed the want of proper care in cases which were in the primary stages of a very benign character, some of which I shall refer to when treating of other sequelæ; I am always earnest in my endeavours to impress on the parents of scarlet fever patients, the great importance of care on these points, until the entire process of desquamation has been completed; and this care is more especially important, at the very juncture when it is least likely to be exercised, just at the close of the process, when the condition of the blood, caused as well by the original impression of the cause of the disease upon the organic nerves and through them upon the blood, as by the arrest of the secretion from the skin and kidneys, is at its worst point, and the new cuticle most tender and liable to the impression of cold air. The effusion is generally first observed

about the face and hands. The complexion suddenly assumes a less healthy hue, resembling that of anæmia, the eyelids are observed to be somewhat puffy, and upon attempting to flex the fingers they are found to be stiffened. The trunk and upper parts of the lower limbs next assume the appearance of disease, and on feeling these parts they are sensibly harder to the touch than natural, and there is often some complaint of tenderness on pressure, which, moreover, does not at this period leave the indentation found commonly in anasarca. All these circumstances agree in the indication that though the condition of the kidneys is undoubtedly abnormal, and the lesion of those organs may be regarded very properly as the principal cause of the dropsical effusion, the skin itself is also in fault, and that the disease is not one of mere infiltration, caused by some affection of the viscera, or destruction of the crasis of the blood. It is upon this fact that MM. Rilliet and Barthez found their conviction that there is an inflammation of the subcutaneous lymphatic layer in all cases of scarlet fever, and that the dropsy and albuminuria are dependent on a special alteration of the blood, resulting from this cause. They attach some importance to the influence of exposure to cold, especially when conjoined to moisture; but refer to the many cases in which anasarca occurs in despite of the most careful precautions as proof that this is not the only cause. There is no practitioner of enlarged observation who has not met with such cases, while undoubtedly there are many patients, who, during convalescence from scarlet fever, are much exposed to vicissitudes of temperature and errors of diet, who yet escape. There are certain epidemics in which this tendency is much greater than in others. MM. Rilliet and Barthez also assert, on the authority of M. Noivot, that in about one third of the cases of dropsy there is no albuminuria, and they quote Dr. Phillip, a German author, as asserting that in more than sixty cases of anasarca following scarlet fever, no trace of albumen could

be found in the urine. The suddenness with which this swelling follows exposure, also confirms the same view, as I have known it to be manifested almost immediately on the return from a drive, or exposure at the door or window, or other similar imprudence. The bowels are generally costive at this time; and even though the secretion of urine may not before have been so much diminished as to arrest attention, it will now be found, on inquiry, that it is very scanty, high-coloured, and turbid. A critical examination of this fluid under these circumstances proves it to contain blood, and albumen, and to be very acid. At one time this was thought to indicate the existence of the incipient stage of that peculiar condition of the kidney found in cases of what is known as Bright's disease. This is, however, an error. The presence of albumen in the urine as indicated by the deposit of that substance coagulated by heat or nitric acid, is often dependent on simple inflammation or, perhaps, congestion only, of those organs; and this is undoubtedly the case in the instances under consideration. In Bright's disease the quantity of the urine is increased, its specific gravity diminished, its colour light: in all these respects presenting a marked contrast with the condition of the secretion in the dropsy following scarlet fever. The examination, moreover, of the bodies of those who have died of scarlet fever, as reported by MM. Rilliet and Barthez, proves that no such disorganization as that known to produce Bright's disease exists. It is true these authors do not indicate how many of their fatal cases had progressed to the period in which dropsy is developed, but they say that "in no case were the kidneys enlarged or pallid, though sometimes red or congested." There is no disease in which we stand more in need of accurate, well digested observations of post-mortem examinations. This results from the fact that the mortality generally occurs in private practice, where the distress of parents and friends prohibits the physician from proposing anything which would aggravate their sorrow.

The strumous diathesis has a powerful influence in promoting the development of the sequelæ now under consideration, and renders them much more grave when they do occur. It is always marked by a diminution of the power of resistance, and greater susceptibility to the chronic forms of organic disease. In children in whom it prevails, the kidneys, like the throat, are liable to chronic inflammation or congestion after scarlet fever, and the disease is less amenable to treatment. I have known the most abundant secretion of limpid urine in such instances without any diminution of the effusion or febrile disturbance, and one such case terminated in death from convulsions in the fourth week.

Anasarca is the form in which the dropsical effusion most generally presents itself. If it were the only one, the previous diseased condition of the cutaneous capillaries, and the generally acknowledged dependence of the disease on the impression of cold on the surface, would justify the belief which has been expressed by some authors that "it arises from increased action in the sanguiferous system."* Next to the cellular tissue beneath the skin in liability to this effusion, I should place the pleural sac or the pulmonary tissue; and after this, in order of frequency, the ventricles of the brain and the pericardium; and I have no doubt that sudden death is caused in many cases by these latter lesions. An instance of this occurred in my own practice. An infant had been carried out by its nurse, apparently in perfect health. It was brought home in a state of collapse, and died in a few hours without reaction. Within a few days another child in the same family sickened with scarlet fever, and had a mild anginose attack with an abundant eruption. It passed through the first week safely, and was apparently convalescent, when an anxious grandmother, confident that it stood in need of more nourishment than I had allowed to be given, fed it largely with

*Tweedie, Cyclop. Pract. Med.

cakes, ice cream, and animal food. At the end of forty-eight hours of this injudicious treatment, the child was seized with general anasarca, dry cough, and dyspnœa to such a degree as prevented the child from lying down. Death speedily ensued. Post-mortem examination of the body exhibited pulmonary œdema, and effusion into the pleura and pericardium. Dr. Hamilton reports three similar cases among the boys of a school in England, in which death took place within thirty-six hours, the symptoms indicating effusion in the ventricles of the brain, and the cavities of the thorax and abdomen, as well as in the cellular tissue generally. Cerebral effusion is certainly the most formidable of the sequelæ of scarlet fever, though happily less frequent than the anasarca. It is indicated by the occurrence of stupor, or violent headache and vomiting. The pulse is slow, one or both pupils dilated. Vision is impaired, or even lost entirely, and there may be strabismus, or even general convulsions, or paralysis. The countenance is at the same time bloated; often excessively so.

Such cases are by no means to be regarded as beyond the reach of medical treatment; nor, urgent and alarming as are the symptoms, do these indicate any lesion which can impair the power of the intellect. I meet frequently a gentleman now actively engaged in the pursuits of commerce, whom I attended when about the age of puberty during an attack of scarlet fever of a mild anginose form. He was the only child of anxious and careful parents, so that my directions as to treatment were implicitly followed. At the end of the second week his face became puffy, and upon examination I found the urine scanty in quantity, and high-coloured. The swelling extended to the entire cellular tissue, and there was an almost total suppression of urine. I placed him upon a rigid diet, and directed the use of nitrate of potash and a gentle purgative. No diuretic action was produced; and while the

external swelling constantly increased, he gradually became dull and finally comatose, with dilated pupils, strabismus, and convulsions. I bled him largely, added calomel to the nitrate of potash, and gave in addition the infusion of digitalis in full doses. Under the influence of this treatment the convulsions were arrested, the secretory action of the kidneys was restored, the effusion both internal and external was absorbed, and the patient was perfectly restored. MM. Rilliet and Barthez, speaking of this condition, remark: "Differing in this from the other cerebral affections of childhood, which so often leave as a consequence some disorder of the locomotive organs, the sensitive functions, or of the intellect, albuminuric encephalopathy leaves, to those who recover, the undisturbed possession of their sensorial, motive, and intellectual faculties. The most remarkable instance that could be adduced is that of De Candolle, so well known for the delicacy of his mind, and his profound scientific acquirements. In childhood he suffered from an attack of encephalopathy, following the dropsy of scarlet fever. Treated by Odier for hydrocephalus, he often referred to his recovery as a remarkable case, hydrocephalus being then thought incurable. The perfection of the cure was proven by the high rank he attained as a naturalist."

Only one such case has proved fatal under my notice. It was that of a leucophlegmatic girl about twelve years old. Her parents had both died of strumous diseases, and an older brother of scarlet fever about a fortnight before she was attacked. I was called to see her on the third day of her disease, in consultation with a highly intelligent and experienced physician. I found her covered with a vivid scarlet eruption, which occurred in patches of a uniform hue, with very irregular margins. It was blotched about the body and neck as though a sponge saturated with some scarlet dye had been suddenly pressed upon it. There was some cough, much sore throat, with swelling as well external as internal, and a free

discharge from the nostrils. The attending physician had expressed his opinion that the case was one of rubeola. Even though the previous occurrence of a fatal case of scarlet fever in the family had been wanting, there was more resemblance to that disease in the course of the fever and the character of the eruption, than to rubeola; while the cough was evidently dependent rather on the irritation of the fauces, than on any affection of the bronchial mucous membrane. The discharge from the nostrils was also characteristic of the disease of the posterior nares which attends scarlet fever: not the thin mucus of rubeola, but a sero-purulent curdy acrid fluid. The child was put upon the use of chlorate of potash in solution, and passed safely through the primary stages of the disease. The anginose symptoms and congestion disappeared, and the pulse lost its frequency. The secretion of urine was maintained throughout in a sufficient abundance. There was, however, much puffiness of the face, a very unhealthy pallid complexion, headache, dilated pupils and sluggishness of intellect, with anorexia, and, occasionally, slight nausea. Circumstances led to my withdrawal from the care of the case, though not without the expression of my conviction that there was still imminent danger of a fatal result. The family physician also ceased to visit her daily. The abundant flow of watery urine was supposed to indicate a restoration of the healthy action of the kidneys, and that the remaining symptoms of disease would gradually yield. At the end of about a week I was suddenly recalled to find her in violent convulsions, with an excessively bloated countenance, dilated pupils, strabismus, and tumid neck. Leeching, calomel, enemata, stimulating pediluvia, all failed to produce the slightest diminution of the coma, or relaxation of the muscles, till death brought release. No examination was allowed. I learned that the quantity of urine had continued to be excessive, of a pale colour, and without any deposit on cooling; while, no albumen was detected by

the test resorted to. A doughy, pallid, puffed face is always, as in this case, to be considered an indication of danger, even though the quantity of urine is large. Nor must it be forgotten that it is quite as important that the urine should be charged with the saline constituents, as that its quantity should be abundant. A mere leakage of watery fluid does not restore the blood to its normal condition; and till this is effected, the patient is still liable to serious complications.

This formidable affection occurs generally, as in the instances now recorded, after the anasarca has existed some time, though sometimes it is developed at an earlier period. I have often met with cases in which the same condition was ushered in most unexpectedly by violent headache, with vomiting, temporary amaurosis and strabismus; and I am always alarmed when these symptoms occur during the third or fourth week of convalescence from scarlet fever.

The pathology of this affection is somewhat obscure. By some, the condition of the brain and nervous system is ascribed to the poisonous influence of the urea, which the diseased kidneys fail to eliminate from the blood. By some, meningitis is thought to be always present; and by others, mere passive effusion of serum into the meshes of the pia mater, the ventricles of the brain, and in the substance itself of that organ, is supposed to exist. The coma and convulsions, which are the prominent symptoms, are common to all these. The reports of the results of post-mortem examinations prove that different lesions are found. MM. Rilliet and Barthez "ascribe the cerebral symptoms neither to a phlegmasia nor to a neurosis; but regard them as the consequence of hydrocephalus, taking that term in its widest acceptation: that is, as including not only effusion into the ventricles of the brain and within or beneath the arachnoid membrane, but also œdema of the cerebral substance." The nature of the symptoms and the course they follow, differ as widely from

those of inflammation as from the mere neuroses. They are less permanent than the former, and less transient than the latter. The most formidable in appearance yield to treatment with a certainty and promptitude we could not look for if dependent on actual inflammation or the changes in structure consequent upon that action; and they are more fixed than they would be if dependent on merely nervous disturbance. Dr. Copland has found more decided organic change: he says, "The membranes and even the substance of the brain present increased vascularity, with some serous effusion between the membranes, especially at the base of the brain and in the ventricles particularly, in those cases in which the urine has been very scanty or suppressed."

Dr. Tripe, in illustrating the causes of mortality in this disease, gives us an abstract from the Report of the Registrar General of England and Wales, and from this source derives the information that of 128 cases of death during the stage of effusion after scarlet fever, in which the symptoms were noted in the report of the medical attendant, and the appearances found on dissection added, "affections of the brain and spinal cord" were recorded as the causes of death in 14. Of this number, "meningitis" is specified in 6 cases, and "passive effusion into the cerebral cavity" in 7 cases. Thirty-seven other cases of the 128 are reported as having died from "uræmic poisoning," as manifested by convulsions alone, or coma with convulsions, in 27. Coma alone, 5. Tetanic convulsions, 1. Epileptic convulsions, 1. And two cases are reported with "complete suppression of urine, with coma and convulsions." Dr. Tripe remarks: "Though coma and convulsions are prominent symptoms of uræmia, yet in making post-mortem examinations we rarely detect any morbid alterations. Sometimes, when the symptoms come on gradually, we meet with indications of slight inflammatory disease; yet in the majority of cases the quantity of fluid in the ventricles and arachnoid cavity is but little, if at all, above that of health. In my

own cases I did not detect any morbid products; and Frerichs makes a similar statement, having never met with more than a slightly increased amount of fluid, the largest quantity not exceeding an ounce." The presence of even this quantity of fluid at any point within the cranium is certainly a sufficient cause of serious cerebral disturbance, whether it be the result of active inflammation or mere passive effusion.

Still another class of pathologists is disposed to attribute the whole train of symptoms to the mere toxic effect of the urea retained in the blood, as in the latter stages of Bright's disease. By others this view is opposed, however, on the ground that in the case now under consideration there is not the slow and gradual increase of stupor which marks the accumulation of the poisonous principle in the former: the invasion is violent and sudden, nor is there any correspondence between the amount of urea found in the blood and the violence of the attack. Large quantities, moreover, of urea have been injected into the veins of animals, not only without causing coma or convulsions, but, what is more striking, with the effect of producing diuresis. With MM. Rilliet and Barthez, I am disposed to attribute the symptoms to the combined influence of a poisoned state of the blood—partly due to the primary cause of scarlet fever, partly to the impaired action of the skin, and still more to the interruption of the function of the kidneys caused by the congestion and perhaps inflammation of those organs—and serous effusion within the cranium; nor am I at present disposed to attribute the effusion to active inflammation of the encephalon. The cases which have fallen under my notice have occurred chiefly among those patients who were beyond the stage of childhood in which meningitis is most commonly developed; and instead of the contracted pupil, frequent pulse, grinding of the teeth, constant vomiting and constipated bowels of that disease, we find a slow pulse, dilated pupil, coma and convulsions, with great

distress in respiration. The vomiting which occurs is violent, but of short duration.

The recent interesting experiments of Dr. Hammond of the U. S. Navy, made to determine the question as to the mode in which urea acts on the system when injected into the veins, are highly important, proving as they do beyond a question the toxic effects of this matter when retained, and the power of the kidneys in its elimination from the blood. Where these organs were left undisturbed, a large quantity of urea was received and promptly discharged, with a comparatively slight disturbance of the normal functions. When the kidneys were extirpated before the urea was introduced, the animals soon manifested the stupor and convulsions of uræmia, and died. We thus find confirmation of the view which attributes the most important influence to the morbid state of the kidneys themselves.

The returns of the fatal cases of scarlet fever to the Registrar General of England and Wales, for the year 1848, have been carefully examined by Dr. Tripe; and from an analysis of his own cases added to this more extended report, he has reached the conclusion that the fourteenth day is the period at which the dropsical effusion most commonly appears: the extremes being the first day, of which two cases are reported, and the ninth week, in which one occurred. Nine per cent. of the attacks were in the first week, 38 per cent. in the second, 34 per cent. in the third, 11 per cent. in the fourth, and 4 per cent. in the fifth week.

There is another most formidable consequence of scarlet fever which has occasionally fallen under my notice. In speaking of the length of the incubative period, I alluded to the case of the family of a gentleman about to travel to Europe, in which that term was prolonged much beyond the usual time. When the family was on the eve of starting, the youngest child, about four years old, complained of tenderness of the

spinal muscles of the neck and dorsum. Supposing it to be only rheumatism, and unwilling to interrupt important and long arranged plans of duty, as well as pleasure, they were allowed to sail. On reaching Germany, the child who still complained of his back, was left under the care of a faithful nurse, with near relatives during the summer months; and in the autumn was brought home. So soon as I saw him I detected caries of the vertebra, which had run its regular course, causing great deformity, and will result in death. Another case of an analogous character, though happily with a very different result, has occurred more recently under my notice. The child, a fine healthy boy about eight years old, had a common attack of regular anginose scarlet fever. Under the discriminating care of my judicious friend, Dr. Rumsey, it went through its course without any peculiar violence, and with nothing to indicate the anomalous symptoms subsequently manifested. About the end of six weeks, after convalescence had been fairly established, without having been subjected to any exposure or irregularity of diet, he began to complain of stiffness of the neck, with extreme tenderness of the muscles. His head was drawn permanently toward the left shoulder, and there was a decided tumefaction of the occipital region on the same side. The tenderness was so great as to preclude the possibility of any minute examination: he shrank with terror from the slightest touch, though a cheerful-tempered and courageous boy. There was no febrile reaction, nor disturbance of any of the functions of the organs of assimilation or secretion. Under the impression that it was a case of mere muscular rheumatism, frictions were applied, at first of a narcotic and afterward of a stimulating character. This treatment produced no relief. The rigidity of the muscles became greater, and the exaltation of sensibility more intense. The slightest movement was productive of great suffering, and ultimately even the jar of the floor was distressing to him.

He kept one hand constantly applied to his head in order to guard it against motion, and it was with great difficulty he could make any change of posture. Leeches and blisters were applied to the nape of the neck. At the end of a fortnight he lost the muscular power of the left hand and arm, though there was no diminution of the sensibility. The paralysis gradually extended itself, first to the leg of the same side, and finally involved all the extremities. It was total. He suffered much from the strain upon the muscles of the neck when lying down, and preferred an inclined chair, on which he rested, unable to move any of his muscles except those about the face and mouth. Occasionally he was thrown forward with his forehead supported against the bed, and his limbs hanging as powerless as those of a rag doll. Still there was no loss of sensation of any part. There was very great tumefaction of the nape of the neck, and the sensibility there was so excessive that the mere approach of a finger gave him great distress, and the change of the dressing applied to the blistered surface, even when these were of the most soothing character, occasioned intense suffering. Under the impression that this condition was dependent on inflammation of the sheath of the spinal cord, with plastic effusion causing pressure at the roots of the nerves, the external irritation was long continued by means at first of blisters, and then by iodine ointment, while calomel in small doses and subsequently iodide of potash were administered internally. There was, however, no mitigation of the symptoms, while his general health was rapidly sinking under the treatment. Dr. Pepper was now called to our assistance, and during a fortnight the same treatment was pursued. At the end of that period, the length of time which had elapsed, the active antiphlogistic treatment which had been pursued, and the entire absence of febrile disturbance, appeared to indicate a change of plan, and we made trial of the effects of strychnia, but with no benefit.

The limbs were all absolutely powerless; the swelling of the occipital region and the exaltation of sensibility were as great as ever, though the part was no longer irritated by local applications. The spring was far advanced, and the period approaching at which he could enjoy the benefit of a change to his father's country seat; and though not without serious apprehension that the disease had involved the bodies of the vertebræ of the neck, it was decided to abandon the use of all those remedies which caused pain by their application, or exhausted still more his vital force, which was manifestly yielding. He was therefore placed upon the use of cod-liver oil, which was continued many weeks. He was taken to the country, and daily drawn about the grounds on a mattress placed on wheels; and during the heat of the summer he was carried to the sea-side. The result has been most happy. He has entirely recovered his locomotive powers, and is in robust health, though there is still the fixed contraction of the muscles of the left side of the neck, projection of the spinous processes, and undue sensibility of the occipital region. In the "Clinical Lectures" of Dr. Graves of Dublin, as re-published here by Dr. W. W. Gerhard, may be found a letter from Mr. Ferral of Dublin, in which he narrates the history of four analogous cases of what he designates as "a peculiar affection of the neck, which (he) had not before seen in connexion with Scarlatina," three of which recovered perfectly, and one with a wry neck. In none of these cases, however, was there the paralysis which presented so marked a feature in this case. Dr. Ferral says: "I can offer no better explanation of the occurrence of this affection during the progress of scarlatina, than by supposing that the inflammation of the fauces and back of the pharynx was propagated to the covering of the spine, and thence more or less deeply to the adjoining parts." Dr. Copland also reports having met with similar instances. He says: "They are observed chiefly in the most malignant cases; and even in more rare

instances of this kind which recover, the morbid action has extended posteriorly to the tissues and parts between the pharynx and bodies of the cervical vertebræ, until these latter and the intervertebral substances and ligaments have become implicated, and dangerous if not fatal sequela have followed the pharyngeal complication. This lesion is met with, not only as a complication, but also as a sequela of scarlet fever. In either form, in the latter especially, it is often attended by spasm, contraction, or painful distortion of the head or neck, and in this state the lesion has often been viewed as merely consisting of irritation, or of simple "crick in the neck," or of rheumatism from cold, and been overlooked until it has advanced to disease of the intervertebral substance, to destruction of the ligamentous or cartilaginous structure, and even to *caries* of the bones of the base of the skull, or of one or more of the cervical vertebræ, with thickening of the ligaments and of the theca of the canal, and complete or incomplete, partial or general paralysis. Of this sequela I have seen several instances, and two of complete recovery, with much shortening and stiffness of the neck from destruction of one or two of the cervical vertebræ, and ossific adhesion of those adjoining." Such would undoubtedly have been the result of the case I have narrated, had the treatment been less energetic and appropriate.

Endo-cardial inflammation is another of the sequelæ of scarlet fever of a most formidable character, which you will find mentioned by most authors. The suddenness and violence which mark its character and the period at which it most commonly occurs, are all illustrated by the following instance which occurred in my practice many years since. This was in the case of a lad of twelve years old. Scarlet fever in its mildest form had passed through a family of six children, of which he was the oldest and last taken. The most rigid attention to diet, and the greatest care to avoid exposure, had

been practised; my attendance had been prolonged to six weeks, and as convalescence was fairly established, I had called in the evening to take my leave, and sat till a late hour. In parting I expressed my gratification at the result, for there is certainly great cause for thankfulness when this disease assumes a form so benign as to pass through a family of that size, and leave the circle unbroken. The reply of the mother, was the expression of her fear that the peril was not yet entirely passed. The hearty laugh of the one that had last been sick, which was just then heard from the nursery, might have induced me to ridicule such apprehensions, had I not known the treacherous character of the disease. Scarcely three hours had elapsed when I was summoned to see him with great dyspnœa, tossing about the bed, unable to lie down, with a small tense pulse and hot skin. Bleeding, leeching, blistering, calomel, digitalis and colchicum, aided by the most anxious and affectionate nursing and rigid abstinence, carried him through this attack, but left him with an hypertrophied condition of the left ventricle, and disease of the valves, from which he has, however, since recovered, and is now a well developed young man, actively engaged as a civil engineer.

Rheumatic pains, with fever, are of very frequent occurrence during the convalescence from this disease. It is often, though not always, the result of premature exposure, and like the dropsical effusion, is more likely to occur in mild than grave cases. A fine healthy child was spending the summer months in the country where scarlet fever had never before prevailed. He had an eruption with febrile symptoms, but of so mild a character that the physician in attendance remarked, he might have had scarlet fever, but that there was not sufficient disturbance of the child's health to correspond with the amount of eruption, and his ideas of the disease. The little fellow was allowed to pursue his usual out door amusements without interruption. At the end of a week he complained that his

"legs were too long for him," that he was "tired," became feverish and languid, refused food, lost the power of using his lower extremities, and died. This was an extreme case; more generally some time during the second week, there is a return of the fever, the pulse becoming quick and corded, and the skin hot and dry; the child complains of pain in the legs, and cries when any attempt is made to move it. This state continues two or three days, and then yields to proper treatment. Often there is swelling and redness of the joints as in common articular rheumatism; while the febrile reaction and violence of pain are equal to the most formidable cases of the idiopathic disease.

Some authors speak of purulent deposits in the joints. This is a result which has never fallen under my notice.

Diarrhœa, when it occurs, is to be ascribed to the irritation of the putrid colluvies swallowed from the ulcers in the throat, rather than to any direct influence of the cause of the disease on the mucous membrane of the alimentary canal. Dr. Southwood Smith, and MM. Rilliet and Barthez, affirm however, that ulceration of the glands of Peyer is a frequent lesion in fatal cases: and peritonitis sometimes proves fatal even under the most judicious treatment.

We are now prepared to enter upon the consideration of the *treatment* of this disease. Though it is undoubtedly true, that but few diseases are amenable to the influence of purely specific remedies, it is not the less certain, that general principles of treatment must be regulated in their application to each disease, by close observation of the peculiar character and tendencies which mark its own history. No habit can be more pernicious to the physician, and less beneficial to the patient, than that so often adopted by superficial thinkers and indolent practitioners, of omitting the consideration of the causes which produce, and circumstances which influence, the progress of any form of disease; and filling the memory

with modes of treatment and specific remedies which may be employed empirically, without endeavouring to understand the principles which should determine their adoption, and regulate their application. There is no disease which more fully illustrates this common truth than that now under consideration. It is only from a careful study of its general history, as well as minute observation of the course of symptoms in individual cases, that any suitable idea of treatment can be deduced; and the liability, which the history of the disease has exhibited, to frequent change in type, from simple and sthenic, to irregular and malignant, demanding a corresponding change in the mode of treatment, renders the success of the practitioner equally dependent upon the soundness of his general principles and the accuracy of his particular observation.

Preserving ever certain distinctive peculiarities which prove its identity, yet yielding continually to the influence of those extraneous impressions which govern its development at particular periods, scarlet fever is a disease in which the treatment must be regulated by one leading principle, while it is varied, not only by temporary or local demands, but often in accordance with individual peculiarities. This view of the case has been too little regarded by those writers on the subject whose works are generally consulted by medical students. During some epidemics assuming a sthenic character, in others marked by a strong typhoid tendency; in some, complicated with severe local lesions, while in others, there is but little tendency to any particular organ or structure; in some cases, pursuing a course as regular as the progression of the hours; while in others, it only touches at certain points on the confines of the disease, and assumes every conceivable variety of irregularity, it must be at once evident that no single remedy or simple plan of treatment could be set forth as appropriate to scarlet fever in all its varied phases and different stages.

There is, however, one idea which should be ever present to

the mind, as the regulating principle by which every plan of treatment must be conducted, and which shall place decided limits to the extent to which any course may be followed. Whatever peculiarities may mark the epidemic character, or vary the individual case, scarlet fever, in all its varieties, is a disease which has a specific origin, a fixed course, and a certain termination.

There are some diseases in which every hour of continued pain or disordered function, is a reproach to the skill of the physician; since they are subject to properly applied remedies, and may, by them, be at once subdued. Scarlet Fever, on the contrary, is one, the duration of which is fixed and may not be curtailed; and often its tendencies to local destruction may be only moderated, not wholly averted. This fact should never be lost sight of in the treatment of this and other kindred diseases; since he who should attempt to cut short the duration of scarlet fever, would find that it could be done only at the expense of the life of the subject. Even in guarding against local injuries, the same fact should be borne in mind; as these are a part of the result of the specific cause, operating on individual organs as well as upon the general system; and in a large majority of cases, they have a natural tendency to abatement with the decline of the primary symptoms of the disease upon which they depend. It was in all probability the observation of these facts which led Sydenham to express his celebrated caution against over anxiety and too vigorous effort:—"Cum ê contra si plus negotii ægris facessamus, vel lectulis continenter incarcerando, vel cardiacis aliisque remediis supervacaneis nimis docté et (ut vulgo videtur) secundum artem supra modum ingestis, morbus statim intenditur, et æger non raro nulla alia de causa, quam nimia diligentia Medici ad plures migrat." By the same knowledge we are supplied with power to meet the empty claim of superior success in treatment, put forth with so much vain-glorious boasting by modern empirics.

While some cases have a fatal tendency so strong that no skill may avert it, by far the larger proportion of simple and anginose cases need little more than the avoidance of impertinent interference, and the guarding against injurious impressions from without, and they will cure themselves. Let me not be supposed to advocate an indolent indifference, or to assume that no treatment is necessary. There is no disease which demands more watchful care, none is more influenced by skilful scientific practice. I would only assert my conviction that medical science has other remedies than drugs; and caution the inexperienced practitioner against the unscientific resort to empirical perturbative treatment, which is certainly more to be dreaded than the morbid impressions of the disease itself. These general principles are applicable to all the various forms assumed by this disease, and must be ever kept in mind during the consideration of the various plans of treatment and specific remedies which will be passed in review.

In order to render it more easy to embrace the views it is intended to present, the same division of the disease will be adopted as was resorted to when describing it. Commencing with the mildest form as affording the type of its character and treatment, we shall be better able afterward to proceed to the consideration of the graver cases.

In the *simple* form of scarlet fever, where there is merely some slight impression on the nervous system with vascular excitement, disturbance of the digestive functions, the eruption on the skin and redness of the mucous membrane, without swelling of the throat, nothing more is needed than a mild laxative, followed by a gentle refrigerant and diaphoretic treatment, with the avoidance of fatigue and exposure and the adoption of a careful diet, not only during the four days of febrile action, but until the desquamation is complete. A dose of good calcined magnesia, adapted to the age and other

peculiarities of the patient, should be given on the first day of the disease. Lemonade, if the taste of the patient desire it, may be used freely as drink, and it may be prepared either with simple boiling water, or with barley or rice water; and in either case may be rendered more grateful by the addition of ice. In the case of infants and young children, ice water or gum water is more acceptable than either. As a diaphoretic, the common neutral mixture, prepared with the natural lemon-juice and carbonate of potash, and not with the citric acid of the chemist, is very useful. The addition to this mixture of a small quantity of the spirit of nitrous ether is of service, as it not only increases the tendency to moisture of the surface, but also promotes the secretion of urine, which it is important to attend to; the kidneys partaking of the morbid impression and suffering a disturbance of their functions in these simple cases, as frequently as in those more formidable ones, in which the force of the disease falls upon the throat. The addition to the neutral mixture of a small quantity of the syrup of orange made with the rind of the fruit, renders it much more acceptable to the patient, whether infant or adult. It may also be added with equal, if not greater propriety, to the solution of carb. of soda or the liq. ammoniæ acetatis, where these are preferred to the neutral mixture. The urine having been found to be more acid in this disease than in health, the use of an alkali was therefore suggested. To meet this indication, the carb. of soda has been much employed, and very many cases have passed through my hands to my entire satisfaction, in which no remedy was resorted to beyond the weak solution of this salt with the addition of sweet spirits of nitre. I am in the habit of directing the solution of a teaspoonful of the soda in a tumblerful of water, to which one teaspoonful of sweet spirits of nitre is added, and give from one teaspoonful to a dessert-spoonful every hour or two, according to the age of the patient. In these milder cases, the appetite

is often but little impaired, and it is therefore important to guard against impropriety in indulgence. I am much in the habit of directing for children the cake known in this city as "lady finger" or Naples' biscuit, which contains nothing but wheat flour with a little sugar and egg, baked in thin slices, so that it is dry and does not become sodden when chewed; or a thin slice of stale bread toasted quickly; or the biscuit known as "dried rusk," or a sweet, well made, soda biscuit; with milk diluted with boiling water sweetened, for the morning and evening meal. Where the fever is very slight, milk-toast without butter may be permitted. It is better that the midday meal should be of the same character if it can be accomplished; and no animal matter, either solid or in the shape of broth or soup, should, on any account, be allowed during the first four days, even where the febrile symptoms abate thus early. Where grapes and oranges are accessible, they may be freely used; care being taken that the skins and pulp are not swallowed. The indulgence of the child in these harmless articles will much abate the desire for other food.

Where the case is more severe and the nervous system more deeply implicated, and we have to contend with muscular twitching, or trembling, or delirium, the greatest possible benefit will be derived from cutaneous ablutions, to be employed conjointly with the treatment first indicated. No slight diversity of opinion with respect to this practice has been expressed by medical writers and practitioners. Under the erroneous impression that the morbid matter present in the fluids was to be eliminated by the skin, some have objected to the application of water to the surface, on the ground of its tendency to resist this action; whilst others have feared to resort to it lest it should diminish the cutaneous activity, and produce a transfer of the disease to the nervous centres. Both these views are founded on false notions of the pathology of the disease, and experience has fully proved the

apprehensions they suggest are without foundation. Equally great has been the difference of opinion as to the mode of application of the water. In this case as in all others, the object proposed and the circumstances of the individual patient must be kept in view. In the large majority of instances, the object to be attained is merely the abstraction of heat from the surface, and the consequent diminution of nervous excitement. This may be effected with the greatest comfort to the patient and the least inconvenience to the attendants, by simply sponging with water. It will allay the heat, soothe the tormenting itching of the surface, and reduce the frequency of the pulse. The temperature of the fluid should be adapted to the sensations of the patient. There are great constitutional peculiarities as regards the influence of temperature on the surface. While some persons in health enjoy a high temperature, and find all their functions performed with most comfort during the warm season, others are then languid and oppressed, and long for the return of the cold weather. In the use of baths, a like diversity is found. The languor and depression which in one person will follow the resort to cold bathing, will in another result in equal degree from the employment of the warm bath. Now these same constitutional peculiarities are carried into the hours of sickness. *Tepid sponging* may always be employed with benefit where the skin is hot and dry, the pulse quick and strong, and the patient restless. *Affusion of water* at a temperature not less than 96° or 98° of Fahrenheit, will in most similar cases be very beneficial, and especially in those patients where there is great restlessness and delirium. It allays nervous irritability, and is often followed by refreshing sleep. Currie, of Liverpool, a physician of great eminence of the latter part of the last century, has advocated in very strong terms, the use of *cold* affusions in this disease as well as in typhus fever, and he has been followed in this recommenda-

tion by other writers. The preponderance of testimony is, however, against it, and it appears to me to be founded on imperfect views of the operation of cold. We are all familiar with the fact, that its primary impression is sedative. This cannot, however, be long maintained without producing serious depression of the vital force. When it is interrupted before this exhaustion is brought about, the result is increased action of the general circulation, and also of the capillaries of the part to which it has been applied. Both these conditions are injurious in scarlet fever: and at the best the cases reported by Dr. Currie prove only that no mischief resulted, since the most he claims is the final abatement of the fever on the fourth day. Dr. Chapman believes the cold affusion to be especially adapted to those cases in which the nervous system is most deeply involved, and he asserts that he has derived from the application of cold water to the surface, more positive benefit than from any other remedial measure he has employed. There is one set of cases to which it is beyond doubt peculiarly appropriate. I allude to those in which there is violent delirium, with great heat of skin, very rapid pulse, and extreme restlessness, and not unfrequently convulsions, or at the least, violent muscular twitching. Bleeding, whether local or general, is in such cases very often followed by fatal results. But a cold douche to the head, maintaining the impression by cloths wrung out of iced water, while the whole surface is freely sponged with that fluid at the temperature of the chamber, or but little below it, will do more to procure tranquillity and reduce the nervous excitement, than any other plan that can be adopted. Much important testimony to the value of this treatment variously modified, might be adduced. By Dr. J. Forsyth Meigs the employment of affusion of water at 96°, containing a small quantity of vinegar, is mentioned with approbation. I have long resorted to baths from 96° to 100°, to which whiskey has been added as a means of tranquillizing young

children and inducing sleep. The temperature of the surface in this disease is much exalted above the natural standard of health. When, then, we resort to the application of water which feels warm to the hand of the person who uses it, it is yet so far below the temperature of the patient that it abstracts heat from the surface, and hence it is that apparently tepid sponging is followed by nearly the same results as those ascribed to more positive cold, and the shock being less, it is not so liable to be followed by pernicious reaction. It diminishes the capillary excitement, and maintains a more healthy condition of the cutaneous functions; the interruption to which exerts so baneful an influence on the subsequent course of the disease. The influence of these results on the disease appears sufficiently great to account for the benefit conferred, without adopting the suggestion of Dr. Chapman, that "while mitigating undue excitement by its sedative agency, it also proves more directly the corrective of the effects of the specific virus causing the disease;" to which I refer only for the purpose of exhibiting how high is the estimate he places on this mode of treatment. Dr. Condie is equally decided in the expression of his confidence in it; and Dr. Bell, in his work on baths, asserts "there is no other remedy which unites to any thing like the same extent, efficacy with safety, and immediate pleasurable results, as the cold bath."

When we bear in mind the importance of the functions of the skin, and the great influence the interruption of them must have upon the condition of the circulating fluids, and the nervous centres, it will not be supposed that undue prominence is given to this remedial agency. More recently, similar views have led to the adoption of a practice, which, though highly lauded by some of my professional friends, who have employed it, when first presented to the mind has no very strong claims to regard. I allude to the employment of inunctions, originally suggested by a German author in the offensive shape of

rubbing with the skin of fat bacon. It is rendered less disgusting when modified, as by a recent English writer, who commends it as equally applicable to all febrile diseases, and resorts to an ointment composed of equal parts of suet and lard, which is to be rubbed into the dry skin by vigorous friction. A somewhat similar practice has long been commended by my valued friend, Prof. H. L. Hodge, who employs a liniment composed of olive oil and spirits ammonia, in varying proportions according to the coldness of surface or feebleness of circulation in the capillaries. Dr. Hodge does not confine this treatment to scarlet fever, but resorts to it in all cases of febrile disease in childhood when accompanied by a harsh dry skin. Whatever benefit may accrue from this practice in the primary stages, can be ascribed only to the soothing influence of the unctuous application to the skin, which acts here as in erysipelas, in which it certainly allays the local irritation, and thus by the removal of one important cause of excitement, may tend to the subduing of the febrile action. How far it may be applicable to the latter stages of the disease, and to those cases in which the sedative influence of cold would be pernicious, I am not prepared to express an opinion: though analogy affords many examples, which might, perhaps, induce some to think favourably of the practice as modified by Mr. Taylor, and to give it a trial, not only in scarlet fever, but in other febrile diseases, with a dry, husky condition of the skin. Nothing can be conceived less likely to promote the restoration of the patient than the German practice as reported in Ranking's Abstract. Not only is the material used for anointing the skin, offensive in itself, but directions are given that the clothing should not be changed, "as a clean shirt takes up more of the fatty matter than one already saturated. The rubbing in is to be kept up twice a day for *three weeks*, and once a day *during the fourth*. The patient is, *after this*, to be washed daily with soap and cold water, and then only is the warm

hip bath to be commenced." It would require the utmost confidence of success, to reconcile an American mother to such treatment, or to induce an American physician to make his daily visits to a chamber so foul. Whatever benefit might accrue from the softening of the cuticle, would be more than balanced by the loathsome effluvia. Nor does the length of time during which the application is to be made, convey an impression at all favourable to the remedial influence of this mode of treatment. I have heard, however, of families in which it has been carried out literally in all its original disgusting uncleanliness.

It will thus be seen that in the management of the simple form of scarlet fever, I am inclined to adopt a very simple treatment, even in those cases in which some symptoms of a very formidable character present themselves. Emetics recommended by some, may be harmless if employed in the very onset of the disease, when the spontaneous vomiting by which it is often ushered in, would appear to afford a natural indication for their use. If the stomach is known to be loaded with some improper food, or if the spontaneous efforts at vomiting are unsuccessful, a small dose of ipecacuanha may be given to aid in the expulsion of the undigested remains of the last meal. I have never found it necessary to resort to vomiting except in those cases which are ushered in by convulsions as the primary symptom, and which in their onset cannot be known to be scarlet fever, unless some direct communication with the disease, or its presence in the family, should give occasion for suspicion. In either case, the object to be accomplished by the emetic is very simple.

When treating of the cause of the disease, I referred to the fact that it is often developed by some agent independent of the specific influence to which it owes its essential character. Whatever disturbs the healthy balance of the system, may thus prove the exciting cause of an attack of scarlet fever,

and among children nothing more frequently acts thus, than improprieties in diet, whether in quantity or quality. Digestion is suspended for the time, either from having been taxed beyond its normal power, or from the depressing influence of the scarlet fever miasm. In either case the presence of the ingestæ in the stomach becomes a source of irritation, which greatly aggravates the danger of the patient, often causing convulsion. The more promptly this offending matter can be discharged the better; and a dose of ipecacuanha, proportioned to the age of the patient, should be given the moment the power of deglutition is restored. The body should be immersed in warm water, while a cold cloth is applied to the head, or cold water poured upon it from a slight elevation. This will almost always suspend the spasmodic action sufficiently long to permit the swallowing of the ipecacuanha which acts as a simple evacuant. Such cases generally occur in early childhood or infancy.

Purging, beyond the mere evacuation of the bowels, as suggested, by magnesia, is positively injurious, and the use of calomel in this disease is, I think, so deleterious, except in cases hereafter to be noticed, that if I were in doubt as regards a case, whether it were scarlet fever or not, I should think the doubt sufficient cause for withholding the use of that remedy, so great is the depressing influence it exerts in its primary impression. There is, in fact, no indication to be met by the use of purgatives; certainly none demanding the resort to mercurials. Neither the symptoms nor the results of examination of the bodies of the dead, afford any reason to suspect the presence of those disorders of the viscera, either functional or organic, to the relief of which this remedy is so well adapted. The depressing influence of calomel, and the irritation of the mucous membrane by the other cathartic remedies are both injurious.

Bleeding is better endured in the simple form of the disease

than in any other. But when the case is not violent it is unnecessary, and if it assume a deeper grade of severity, my personal experience is very decidedly unfavourable to its employment. Dr. Graves, of Dublin, expresses himself strongly to the same effect. He delineates very ably the state of medical opinion and its influence on the practice of that city, at the period at which his clinical lectures were delivered. The picture is the precise counterpart of what I myself witnessed in this city in the years 1829 and 1830. He describes the cases in which depletion was resorted to, and records the fatal results. The cases which are attended by convulsions and high cerebral excitement with very rapid pulse, are those in which, if in any, blood-letting may be supposed appropriate. Dr. Graves says, "This form of the disease where the pulse, without becoming strong, at once became extremely rapid, bore V. S. badly, and required great caution even in the application of leeches; the nervous symptoms only appeared accelerated by the system of depletion, although the heat of the skin suggested its employment. The derangement of the brain and nerves in this form, depends on something more than the violence of the circulation, and originates in something altogether different from mere cerebral inflammation or congestion. What that something was, I cannot even conjecture, but it was probably the result of an intense poisoning of the system by the animal poisoning of the scarlet fever miasm." I have never seen any good result from it even in those cases in which the nervous symptoms were most severe, and the vascular excitement the most intense, and I have, alas too frequently! had occasion to mourn over its fatal influence. The impression of cold will, in these cases, be always sufficiently sedative to allay the nervous excitement; and neither analogy nor direct examination of the results on the bodies of those who die, affords any reason to suspect the existence of cerebral inflammation in them. In almost every instance in which I have resorted to depie-

tion, either local or general, in cases of scarlet fever in the primary stages of the disease, no matter how vigorous the patient, or violent the symptoms, the case has had a fatal termination; and in no cases has its evil influences been more manifest than in those in which convulsions or violent delirium, accompanied by sudden shrieks and grinding of the teeth, as in meningitis, would appear to have presented the strongest possible reason for a resort to it. In one recent case of a lad of thirteen years, in whom the delirium was violent, amounting to maniacal fury, with *great muscular force*, and strong as well as rapid pulse, four ounces of blood were taken by leeches, after which he was treated with mild diaphoretics and morphia with the happiest result.

One case which occurred in what might be properly termed the transition stage of my views of the treatment of this disease, will illustrate, at the same time, the character of a severe attack of *simple* scarlet fever and the treatment I think most appropriate. The subject was a healthy boy, five years old. He had retired to bed in his usual health. About daylight I was called to see him with convulsions. I found him wholly insensible, with violent spasmodic action of the muscles of the whole body as well as of the extremities, pupils contracted, pulse frequent, and skin hot. Though it was impossible to arouse his attention, yet the least disturbance, as in moving him, or administering an enema, produced increased convulsions followed by long continued muscular tremor. On inquiring into the history of the attack, I was informed he had been waked up by a sense of sick stomach, and the convulsions had occurred whilst he was in the act of vomiting. Portions of an apple eaten on the previous day were ejected just as he had swallowed it, imperfectly masticated. Supposing the case to be one entirely dependent on indigestion, so frequent among young children, I adopted the treatment appropriate to its relief. A stimulating injection was promptly administered, and

the child removed to a warm bath; and so soon as it could be procured, a dose of calomel and ipecacuanha was given during an interval between the convulsions, while mustard cataplasms were applied to the extremities and epigastrium, for the purpose of revulsion. At the end of two hours he vomited again, throwing off an additional quantity of undigested apple; soon after which he recovered his consciousness, so far only as to protrude his tongue when solicited to do so. He neither spoke nor manifested consciousness in any other manner. He continued through the day to start much, and manifested no knowledge of the action of the bowels produced by a dose of magnesia given soon after the operation of the emetic. As the convulsions did not return, and the pupils recovered their natural condition, I determined to rely on the counter-irritation of a blister, which was applied to the nape of the neck, and cool cloths kept constantly on the forehead, and to wait for the full effect of the purgative. The pulse continued very rapid throughout the day, though the skin presented no indication of any rash. The following morning I found him with a vivid eruption on the face and neck, conjunctiva injected, eyes upturned, and pupils contracted, pulse very rapid. The tendons of the wrist twitched incessantly under the finger; he started frequently, as though about to spring off the bed, and grated his teeth with much violence. It was impossible to arouse him; and his pulse was still as frequent as on the previous day. There could be no hesitation in recognising scarlet fever, even if the tongue had not assumed the peculiar appearance which is so common in that disease. There was, however, no evidence of angina, except some little shrinking on passing the finger beneath the angle of the jaw. The cerebral symptoms were certainly urgent, and appeared to demand the most energetic treatment. In any other disease than scarlet fever, I should not have hesitated to resort to free depletion. Sad experience of the fatal results of bleed-

ing, whether local or general, in several cases, in which the convulsions and delirium had been even more violent than this, which had then recently passed through my hands to a fatal termination, had led me to determine never again to employ depletion in such cases. I explained to the father my views of the case, told him the result of my observation, assured him of my readiness to meet any other physician of experience and good judgment in consultation on the case, or even, if he desired it, to yield the treatment to another; that if I employed any depletion, it must be to the smallest possible extent. Twelve American leeches were applied to the temples, by which but about one ounce and a half of blood was abstracted—and the case was then committed to a mere expectant treatment. The rash was fully developed. There was no affection of the throat, beyond that which was indicated by the tenderness on pressure. The coma gradually subsided from hour to hour, till, on the fifth day, the symptoms all disappeared, and convalescence was fairly established. The favourable result of this case afforded me much encouragement. While in every such instance in which active depletion had been employed by me for the relief of the cerebral symptoms, death had ensued; here was a propitious result, though the amount of blood drawn was too small to be entitled to any part of the credit of the case. I was thus confirmed in the opinion, that the cerebral symptoms were purely nervous, and had no connexion with inflammation, or even vascular congestion, and that the proper indication was merely to allay nervous irritation, and to avoid every agent which should prostrate the vital energies. I accordingly from that time adopted a treatment having this object in view, in all similar cases, and have no hesitation in expressing myself entirely satisfied with the result. I place an entirely different estimate on the value of depletion in the treatment of the sequelæ of this disease.

I should now not employ even the calomel which was added

to the ipecacuanha in this case under the impression that it was wholly dependent on gastric disturbance,—but should rely on the simple evacuants, to get rid of the ingestæ; following them by the tepid bath or affusion, and the use of simple drinks, with entire rest. The *whole train* of morbid phenomena disappeared as the case approached the period at which scarlet fever terminates. I saw it first before daylight on the morning of Tuesday, and on Saturday convalescence was fairly established. To sum up the treatment of simple scarlet fever, I should adopt and recommend that of Dr. Armstrong:—"Open the bowels (*not purge*) every day with some mild aperient, (if spontaneously opened, there is no need of medicine.) Keep the patient at rest, between cool clean sheets, or on a bed, or on a mattress with light clothing, and in a temperature from 56° to 60° F. Sponge the surface with tepid water twice or three times a day, while it is hotter than natural. Admit plenty of fresh air, allow a bland diet, and in two or three days the patient will be well." Above all, do not allow the dread of the name scarlet fever to induce the adoption of a treatment which shall be more injurious than the disease itself.

While the general character of the *simple* form of scarlet fever is sthenic, and, as I have remarked when describing the treatment appropriate to it, will bear depletion better than the other varieties, though rarely or never demanding it, the *anginose form*, which is that in which it most commonly prevails, is not so uniform in this respect. In different epidemics, and sometimes between different families or individuals during the same epidemic, it presents every grade of action, from one of acute inflammatory fever, till it is merged, by imperceptible shades, into the low or malignant form. Hence arises the great variety in the modes of treatment recommended by different authors, and the great difference in the mortality in different years; or in the same year at different places. This

difference in mortality cannot always be ascribed to different modes of treatment, though this does undoubtedly exert a powerful influence. In the London Fever Hospital it varied, in the course of eleven consecutive years, from *one* fatal case in every *six*, to *one* in *forty;* and an equally great variation will mark the practice of most medical men, not only in the course of years, but even during the same year, in different parts of the same town or district of country, and in different families. It is of the utmost importance, in estimating the value of any given plan of treatment, to bear ever in mind the variations in the *stationary constitution of diseases*, originally noticed by Sydenham, and confirmed by the report of all careful observers since his day. There is no fact better established in medical science, and none the influence of which on modes of treatment is more decided. The transition from a sthenic to an asthenic constitution of disease is not, generally, sudden, but gradual. Occasionally we have the outbreak of a violent typhous epidemic, with no perceptible change in atmospheric conditions to herald its approach; but, as the general rule, there is a gradual though perceptible change in the prevalent type of all diseases, which will not escape the notice of the close observer. Dr. Copland remarks with reference to this point: "During the stationary epidemic constitution from about 1810 to 1820 or 1825, blood-letting, even in this disease, especially in its more inflammatory types, was much better tolerated than subsequently, and some writers considered their recommendation of it as sufficient to constitute it the chief remedy in all circumstances and for all time, denouncing those who had preceded them for advising different means, although more appropriate for the types of the disease for which those means were employed. More recently, and since late writers have ascertained that blood-letting should be more cautiously employed even in the most inflammatory type, cupping on the nape of the neck, or

leeching behind the ear, has been advised for the more sthenic anginose form of the malady, and often practised by myself for many years." "In the more *sthenic* diathesis or *inflammatory type*, if generally adopted, blood-letting is a destructive practice, unless in rare epidemic visitations, when the prevailing epidemic constitution admits of the practice, with such limitations and cautions as the nature of the disease and the peculiarities of the case suggest." The observation of these facts has caused me to be very cautious in the expression of condemnation of any particular mode of practice. The candid remark of the judicious and upright Dr. Fothergill may be borne in mind with great advantage: "In some cases the disease appears to be of so mild a nature, and so benign, as to require but little assistance from art; persons even recover from it under the disadvantages of unskilful and injurious management; whilst in others the progress of the symptoms is so rapid, and the tendency to corruption so strong, that nothing seems able to oppose it." It is not, therefore, just, always to estimate the advantage of a plan of treatment by the recovery of a limited number of patients. It may merely indicate that the power of nature for self-preservation is sufficiently strong to resist the combined injurious influences of the disease and the treatment. I desire to make this remark with entire candour, and that it should be applied with equal fairness to the treatment I myself suggest, as to that often strongly recommended by others; while, at the same time, I may safely assert that it is not without personal experience of the effect of other plans that I have adopted my own.

The same general remark as to the limited duration of the original disease, the importance of which I endeavoured to impress when the simple form was under consideration, is equally applicable to this. It is here of far greater importance, however, to keep it ever in mind, and to allow it

modify the treatment. The greater urgency of the symptoms appears to demand a proportionate increase of the energy of treatment; the local lesions are frequently so severe from the very onset, as to require anxious care; and the influence they exert in prolonging the fever by their irritation after the primary disease has subsided, is well calculated to render the treatment obscure, and the result doubtful. Few minds are so well balanced as to be able to resist the influence of these circumstances, or capable of such nice discrimination as will enable them to arrange the symptoms and adopt the treatment without improper bias. Not only does the severity of the local lesions, in many cases, incite to the adoption of a treatment needlessly energetic, but the appearance of active inflammation, the redness, heat, swelling and pain of the local lesions, and the fear of the result of these local inflammations, is often so great, as to overwhelm the judgment. I have known not a few lives sacrificed to the anxiety to avert anticipated evils, and to cure a condition which art can only *relieve*, while nature herself is working out the cure, in the regular course of events. Nor have I any wish to screen myself from the censure of being a participant in such results. The remembrance of too many cases in which I have had reason to regret a too energetic treatment, whether depletory or stimulating, urges me thus earnestly to press opinions which have been formed at the expense of much personal observation.

The occurrence of a local lesion giving rise to the *anginose* variety of scarlet fever, does not of itself involve any change in the general principles of treatment already laid down. In its slightest degree the angina manifests itself by a little tenderness about the angle of the jaw, with some enlargement of the lymphatic glands. If the condition of the fauces is examined, the membrane lining the arches and covering the tonsils and uvula, will be found more intensely red, and sometimes œdematous. From this condition the severity of the

local affection gradually increases, till it assumes the various appearances formerly described.

The only change in the treatment demanded by this local affection, when there is no tendency to sloughing of the inflamed organs, nor general disposition to prostration of the vital force, is attention to those agents which will afford present relief from the discomfort it occasions. The external swelling and tenderness will yield to the soothing influence of warmth and moisture. When properly applied, this is always grateful; but when done in a slovenly or careless manner, is exceedingly offensive. A flannel cloth wrung out of hot water, and applied with moderate firmness, and of several folds thickness, and then covered with a layer of oiled silk, and that enveloped in a nice napkin, will retain the necessary degree of warmth and moisture a long time. It is lighter than the poultices commonly resorted to, and is free from the smell which renders them offensive, and does not leave the dried deposit which forms around the edges of the cataplasms. Next to this in adaptation is a thin layer of Indian mush, thoroughly boiled till it forms an adhesive mass, and applied in a thin flannel envelope, taking the same precautions to avoid evaporation. Better than either is a portion of the article known as spongio-piline, made of wool and sponge, wrought into a thick felt-like texture, and coated on one side with gutta-percha, cut into such a shape as fits the neck, soaked with warm water moderately and bound lightly around the throat. This forms a very convenient and comfortable epithem; a little rose water or Cologne water, sprinkled on the wrappings or mingled with the hot water in which it is soaked, covers any unpleasant odour. Dr. Sutton of Aurora, Illinois, in an exceedingly able and interesting paper published in the Medico-Chirurgical Review of Philadelphia, for November, 1857, ascribes great advantage to the use of a portion of fat salt bacon adapted to the size and shape of the part, and

bandaged around the neck. He applies it at an early period of the anginose and malignant cases. Some think these are matters which may be left to the attention of the nurse; but not only the reputation of the physician will be increased by his ability to give minute directions about apparently trifling matters, but, what is of vastly greater consequence, not only the present comfort of the patients will be promoted, but these little things influence, in a great degree, the ultimate result. To no portion of human experience is the line of the satirist more applicable, than to that which comes under the notice of the medical adviser:

> "Let school-bred pride dissemble all it can,
> These *little things* are *great* to little man."

Great not only in relation to comfort, but to results.

But while warmth and moisture externally applied are thus important, the internal condition requires an opposite treatment. There is nothing so effectually soothes the internal irritation, and averts the probable results of the excited action of the capillaries of the mucous membrane, as the free use of *ice*. In the same manner as the sponging or ablution of the surface, it acts not only in the relief of the local inflammation, but also on the general nervous system. The natural instinct of the patient calls for such treatment, and its appropriateness will commend it to every one ready to throw off the trammels of authority. I had long employed it to great advantage before I was aware that it had been used by any other person, but am happy to be able to fortify my testimony to its usefulness, by the report of Dr. S. Jackson of Northumberland, which is given in the North American Medical and Surgical Journal. Dr. Jackson deserves, I believe, the credit of first drawing the attention of the profession to its use, through the agency of the press. I direct the ice to be divided into *small* fragments, such as can be easily held in the mouth while dissolving. When thus prepared, wrapped well in flan-

nel and placed in a bowl at the bedside, so as to be easily accessible, the patient may use it as freely as is agreeable. When old enough to perform the act of gargling, iced water is the best article for that purpose, or tepid water with vinegar and honey. In a large majority of cases I have found this local treatment, joined to the same general course previously recommended, of mild diaphoretic and alterative liquids, lead to the entire subsidence of the local symptoms simultaneously with the decline of the primary fever.

Would that I could promise so happy a result in every case, even where the primary symptoms are least threatening. It occasionally happens that ulceration of some part of the mucous membrane occurs, either in the posterior nares or the fauces, and gives rise to a profuse secretion of viscid mucus, or a discharge of an acrid fluid, which spreads the destruction over adjacent parts; and, as I have mentioned already, even excoriates the skin when it is allowed to rest upon it. It is almost equally important to relieve both of these conditions. The latter secretion, by spreading the ulcerative process, adds to and prolongs the irritative fever, while the former very materially increases the risk of a fatal termination by the serious impediment to free respiration which it interposes. The vital powers already prostrated by the depressing agency of the miasm which produces the disease, the blood poisoned by its deleterious influence and the arrest and perversion of the secretions, the life of the patient may depend on the freedom with which air is drawn into the lungs. The nervous force diminished and the muscular power abated, we have only to obstruct the air passages through which the life-giving oxygen is admitted, to cut off the only avenue for hope. How often have I seen a poor child lie with the nostrils—the natural breathing channel—entirely obstructed: the mouth unnaturally open to supply a supplementary avenue for air: yet tossing and struggling in instinctive efforts for fresh air to

vivify the blood; while the injected conjunctiva, the up-turned eye, and the livid hue, all told how vain was the effort. Though when our patients have reached this point in the downward course, little hope can cheer our efforts, even then they should not be abandoned, as relief to suffering is within our reach, even though death may finally conquer. Emetics of sulphate of zinc and ipecacuanha, or of salt and mustard, are advised by some authors in order to evacuate the throat and fauces, and to produce a revulsive action. My own experience does not enable me to endorse the recommendation. The vital forces are too much exhausted to be thus rallied, and the local lesion too firmly rooted to be thus removed. Gargling is then wholly useless; the seat of the diseased action is beyond its reach, and the barbarous substitute of swabbing is but little more effective, with all the pain it gives to the patient and trouble to the operator. The *syringe* affords a most effectual and very easily applied remedy. When no other was accessible, I have employed a common gill pewter pipe; but the neat syringe with a long ivory tube, now used for cleansing the ear, is admirably adapted for this service. Water alone does not sufficiently deterge the mucous membrane. A little nice soap, which has no volatile oil in it, may be diffused in the water, in those cases where the irritation of the mucous membrane gives rise to a viscid tenacious secretion; or if this is not effectual in changing the action, a very *weak* solution of sulphate of copper or zinc. Either of these agents coagulates the mucus and facilitates its removal at the same time that it acts kindly on the diseased membrane. In those cases in which the secretion is thin and acrid, I have found simple lime water the best detergent. An infusion of rose leaves forms a peculiarly elegant wash, where we require only cleansing of the parts, or in cases where there is much ulceration with febrile action. Claret wine diluted with water may be employed. This may be used as a drink also in asthenic cases

with great advantage. Any of these substances may be thrown into the nostril, care being taken to have the head elevated at the time, and the person of the child inclined forward, while the direction given to the syringe should be such as will cause the fluid to pass toward the posterior nares, and not toward the cells and sinuses. When the throat is much swollen, the fluid thrown into one nostril will often return through the other, thus effectually cleansing both; carrying before it large quantities of coagulated mucus and affording instant relief; in other cases it will be rejected through the mouth. The greatest trouble it causes is some little retching or sneezing, either of which is advantageous to the patient. I have often saved life by this simple resort, and commend it to notice as of great practical value. Washes thus thrown into the nostril are applied to the pharynx and tonsils more effectually than by swabs through the mouth. When these are employed, they should always be large soft camel's hair brushes, short and thick, and not long and inflexible. The solution of sulphate of copper or zinc should not be employed during the first five days of the disease. They then only increase the irritation and aggravate the suffering of the patient, as well as promote the ulceration they are so adapted to cure in the later stage.

Purging as a curative agent is needless, though it is important in this form as in the *simple*, to secure a regular action of the bowels, which may be readily effected either by small quantities of calcined magnesia or the use of the neutral mixture. We meet with some cases in which there is a tendency to diarrhœa, caused by the irritation of the acrid secretions swallowed by the child. These are most effectually treated by the magnesia in very small doses, which absorbs the acid and carries off the cause of irritation. It should be followed by suitable doses of Dover's powder or laudanum.

After the bowels have been moderately evacuated by the magnesia, or where it is preferred, a small dose of castor oil

as in the *simple* form, we may resort to the usual diaphoretic remedies as advised when describing the treatment of that form of the disease. The solution of the chlorate of potash is especially well adapted to this form. The citrate of potash may be given in the state of effervescence to those patients who are old enough to swallow it promptly, before the carbonic acid gas has escaped, and as there suggested the spiritus etheris nitrosi could be added. I have found great benefit from the practice of securing some tranquil rest by the careful administration of small doses of morphia in these diaphoretic solutions in the latter part of the day or evening. I do not combine them with the entire quantity of the mixture, but direct the addition of doses of suitable amount as the state of the patient requires or permits. A slight anodyne combined with a diaphoretic draught, will compose a restless child, sooth the delirious disturbance, and secure tranquil sleep, and thus economize the strength and promote the recovery of the patient. I know of no point in the treatment which is more important than this.

But whilst I thus recommend, as the result of my own observations, in a field by no means limited, a treatment so simple, and by some, thought inert, when brought into contest with a disease of so formidable character, there are not wanting many authors, and those, too, of the very highest authority in medical science, who urge a very different plan. General bleeding is not without its advocates, as well among our own medical authors as those of Europe. Even those writers, however, who most recommend its employment, do not hesitate to admit that there are epidemics to which it is inappropriate. Cerebral complications have been thought especially to demand it; on that point I have already delivered my opinion. I have never known a patient to recover from the anginose form of scarlet fever when I employed the lancet. The rapidity of the circulation, the heat of the surface, and the buffy

coat on the blood, which have been adduced as indications for bleeding or justification of its use, have all been proved by more accurate observation to be susceptible of a different construction. I do not mean to assert that it is not possible for the disease to assume a character which may demand such treatment. I know it to be capable of changes so extreme, that I can easily believe such may have been its character without my having met with the cases.

But even many of those authors who coincide with me in the abandonment of general bleeding, still urge the necessity of the topical abstraction of blood by cups or leeches. This practice is, I think, open to still greater reprehension than the other. Not only is it subject to the same objection on account of its depressing influence, but there is superadded the liability to ulceration of the bites of the leeches or the gashes of the scarificator, which give rise to tedious sores, and often leave unsightly scars, even if the vigour of the patient be sufficient to carry him through the combined injurious influences of the disease and the treatment. While modern observation has cast a shade of doubt on the necessity for blood-letting in even the pure phlegmasiæ, it has brought still greater discredit on the resort to it in the mixed cases of local inflammation with specific fever. Even quinsy, which is more closely allied by its topical lesions to anginose scarlet fever than any other disease, is rarely, if ever, arrested in its progress by either general or topical blood-letting. While, therefore, there is much to discountenance the resort to these measures, there is, on the other hand, little to invite to their use.

The employment of emetics has been highly commended by many authors, as the first effort in the treatment of the anginose form of the disease, and their use may be vindicated more easily than that of bleeding. The shock given to the nervous system is by some thought to promote the regular development of the disease. This is at least a questionable

assertion. I believe the only mode in which they can act advantageously, is by the discharge of the contents of the stomach, which might, if retained, become a source of irritation, and by the production of that determination to the surface which accompanies the act of vomiting. Antimonial emetics are wholly unsuited. Ipecacuanha is the best article that can be employed for the purpose; and next to it I rank the powdered alum, so highly and justly recommended by Dr. Meigs in croup. This would exert a beneficial influence on the fauces and pharynx, as well when rejected as when swallowed. Dr. Sutton recommends strongly salt and mustard, and Dr. Copland the addition of capsicum to whatever agent is employed.

Purging, when persisted in beyond the free evacuation of the bowels, is not only uncalled for, but pernicious. It cannot remove the specific irritation of the mucous membrane of the alimentary canal, and adds another to that already existing. Even Dr. Hamilton, while he lauds highly the advantages of a free purge in the beginning, admits that it is not required subsequently. The recovery of patients after vomiting or purging, cannot be adduced as evidence of the benefit of the practice, for reasons already assigned; and when there are any signs of irritation of the mucous membrane, purging is decidedly injurious. Dr. Fothergill, speaking of the treatment of the disease, says: "Bleeding was prejudicial," but with that caution which gives the more weight to his authority, adds, "in general, some admit of it at the first attack, but later it never fails to aggravate the symptoms, and in some cases it appears to have produced fatal consequences. Nor has purging," he continues, "been observed to be more beneficial, and nitrous cooling medicines produce the like effect." Gentle emetics, if administered early, he commends highly, declaring that they often cure the disease, even when the symptoms are most threatening.

It not unfrequently happens that about the fifth day from

the first invasion of the disease, as the primary fever subsides, the pulse loses its frequency, the skin becomes cool and moist, and the patient languid. A moderate use of quinine in such circumstances is highly important. Great care is requisite not to push it too far, either in quantity or the length of time. A few days bring us to the period which is especially liable to inflammatory sequelæ. A return of the frequency of the pulse, and an increase of the languor, will mark the occurrence of this condition, and should cause an immediate suspension of the tonic treatment, and great care about the diet. This is especially necessary, as it is impossible to foresee in which of the organs liable to the secondary affections the mischief may develop itself; and the attacks are so formidable, that it is important to guard against the very beginning of the evil. A cerebral or cardiac inflammation would be materially aggravated by the influence of the quinia. The condition of the urine is an important means of determining how far it may be proper to pursue the tonic treatment. While that secretion continues abundant and clear, and the skin cool and perspirable, there can be no risk. I was indebted to my honoured friend, the late distinguished Professor Chapman, for this suggestion. There is, however, nothing novel in the resort to the use of cinchona in malignant scarlet fever. It is as old as our knowledge of the remedy itself. A recent author, Mr. Hood, of London, has claimed for the quinia a specific influence in counteracting the cause of the disease itself, and gives to it the most important position in the treatment. This, I am confident, is an erroneous idea; and, if admitted, would lead to a dangerous practice. But though I cannot subscribe to the assertion made by Mr. Hood, that "quinine is the antidote to the specific poison of scarlet fever," I can with confidence recommend it when used as I have suggested above as the best agent we possess to restore tone to the exhausted nervous system, and thus restore the blood to its normal condition and prevent the local dis-

organization which would otherwise occur in the throat and kidneys. It should be given in full doses, at intervals of two or four hours. The interruption of the secretion from either of these eliminating organs, or the deep colour or turbidity of the urine, would at once indicate the propriety of suspending the quinine.

It is at this period that we frequently meet with that very formidable complication, inflammation of the larynx, producing croup. Even in this complication no benefit will result from depletion, or any other depressing agent. Dependent on the extension of the specific inflammation from the fauces, it must be relieved by local treatment alone. Emetics of alum, zinc, or ipecacuanha are the most valuable of our remedies, and may be repeated as often as the urgency of the symptoms requires; care being taken at the same time to afford proper support, by suitable nourishment and even stimulants. One of the happiest results I ever achieved, was in the recovery of a child of about two years of age, in whose case the disease was ushered in by convulsions, which yielded to tepid baths, with cold affusions to the head. The disease then ran its regular course, accompanied with much sloughing of the fauces and uvula, and leaving an exceedingly red ulcer. This I treated with the injections recommended above, and was flattering myself with the expectation of a speedy recovery, when the harsh clangor of a croupy cough sounded like the knell of hope. I procured at once a stick of nitrate of silver, securely fastened in a quill, and, depressing the tongue, thrust it deep into the fauces, with the design of extending the application to the very verge of the glottis itself. A sudden struggle of the child broke off the caustic in the quill, and, to my indescribable horror, one gulp carried it into the stomach. To fail in one's efforts to cure is disheartening enough,—to feel that those efforts, however well meant, have rendered death certain is like being dragged at the chariot wheel to swell the tri-

umph. Determined not to yield without an effort, and saying nothing of the accident, I called for the salt cellar, which was promptly handed me, and compelled the child to take large and repeated draughts of a strong solution of salt. This of course produced free emesis, at the same time that it rendered insoluble and inert the poisonous mass thus undesignedly passed into the stomach. Whether the result may be ascribed to the action of the caustic, or that of the saline application to the local disease, or, what is more probable, to the oft repeated vomiting, I am not prepared positively to assert. I am disposed to divide the credit between the two latter influences, providentially though unintentionally applied. Certain it is that most unexpectedly the child recovered.

But the most judiciously planned treatment, though faithfully carried out, will not ensure a successful result, even in those cases which do not manifest any very unfavourable symptoms at the beginning. The impeded deglutition, the laboured respiration, the swollen lymphatics, the œdema of the neck, occurring about the end of the first week, or even sooner, all speak of a condition full of danger, while a hard, quick pulse which generally accompanies this condition, would appear to demand local depletion for the relief of the local disease. We must not allow ourselves to be beguiled even now by this simulation of inflammatory action. The corded pulse tells of irritative action, but not of one which can be removed by depletion, either local or general. Neither would the resort to blisters be a whit more beneficial. Dependent on the disease of the mucous membrane, it will only yield as that subsides. Happy indeed were it for the patient if it were certain then to disappear. Too often the inflammation results not only in effusion into the cellular tissue, but also in suppuration, either in that tissue or in some of the glands, leaving one of the results of which we shall speak when we come to treat of the sequelæ. This acute glandular enlargement and effu-

sion will yield more kindly to the continuation of poultices and injections than to any other plan. Iodine and the iodide of potassium have been employed both locally and internally, but I believe without any well attested advantage.

The diet of the patient in anginose scarlet fever should also claim the attention of the physician. During the earlier stage, the remarks made on the simple form are equally applicable here. Water ices, iced cream or chocolate ice, subacid fruits and whey, either frozen or dissolved, are excellent, if used with moderation. When the farinaceous food is acceptable, which it often is not, any of the usual preparations of arrow root, rice flour and tapioca may be employed. Milk and water and stale bread may be used sparingly. As the primary fever subsides, animal broths, and bread and milk are well adapted; still keeping in view the fact that quantity is quite as important as quality.

The treatment of those cases in which the eruption appears imperfectly developed from the first, or in which, after having been well marked, it recedes, or where the force of the attack falls upon the throat, from the very beginning, causing great tumefaction and difficulty of deglutition, must be very energetic. In all these cases, this condition evidently results from the overwhelming influence of the poison upon the nervous system. Whether convulsions, or restlessness, or stupor, complicate the case, or mere languor and exhaustion, all are but varying phases of one condition, and that, a condition which is to be removed by appropriate stimulation; and it is in these cases that the capsicum is productive of the happiest results. It was, I confess, with great reluctance, I was first prevailed on to resort to a remedy apparently so little appropriate to the treatment of a disease in which the rapid circulation and heated surface seemed rather to call for remedies which should produce a refrigerant impression; and to force a harsh irritating liquid into a throat already inflamed, was, I thought, little short of

a refinement of cruelty. The entire failure of the cooling treatment in such cases, led me to test the opposite course, and I can recommend it with entire confidence. Weak animal broths, freely charged with capsicum, may be given with great safety, even to the youngest infants in this condition; and though it may not—indeed it rarely does—so rouse the energies of the system as to cause the full development of the eruptive features of the disease, it will so far excite the vital forces as to carry the patient safely through the regular period. Should there be much local disease of the throat, it will receive great benefit from the passage of the capsicum over it. I have often administered the simple infusion when the stomach rejected the broths, or when I desired to maintain a more constant local impression. The common formula of a teaspoonful of powdered capsicum, the same quantity of common table salt, a large spoonful of vinegar, and a half-pint of boiling water, is an exceedingly good one. Of this, a teaspoonful may be given every hour or two to a child of five years old and upwards, followed by a small portion of broth, or even wine-whey. Brandy and quinine have not the same beneficial influence in these cases that they exert over those we shall consider hereafter. They oppress the nervous centres instead of relieving the load. Where there is great restlessness I have derived advantage from moderate doses of morphia, given in the liquor acetatis ammoniæ, or, which is more often tolerated, from small doses of the Dover's powder. Wine-whey having more tendency to promote the determination to the skin, than quinine and brandy, may be given with safety, even in cases where these too would be inappropriate. The resort to hot and stimulating baths, irritating frictions, and the revulsive treatment generally, which would naturally suggest itself, has never been followed by any advantage, so far as I have had opportunity for observation; and the internal use of carbonate of ammonia has also disappointed my expectation.

Under the plan of treatment thus indicated, I have found the cases in which the eruption was irregular, defective, or even entirely absent, yield quite as large a percentage of recovery as those which are accompanied with the most intense degree of cutaneous inflammation. It is worthy of remark that such cases are less liable to be followed by dropsical infiltration of the cellular tissue, though the convalescence is more tedious and imperfect.

Dr. Copland, on the contrary, is disposed to look to the kidneys as the organs on which the force of the disease falls in these cases, and directs attention to the removal of this "congestion or affection as a primary intention of cure, and whenever the state of the constitutional power does not admit of vascular depletion," advises "dry cupping on the loins, and an epithem applied on flannel or spongio-piline to the same parts, composed of:—

Liniment. Terebinth., ℥ij.
Linim. Camph. Comp., ℥j.
Ol. Olivæ, ℥iij.
Ol. Cajeputi, ℥j.

The flannel to be covered with oiled silk. This is, I doubt not, an excellent practice.

While, as we have seen, death occasionally defies our best directed efforts, and terminates the course of even *simple* scarlet fever, either as the result of some unexpected local inflammation, or, more often, of one of the sequelæ of the disease; and with greater, though still varying frequency, occurs in all stages of the *anginose* variety—the *malignant* form more often sets at defiance the utmost energy of treatment, even when directed by the most consummate skill. The melancholy picture of its ravages in the earlier period of the settlement of this country, as drawn by Dr. Kearsley, has been already exhibited; and similar vestiges of its progress have been left in all parts of Europe, as well as in every age, of the diseases of which we possess any history sufficiently accurate to enable us to distinguish them clearly. The very term *malignant*,

conveys, even to the unprofessional ear, the idea of great danger, and in the language of medicine is meant to express a great tendency to the prostration of the vital forces. The knowledge of the lethal character of this form of the disease, should, however, lead to no despondency, but rather stimulate to more determined effort to rescue the patient, and increase the triumph of medical science. There are many other diseases which partake more or less, at different times, of this tendency to prostration. Between them and *malignant* Scarlet Fever, there is however this very important point of difference: that in this the local lesions are very severe, and often in themselves sufficient to cause death, even though the vital energy were not impaired by the peculiar character of the case.

A theory which taught that in this, as in the kindred forms of fever characterized by the same tendency to rapid decline of vital power, there was a previous stage of excitement, of greater or less intensity; upon which the subsequent depression depended, not as a mere sequence, but as the effect upon a cause, was at one time generally received; and exerted a most deleterious influence on the interests of medical science. Discarded now by most authorities from its position in connexion with other fevers, it still exhibits some lingering traces of its influence in a few of even the more modern writers on this disease. Those who adopted this view, recommended in strong terms the prompt resort to an antiphlogistic treatment of the early stage, under the impression of the fallacious hope that by such measures they would diminish the primary reaction, and thus avert the consequent depression; and there are not wanting authors of even a recent date, who still teach this erroneous doctrine; and strongly recommend the prompt resort to bleeding, vomiting, and purging. When called early to these cases, they do not hesitate to direct an antimonial emetic, followed by an active mercurial purgative, nor do they shrink from a prompt and decided bleeding if these fail. They

assert that "this treatment, if adopted at the onset of the symptoms, will, generally, not only moderate the fever, but shorten the duration and violence of the disease." In the clinical lectures of Dr. Graves, of Dublin, he describes vividly the influence of this theory on his own mind: the certainty with which he attributed the mortality of the disease in other hands to a neglect of proper evacuants: and the zeal with which he himself brought it to bear on his own practice; and candidly admits the result to have caused him to abandon the theory and change his treatment.

Nor is this view and the practice founded on it, confined to European physicians. One of our own writers on the diseases of children, Dr. Condie, has adopted them to their full extent, and claims for his practice a degree of success which would justify the positive terms in which he commends his views. "In a table of two hundred and sixty-eight cases, occurring during different epidemics of considerable extent and severity, and treated on the plan laid down by me," (into which bleeding, calomel in full doses, and castor oil with spirits of turpentine, as purgatives, enter,) "two hundred and twenty-three recoveries, and forty-five deaths are enumerated." Dr. Condie asserts of the treatment he recommends, that "when judiciously carried into execution, it is calculated to disarm the disease of its 'malignancy' and to prevent the necessity for a resort to powerful cordials, tonics and antiseptics, in the advanced period of the attack, and to remove the putrid symptoms when they show themselves." "The bold and indiscriminate use of the lancet," Dr. Condie "strongly objects to; but of the good effects a cautious use of blood-letting in the manner and under the circumstances directed, is calculated to produce," he says, "I speak from actual observation." "It is," adds Dr. C., "unquestionably, in a large number of cases, the only 'restorative and tonic' upon which any confidence can be placed." In thus quoting the testimony of Dr. Condie, I have designed

to furnish the strongest statements that can be offered in favour of the antiphlogistic treatment.

I need not repeat what I have already said when treating of the other forms of this disease, that, believing the primary influence of the cause to be depressing, I cannot adopt a view which assigns to its first impression a sthenic character. If bleeding, and antimonials, and purgatives are inappropriate to the simple anginose form, much less are they required in that now under consideration; and Dr. R. Williams, after a careful investigation of the history of the epidemics which have prevailed from 1763 to 1834, asserts, with regard to scarlet fever in general, "that the chances of recovery are diminished by the practice of bleeding, in the ratio of nearly four to one, as compared with the chances supposing the patient not to have been bled."

With this expression, my own observation is concident, and my views are sustained by not a few authorities of deserved repute. Dr. Fothergill, than whom a more accurate, careful observer, or more honest writer, cannot be found, when he sums up his views of the practice and treatment of this disease, of which it is evident he saw the malignant form, asserts, "that a cordial, alexipharmic, warm regimen has been found by experience to be of the most use in such cases," and condemns as injurious, "bleeding, purging, and antiphlogistics liberally employed." He says: "In some of the first cases I met with, the quickness of the pulse, the degree of heat, the apparent inflammatory redness of the eyes and face, and pain in the head, sometimes urged me to order bleeding, especially if there were any marks of plethora; but in these cases it did not appear to have any advantageous effects; so that notwithstanding the vehemency of the symptoms above mentioned, it seems proper in general to omit this evacuation."

Dr. Kearsley, speaking of the disease as it appeared in Philadelphia in 1746, says:—"The pulse was generally full

and quick, yet attended with some remissions and even sinkings, but it most commonly kept up those deceiving strokes which sometimes but very improperly indicate the use of the lancet." . . . . "Although most of the symptoms in the beginning of this disease, as well as the fulness of the pulse, appeared to point out to us the necessity of bleeding, yet, should we have complied with the indication, it would have proved a fatal error." That this opinion was the result of observation is proved by the remark, that "the blood which has been drawn away in these cases has been often observed to have a tenacious glue upon the surface, and yet, nevertheless, it has been found underneath to be broken, loose and divided in its texture, and has also thereon very evident marks of a putrid gore which must and does increase by bleeding." "One blood-letting may make a difference of a change from a texture that, with proper management, would have carried a patient through the sickness with safety, to no texture at all, but a total dissolution of all animal fluids, which must in course terminate in death. Of such vast consequence is this one article of bleeding, that it has been my choice to give this caution against it in the strongest terms." Dr. Burrows in an interesting article on this disease, in the Library of Practical Medicine, remarks of the malignant form, that, "it quickly indicates its formidable nature by the sudden depression of the vital powers. If blood-letting from the arm be a remedy of doubtful propriety in the two former varieties, it is here hazardous in the extreme." Dr. Chapman says:— "The abstraction of blood appears to be required by the loaded state of the organs, and contra-indicated by the depression of the vital energies. My own conviction is, that it should not be hazarded, unless reaction is pretty firmly established, the circulation in some force, and the skin warm, and even then is to be resorted to with extreme circumspection." And with regard to the general applicability of blood-letting

as a remedy in any form of scarlet fever he says:—"It is true that the loss of blood has no direct curative tendency in the disease, it only abating action, without changing or subverting it; and is usually not well borne to any extent. It is not safe to detract it with the same freedom as in more purely phlegmasial affections, or perhaps, to the amount that the existing indications in the case would seem to demand. Collapse, frightful and sometimes even fatal, I have repeatedly seen to result from an abuse of the practice, and it is always hazardous in an advanced stage of the disease."

Dr. J. Forsyth Meigs, in his able work on the diseases of children, after producing the testimony of many distinguished writers on this disease to the doubtful tendency of a resort to blood-letting, says:—"On the whole, it is clear, I think, that the weight of evidence is against blood-letting to any considerable extent, in grave cases. If used at all, it is only to be used in the earliest period, and even then with great caution. My own opinion, derived from personal experience, is as follows:—I believe that I have seen general depletion useful in several cases of the regular form, in which there was a tendency to the grave form, shown by the presence of excessive reaction, and still more by great jactitation and irritability, alternating with drowsiness and delirium. But in those sudden attacks of the disease, in which it assumes from the very start the terrible symptoms which threaten extreme danger to the patient, in which we find the child within a few hours of the onset, delirious or comatose, or labouring under convulsions, convulsive movements or contractions, in which the eruption is imperfect or scanty, or copious and of a deep livid tint; in which in other words there are either strongly marked ataxic or adynamic symptoms, general blood-letting has never seemed to me at all advantageous, and I have several times feared that it had been injurious. As to leeches, I have never known them to be really useful but in one case,

and in that they were used sparingly, and after an interval of two days. In all other cases they appeared to be without any effect."

The local abstraction of blood from the neck in these cases, cannot be too strongly condemned. It can no more arrest the progress of the inflammation of the fauces, than it can that of an external part tending to gangrene. The bites of the leeches do not heal, but continue to permit the leakage of a thin bloody serum, till they take on a low grade of inflammation themselves, which results either in sphacelus, or spreading ulcers. This remark is equally applicable to the use of blisters, which almost always, either slough or ulcerate, and have not unfrequently proved the cause of death even after the sufferer had struggled through the disease for the relief of which they were employed.

I might swell largely the list of authors who have either condemned depletion entirely, or expressed their doubt of its fitness to the treatment, and proposed its employment with caution; but I have adduced testimony enough to prove that observation places depletion among the remedies of doubtful value, to say the least of it, and thus confirms the view, derived from reasoning on the nature of the disease, its origin and course, which I have endeavoured to present.

But, though blood-letting, antimonial emetics, and antiphlogistic treatment, are all, for the same reason, excluded from our list of remedies in the malignant more decidedly than in the other forms of scarlet fever, a simple emetic of ipecacuanha, or of infusion of Eupatorium perfoliatum, the thoroughwort or bone-set, of our own meadows, may be given in the commencement of a case of this malignant form with decided advantage. Where the prostration is great, capsicum should be added. It evacuates the primæ viæ, and produces a strong determination towards the surface, without leaving any secondary depression of the vital forces or exhaustion, such as follows the use of antimonials.

The action of the emetic having been accomplished, attention should at once be given to the support of the vital power, which will be found flagging from the very commencement in many cases, and to the arrest of the local lesions in the fauces and pharynx. The capsicum is here an agent of great value, acting at once to the fulfilment of both indications. We are indebted to the West India practitioners for the introduction of this remedy to our notice in this disease. It is not only to its local impression on the throat that its beneficial influence is to be ascribed. It excites the depressed forces of the digestive organs, gives greater power to the functions of assimilation, and thus supports life by a secondary influence, even if it be not a direct nervous stimulant. Though the first sensation produced in the throat is one of increased heat, this soon passes away, and is followed by a sense of relief from the tension and soreness which aggravate, so materially, the sufferings of the patient.

I have conducted many cases to a favourable conclusion by these remedies alone, giving the capsicum in the manner suggested, when treating of the form of the disease last under notice, and supporting the strength of the patient by animal broth and wine whey.

Purgatives have been recommended in this as in other forms of the disease, even by those who condemn other antiphlogistic treatment; especially calomel, either in combination with those articles usually united with it to secure its prompt action, or followed by castor oil and spirits of turpentine. The object proposed by this treatment, is to promote a free secretion from the viscera, and, as is supposed, remove a load which is thought to oppress the vital energy. The reasoning is, I think, erroneous, and the practice founded on it pernicious. The congested condition of the vascular system, and the suspension of secretory action, are dependent on the diminution of the vital forces, and not the cause of that depression; and it were

as contrary to common reason to bleed a porter struggling to support a load beyond his power, as to resort to any remedy which diminishes vital force in the malignant form of scarlet fever. Since the completion of this essay, while the MS. was still in the hands of the publisher, I have met with one instance in which the life of a child was saved by the use of calomel, which I feel bound to report. I was called to see the family in which one child had died from scarlet fever of the malignant type, and another of about two years old was just seized. It lay insensible, tossing and rolling about the bed with up-turned eyes, making unceasing efforts to vomit, and utterly unable to retain on its stomach any thing which was administered. The skin was pale, the heat of the surface great, the pulse extremely rapid; warm baths, stimulating pediluvia, cataplasms of mustard to the surface all failed to afford any mitigation of the symptoms. On examination of the abdomen, I found extreme tenderness of the epigastric region and evident congestion of the liver. The child was rapidly sinking under the oppression caused by this state. I suggested the employment of calomel in doses of a half grain every hour, to be dusted upon the tongue and washed down with a little sweetened water. Six grains were thus given with the happiest result; the vomiting and jactitation subsided, the pulse became more full, the consciousness of the child was restored, and the case pursued a normal course. Dr. Copland advises calomel as a purgative in those cases in which the sthenic diathesis is exhibited in the commencement, and Dr. Douglass appears to have resorted to it with a view to its specific or alterative influence.

However much diversity of opinion may prevail as regards the employment of antiphlogistics and purgatives at the commencement, there is great uniformity in advising the resort to a cordial treatment so soon as these have produced their effect; if the case assume the asthenic form, the chlorate of potash as

an alterative, is much more appropriate than either the citrate of that salt, or the acetate of ammonia, and should be given at short intervals steadily. The ol. terebinth. may be alternated with it suspended in a sweetened mucilage of gum acacia. An infusion of cinchona and capsicum, containing carb. of soda, may be resorted to; or serpentaria may be used instead of the cinchona; and when decided stimulation is demanded, the tinct. cinchonæ compos: may be added in doses appropriate to the age of the patient.

My mode of treating the severe malignant form, may be illustrated by the record of my experience in one family. It was that of a widow who had been compelled to leave her children without protection, while she returned to England to secure a bequest. The oldest was a girl of about fifteen years. She and two others were seized, simultaneously, with scarlet fever. I found her lying, insensible, on the bed; the whole surface of a mulberry hue, the pulse too frequent to be counted: there was perfect stupor and extreme jactitation; the throat swollen so as entirely to prevent deglutition; the fauces covered with ash-coloured deposit; a fetid ichor distilling from the nostrils; the eyes injected and upturned. The two other cases presented the usual marks of the severe anginose form. I at once secured the services of a judicious nurse, and in order to call out the utmost exertion of care and effort, told her, that though severe, the worst case was not hopeless, and that I was so conscious that the best medical advice would be useless without the aid of good nursing, that I was willing she should have all the credit of her recovery if it were accomplished. I furnished her with a syringe, and introduced a stomach tube through the nostrils. Wine whey, beef broth, highly seasoned with capsicum and quinine, were thus injected into the stomach at stated intervals, while the solution of sulphate of copper, and compound capsicum infusion were employed as local applications to the throat, by means of a syringe. Convulsions oc-

curred within a few hours; three days she lay in the condition described, the only evidence of consciousness afforded, being found in the resistance she opposed to treatment. On the fourth day the jactitation diminished, and there was a manifest abatement of the stupor, and much to my gratification, she recovered; without any sequelæ being developed. The other cases were treated in the simple manner described when speaking of the anginose form, and with an equally happy result.

The application of cold to the surface, and the use of ice internally, has been advocated by some authors even in this form of the disease. I need hardly say that the sedative impression of cold, is as much to be avoided as that of any other agent; but where the skin is hot and dry and the eruption is very abundant, great benefit results from the tepid sponging; and the addition of a small quantity of vinegar or whiskey to the water is advantageous. Several authors speak of fatal collapse following the injudicious resort to external cold.

Even Dr. Currie himself, to whom we owe the introduction of this treatment, did not consider it appropriate here. The cases to which he refers as "purpurata," are those which I include under the head of malignant, and to such, Dr. C. says, "the cold effusion is scarcely applicable, and tepid effusion makes little impression. In my experience, indeed, all remedies have been equally unsuccessful. It outstrips in rapidity, and it equals in fatality the purple confluent small-pox, to which it may be compared." The internal use of ice in these cases is too often forbidden by the stupor and delirium. Where these do not prevent, it may be resorted to with the same advantage as in the common anginose form. The internal use of a weak solution of the chloride of soda has been strongly recommended by Dr. Jackson of Northumberland, who reports many cases in his own practice, and that of his friends, which recovered under the use of this remedy and ice.

No attempt should be made to separate the sloughs or detach the deposits from the mucous membrane of the throat, either by mechanical means or by harshly stimulating washes. Fatal hemorrhage is sometimes brought about by this rude interference, or the tendency to gangrene aggravated by it.

Many practitioners are in the habit of resorting to the use of common yeast in large doses, in those cases where the throat is gangrenous. This practice was adopted from the surgical use of the same article in external gangrene, and the result is said to be highly satisfactory.

Carbonate of ammonia has been highly commended by some authors in this form of disease. One insuperable obstacle to its use, is found in the difficulty of deglutition. Even in those forms of low fever which are free from angina, the pungent character of the remedy makes it difficult of administration, and where there is much swelling or ulceration, it would be impossible that it could be swallowed, especially by a child.

The capsicum produces all the benefit which could be hoped from the ammonia, and with less effort in swallowing. Ol. terebinth. is an excellent stimulant, especially where there is tympanitis. If it purge, it should be guarded by the addition of properly graduated doses of laudanum. When combined with mucilage of gum Arabic and syrup flavoured with aniseed, it can be given to very young children without difficulty. Dr. Copland recommends highly the external application of the ol. terebinth. combined with spirits camphor and olive oil, especially to the loins and abdomen.

Musk, too, and camphor, have their advocates in those cases where the nervous symptoms predominate. I do not believe they possess any special virtues which entitle them to favour, and prefer depending on a few tried and proved friends to the resort to many other articles of questionable powers. The rational indications are met by those I have recommended, and on them we may safely rely.

In those *irregular* cases which I have described, it is impossible to direct any uniform plan of treatment. There is no specific for scarlet fever, even in its regularly developed forms. I have endeavoured to indicate the symptoms, and to deduce from them a treatment based on the known rules which regulate the human economy in health and disease. Where these laws cease to exert a control, the physician must be guided by his own discretion in each case as it presents itself.

Warm, stimulating, spirituous baths, or vapour baths, may be employed to invite the diseased action to the skin, and thus to liberate the central nervous system from the load by which it is oppressed; and where there is much tendency to collapse, warm wine whey or brandy may be given internally.

In those cases where the skin is hot and dry and yet devoid of eruption, and where there is great restlessness, I have used the Dover's powder with advantage. Capsicum, too, in some cases of this kind, has appeared to confer benefits which might be supposed almost to entitle it to the character of a specific; and should never be omitted.

Free ventilation is of the utmost importance in all the forms of this disease; but in the malignant form its value is beyond estimation. Nor is there, during the progress of the primary fever, any danger from the influence even of cool draughts, so much dreaded by parents and nurses.

I am fully aware that many condemn the views I have here presented, and that it is not uncommon to find the advocates of the antiphlogistic treatment attributing the mortality of this disease to the stimulating treatment I have thus recommended. Improperly employed, it is certainly pernicious. It should never be resorted to except where the feeble pulse, languid circulation, livid or violet colour of the eruption, and sloughing throat, give unmistakeable evidence of the failure of vital power. The resort to the treatment appropriate to this state from an apprehension of its approach, is, indeed,

likely to induce it. It is even more to be deprecated than the opposite extreme. Where bleeding, the application of cold, or the exhausting treatment, has reduced the patient, there is still room for hope that reaction may be produced by the resort to the proper remedies. But where the nervous energy has been exhausted by the addition of artificial stimulation to the febrile excitement, a state of prostration from over-excitement is induced for which we have no remedy. While, therefore, I desire to caution against the resort to those measures which directly exhaust the vital power, I would enter an equally strong protest against the premature employment of stimulating remedies. If, as in the case I have described, the malignant symptoms are present from the first, adopt immediately the stimulation necessary to counteract their tendency; but do not let the fear of its future occurrence induce the premature resort to them as a preventive. This, like bleeding beforehand to avoid inflammation, will only precipitate or make more certain the result which is dreaded. These remarks are especially applicable to the use of quinine. The wine whey is transient in its influence, the capsicum gives rise to no febrile reaction, but the quinine produces a more permanent impression upon the nervous system, and has a stronger tendency to excite local inflammation. Properly applied, it is the sheet anchor of our hope: the very power which renders it so, causes it when misused to be most pernicious. It should be given, when required, in full doses at long intervals, leaving the stomach free to receive the animal broth, wine whey, or brandy. These latter are most conveniently given in arrowroot or some of the usual farinaceous articles of diet.

Before passing to the consideration of the sequelæ of the disease, and the proper treatment of them, some notice must be bestowed on the question how far it is possible to remove the susceptibility to the impression of scarlet fever. It is now many years since it was announced that the administration of

small doses of belladonna to those who were exposed to the influence of this cause, whether epidemic or contagious, produced an almost entire immunity. The source from which the suggestion came, though entirely destitute of authority, was less calculated to excite suspicion than the reasoning by which the assertion of its power was supported.

In order that no injustice may be done even to Hahnemann himself, I shall introduce his own statement of the circumstances which led to the adoption of this prophylactic treatment, as derived from an English translation of his work, quoted in the British and Foreign Medico-Chirurgical Review for January, 1855: "The mother of a large family, at the commencement of July, 1799, when the scarlet fever was most prevalent and fatal, had got a new counterpane made up by a sempstress who (without the knowledge of the former) had in her chamber a boy just recovering of scarlet fever. The first mentioned woman, on receiving it, examined it and smelt it in order to ascertain if it might not have a bad smell which would render it necessary to hang it in the open air; but as she could detect nothing of the sort, she laid it beside her on the pillow of the sofa, on which some hours later she lay down for her afternoon's nap. She had unconsciously, in this way only, (for the family had no other near or remote connexion with scarlet fever patients,) imbibed the miasm. A week subsequently, she suddenly fell ill of a bad quinsy, with the characteristic shooting pains in the throat, which could only be subdued after four days of threatening symptoms. Several days thereafter, her daughter, ten years of age, infected most probably by the morbific exhalations of the mother, or by the emanations from the counterpane, was attacked in the evening by severe pressive pain in the abdomen, with biting itching on the body and head, and rigour over the head and arms, and with paralytic stiffness of the joints. She slept very restlessly during the night, with frightful dreams, and perspiration all

over the body excepting the head. I found her in the morning with pressive headache, dimness of vision, slimy tongue, some ptyalism, the submaxillary glands hard, swollen, and painful to the touch, shooting pains in the throat on swallowing and at others. She had not the slightest thirst, her pulse was quick and small, breathing hurried, and anxious; though she was very pale, she was hot to the touch, yet *complained of horripilation over the face and hairy scalp. She sat leaning somewhat forward, in order to avoid the shooting in the abdomen, which she felt most acutely when stretching or bending back the body; she complained of a paralytic stiffness of the limbs, with an air of the most dejected pusillanimity, and shunned all conversation. 'She felt,' she said, 'as if she could only speak in a whisper.'* Her look was dull and yet staring, the eyelids inordinately wide open, the face pale, the features sunk.

Now I knew only too well that the ordinary favourite remedies, as in many other cases so also in scarlatina, in the most favourable cases, leave everything unchanged: and therefore I resolved, in this case of scarlet fever just in the act of breaking out, not to act as usual in reference to individual symptoms, but, if possible, (in accordance with my new synthetical principle,) to obtain a remedy whose peculiar mode of action was calculated to produce in the healthy body most of the morbid symptoms which I observed combined in this disease. My memory and my written collection of the peculiar effects of some medicines, furnished me with no remedy so capable of producing a counterpart of the symptoms here present, as belladonna. It alone could fulfil most of the indications of this disease, seeing that in its primary action it has, according to my observations, a tendency *to excite even in healthy persons great dejection, pusillanimity*, dull, staring (stupid) look, with incredulously opened eye-lids, obscuration of vision, *coldness* and paleness of the face, want of thirst,

excessively small rapid pulse, paralytic immobility of the limbs, obstructed swallowing, with shooting pains in the parotid gland, pressive headache, *constrictive pains in the abdomen, which became intolerable in every other position of the body besides bending forward,* rigor and heat of certain parts to the exclusion of others—*e. g.*, of the head alone, of the hands alone, &c. If, thought I, this was a case of approaching scarlet fever, as I considered was most probable, the subsequent effects peculiar to this plant—its power to produce synochus, with erysipelatous spots on the skin, sopor, swollen, hot face, &c.,—could not fail to be exceedingly appropriate to the symptoms of fully developed scarlatina. I therefore gave this girl—ten years of age, who was already affected with the first symptoms of scarlet fever—a dose of the medicine, ($\frac{1}{432,000}$ part of a grain of the extract, which, according to my subsequent experience, is rather too large a dose.) She remained quietly seated all day, without lying down; the heat of her body became but little observable; she drank but little; none of her other symptoms increased that day, and no new ones occurred. She slept pretty quietly during the night, and the following morning—twenty hours after taking the medicine—most of the symptoms had disappeared without any crisis: the sore throat alone persisted, but with diminished severity, until evening, when it, too, went off. The following day, she was lively, ate and played again, and complained of nothing. I now gave her another dose, and she remained perfectly well, whilst two other children of the family fell ill of bad scarlet fever without my knowledge, whom I could only treat according to my general plan detailed above. I gave my convalescent a smaller dose of belladonna every three or four days, and she remained in perfect health. I now earnestly desired to be able, if possible, to preserve the other five children of the family free from infection. Their removal was impossible, and would have been too late. *I*

reasoned thus: A remedy that is capable of quickly checking a disease in its onset, must be its best preventive; and the following occurrence strengthened me in the correctness of this conclusion. Some weeks previously, three children of another family lay ill with a very bad scarlet fever; the eldest daughter alone, who up to that period had been taking belladonna internally for an external affection on the joints of her fingers, to my great astonishment did not catch the fever, although during the prevalence of other epidemics she had been the first to take them."

"This circumstance completely confirmed my idea. I now hesitated not to administer to the other five children of this numerous family this *divine remedy*, as a preventive, in very small doses; and as the peculiar action of this plant does not last above three days, I repeated the dose every seventy-two hours, and they all remained perfectly well, without the slightest symptom throughout the entire epidemic, and amidst the most virulent scarlatina emanations from their sisters who lay ill with the disease. In the meantime, I was called to attend another family, where the eldest son was ill with scarlet fever. I found him in the height of the fever, and with the eruption on the chest and arms. He was seriously ill, and the time was consequently past to give him the specific prophylactic treatment. But I wished to keep the other three children free from this malignant disease. One of them was nine months, another was two years, and the third four years of age. The parents did what I ordered: gave each of the children the requisite quantity of belladonna every three days, and had the happiness to preserve these three children free from the pestilential disease, free from all its symptoms, although they had unrestricted intercourse with their sick brother."

More inconsequential reasoning could not be presented; and certainly there is nothing in the description of the case

just narrated, to convey any idea of its relation to scarlet fever. Nor, if the power of production of similar symptoms is to be the test of the adaptation of a medicine to act either as remedy or preventive, are the "symptoms" of belladonna in the least degree suggestive of its applicability to scarlet fever as it generally prevails. The absurdity of the dose, and the interval at which it is repeated, are not wanted to show the absolutely baseless foundation on which the claims of belladonna rest in either case.

Various other articles have been at different times commended by different authors, as capable of affording a similar exemption—such as small doses of rhubarb, given daily. There is one insuperable objection to them all. The advocates of the use of preventives, whether Homœopathic or others, refer to the preventive influence of vaccination as though the cases were parallel, or illustrative of each other. There is no affinity between them. In the one case, the susceptibility of the system to a specific miasm producing a disease to which as a general rule the system is liable but once, is saturated or exhausted by the introduction into the system of the specific miasm either in its integrity, as in inoculation, or in a modified form, as in vaccination, in which case the disease has been satisfactorily proven to be variola, modified by passing through the system of the cow.

Now, not even a disciple of Hahnemann can venture to assume this identity for the active principle of belladonna and the scarlet fever miasm; and until this can be proven, no reasoning can be brought from the one to bear on the other.

There is another important subject for consideration before adopting the preventive treatment, even granting that observation had proved its power, though the observation had its origin in false reasoning. Hahnemann claims three days as the duration of the belladonna influence. Children cannot be kept permanently under this influence until they pass the period of

greatest susceptibility. Nor are parents always aware of the moment of exposure, so as to meet the poison by the antidote.

An illustration of the questionable character of the testimony on which the prophylactic virtues of belladonna are supported, the necessary uncertainty which attends it, as well as of the point which it is here attempted to enforce, occurred in the practice of my son, Dr. J. Cheston Morris. A sudden death by malignant scarlet fever occurred in a lodging house, in which several families, with many children, boarded together. The medical attendant of one of those families gave belladonna. The father of four children, who were under the care of my son, applied to him with great solicitude for his opinion of the propriety of adopting the same measure. At my suggestion, it was not employed. No second case of scarlet fever occurred in the entire household. The only approach to it was an attack of sore throat and fever without eruption, which confined to his bed three days the father of the family under my son's care. Had this family joined the other families in the house in the use of the belladonna, it would have furnished a case as satisfactory as any that have been reported in favour of the treatment. About four weeks after this, the family alluded to removed to another residence; and six weeks after the removal, the children were all seriously ill with scarlet fever of the most violent type, from which they happily recovered. Another experience of my son may be quoted here also, as bearing on the same point. (See American Journal of the Medical Sciences, for April, 1857: Experiments made to determine the protective power of Belladonna in Scarlatina. By J. Cheston Morris, M. D.) The experiment was conducted in an asylum for children, containing at the time 49 inmates between four years and twelve years old, males and females. The apartments were large and airy, and the sick were promptly and entirely separated from the well. Six of the children were attacked, within a few hours, by scarlet fever of a malignant

type, leaving 43 as subjects of the experiment. Of this number, fourteen were supposed to have had the disease previously, on the testimony of their parents at the time of their admission. This testimony was discarded as questionable, however, and the whole number were divided, without regard to this point, into two bodies, one of 24, to whom no belladonna was given, and another of 19, who took daily one drop for each year of the child's age, of a solution of the Extract made by adding grs. iii., to water ʒiv., alcohol fʒi. The quantity of the extract in each drop, therefore, was equal to about $\frac{1}{4\frac{1}{5}0}$ part of a grain, and one drop for each year of the child's age, was given daily—by no means a Homœopathic dose, as in the older children it amounted to a pretty full dose. As the result, it proved that of the 24 who took no belladonna, 18 had the disease with great severity; and of the 19 who did take it, 11 were affected with equal violence. The epidemic was one of great malignity, and complicated by the simultaneous presence of whooping cough and measles. The rubeola appeared as the primary symptoms of the scarlet fever abated in each case, ran the regular course cotemporaneously with the sequelæ of the scarlet fever, and added pneumonia to them. Though the percentage is slightly in favour of the belladonna treatment, if we look on it in that point of view, the absolute failure to protect, in so many cases, is sufficient to destroy our confidence in its powers, and to lead us to attribute the exemption of those who did escape, to some other cause.

In the British and Foreign Medico-Chirurgical Review for January, 1855, already quoted, may be found an analysis of the testimony both for and against the belladonna treatment. Among the latter is that of Lehman, a German practitioner. He gives the following, among other observations: A boy five years of age, an only son, contracted scarlet fever after having taken belladonna uninterruptedly during several months. The fever assumed a cerebral character, and on the fourth day the little patient died. In a family of four chil-

dren, the eldest (who was five years old) became affected with scarlet fever. The remaining three were immediately put on the use of the belladonna. On the twenty-first day of the employment of the drug, two of the three were attacked by the disease in a more violent form than the first case.

Dr. West, of London, reports having given it a trial similar to that of Dr. J. Cheston Morris alréady referred to, but on a larger scale. He had 151 boys under notice, of whom he had reason to believe none had experienced a previous attack. He gave the belladonna to 75, and withheld it from an equal number. There were two seizures of each class.

Dr. Sims reports that rhubarb, taken in such doses as will produce one loose stool per diem, was found by him to be the best preventive. "He did not see one, who used this, confined afterward to bed, though several commenced the practice after they had been infected." Dr. Lee, (see Copland's Dict.) says: "Where a person has been exposed, I have reason to believe that the liberal use of spirits of nitre, with magnesia, or spirits of mindereri, will prove successful in preventing a severe attack, and in some instances in arresting it altogether. The depurating organs should all be kept active if we seek to avoid a severe attack."

MM. Rilliet and Barthez give us the report of Gumpert, who employed belladonna in more than twenty families with entire success. Berndt found that of one hundred and twenty-four children to whom it was administered during exposure, only fourteen took the disease; and Hillenkamp had still better results, only five having sickened out of one hundred and twenty who took the belladonna. Our own medical journals contain reports of the same favourable character. Dr. Condie, however, asserts that, having tried it in repeated instances, he never found it to produce the slightest effect in mitigating the character or preventing the occurrence of scarlet fever; and Dr. Sutton, in the paper already quoted,

says: "Belladonna was given as a prophylactic; but, seeing children attacked with the disease while taking the medicine, I lost all confidence in it, and perhaps discontinued it before I had given the medicine a fair trial."

The only field for a crucial experiment is some large institution for orphans or destitute children, where it can be tried, while all other means of prevention are avoided. Larger numbers than can be found in private families, and more careful observation are necessary to settle this point. Though the reasoning of Hahnemann in support of his prophylactic is simply absurd, it is quite possible that the influence on the nerves of organic life, of a slight narcotic, may so preoccupy them that they shall not yield to the impression of the epidemic or contagious principle. If it be proven to have this effect in scarlet fever, it should be equally available in the case of other diseases which are diffused by the same agency. Professor Chapman long since drew attention to the effect of the occupation of the stomach by food, in preserving those who are exposed to miasmatic impressions. It would be impossible to keep the stomach always filled with food; but the nervous system may be kept constantly affected by the narcotic, and, if given in quantities sufficiently minute, without inconvenience. I have never tested the effect myself, not having had an opportunity which was sufficiently guarded from sources of uncertainty. Though I have thus entered at large into the question on account of the positive assertions of the advocates of prophylactic treatment, and have endeavoured to exhibit the manner in which, if at all useful, it operates, I have no faith in the prophylactic power of this, or any other agent. The mode of exhibition recommended, is to suspend *three grains* of the extract of belladonna in *one ounce* of water; of this, *two* or *three drops* are to be given twice a day, to a child under twelve months old, adding one drop for each additional year of age.

We now come to the consideration of the treatment of those diseased conditions which are commonly recognised as the *sequelæ* of scarlet fever, though they may perhaps in many cases be considered, with greater propriety, a mere continuance of the diseased action caused by the specific poison.

I have already described them, and spoken of them as susceptible of division into two classes. Those which appear to be the mere continuation of the local lesions developed during the progress of the disease itself, ulceration of the throat, enlargement of the cervical glands, with infiltration of the cellular tissue of the adjacent parts, abscesses about the neck, and inflammation of the ear, were grouped together as the first class: while the inflammation of the endocardium, or of the kidneys, and the dropsical effusion and rheumatic fever, were arranged as the second; and an attempt was made to exhibit the connexion of the dropsical effusion with the interruption of the functions of the emunctories of the skin and kidneys. This division was not adopted without design, and has reference to the treatment appropriate to the several groups.

The ulceration of the throat requires no change in the treatment which has already been suggested as appropriate to the anginose symptoms during the primary stage. The lime water, solution of chloride of soda, sulphate of copper or nitrate of silver, may be injected as detergent and stimulating applications for the cure of the internal affections, should they not subside spontaneously with the decline of the fever: while fomentations are still applied to the external swelling. Friction with a pommade of iodide of potassium combined with the officinal camphor liniment, or dissolved in glycerine, may be used advantageously in promoting the absorption of the effusion and the reduction of the enlarged glands. If suppuration occur, the abscesses should be discharged so soon as the matter approaches near enough to the surface to permit the safe resort to the lancet.

The affections of the ear which complicate scarlet fever in its progress, or are developed as sequelæ, should always receive prompt attention, as they not unfrequently result in the entire destruction of the diseased organ. There may be *otitis*, or acute inflammation of the inner ear, or mere *otorrhœa*. The least important cases are those in which the inflammation commences in the meatus auditorius externus. This may occur at any time during the progress of the disease, but most commonly commences about the fourth or fifth day. If the patient be a young child, it will be found more drowsy than usual, and when awake, more fretful; and if old enough to express the seat of distress, it will indicate one or both ears. In some cases, however, there is little or no pain, and the first intimation of any local lesion will be derived from the stain of the cap or pillow-case, by a glairy, purulent discharge, which excoriates the concha as it flows over it, and occasions a vesicular eruption wherever it touches the skin. Whether the accumulation of this matter in the ear produce an extension of the disease to the tympanum, or the membrana tympani itself take on the inflammatory action, it not unfrequently happens that even those cases which are attended by little or no suffering in the beginning, become very serious in their progress, and result, finally, in the destruction of the membrana tympani and discharge of the ossicula.

During the first few days, the external meatus should be kept perfectly cleansed by the injection of simple warm water with a little pure Castile soap dissolved in it; after which, if the discharge still continue and become fetid, the weak solution of chloride of soda or sulphate of copper may be employed.

The injection of the ear should never be intrusted to the mother or nurse. Ignorant of the structure of the parts, they are either restrained from the effectual use of the remedy by apprehension of doing mischief, or employ an undue force,

and injure the inflamed membrane. Where the ulcerative process has destroyed the membrana tympani especially, great care is requisite not to throw the fluid so far into the cavity that it shall lodge there and become a source of additional irritation.

Even the cases which originate externally, sometimes result in the entire destruction of the ear; but when the inflammation is extended from the fauces through the Eustachian tube to the internal ear, the pain at the time of invasion is much more severe, and the consequences are much more serious. In the case of infants or young children, this internal affection is first manifested by sudden shrieks, like those of meningitis, accompanied by grinding of the teeth and violent febrile excitement; these symptoms may continue many days before any discharge from the external ear affords positive evidence of the site of the inflammation.

This extension of the inflammation from the fauces to the inner ear, may occur at any period; either during the progress of the scarlet fever, or after the primary symptoms have declined. In either case, it demands prompt and energetic treatment; and unless the prostration of the vital forces is so extreme as to render the recovery of the patient hopeless, *leeches* should be applied to the mastoid process, followed by a blister. No apprehension of sloughing or ulceration should be allowed to interfere in these cases. The introduction of warm olive oil and laudanum into the external meatus may be resorted to for the temporary relief of the suffering, simultaneously with these applications; and morphia may be applied afterward to the blistered surface, in doses appropriate to the age of the patient.

These are the cases which result, of necessity, in the destruction of the organ, and lay the foundation for necrosis of the petrous portion of the temporal bone, and occasionally produce inflammation of the dura mater and death. It is

not at all uncommon for the matter to find its way into the mastoid cells, and to give rise to abscesses behind the ear, which discharge externally; and leave openings, through which pus, contaminated by the dead bone, is discharged during a series of years; making the patient an object of disgust and pity by the excessive fetor. I have known both ears thus destroyed, reducing the child to the condition of a mute. Where the disease assumes this chronic form, cod liver oil is a most valuable resort, and should be administered perseveringly.

Croup, when it occurs as a complication during the first week of the disease, should be treated by emetics of ipecacuanha, alum or sulphate of zinc. Should it be developed during the convalescence, the disease of the larynx will partake of the character of that of the adjacent parts, and if that be one of active inflammation, V. S. or leeching may be safely resorted to; the quantity of blood drawn being regulated by the degree of reaction which is present. In taking leave of the primary stage of the disease, and the local affections associated with, or immediately dependent upon it, we encounter an entirely new condition of the system, one of active inflammation. Should the croupy cough and difficulty of breathing continue, the child should be put at once on the use of iodide of potash, given in large doses, freely diluted in some simple vehicle, such as gum syrup and syrup: zingiberis, in equal proportions.

It is admitted by all writers on this subject, that the *malignant* form of scarlet fever is less likely than the *simple* and *anginose* to be followed by those sequelæ which I have grouped together as the second class. Though in the former, the powers of the system may be so far exhausted that it is long in recovering its healthy tone, and the convalescence may be protracted to many weeks, and rendered more tedious by the condition of the throat or ears, there appears to be little or no tendency to the secondary inflammations or drop-

sical effusions which so frequently follow even the mildest cases of the latter. When they do occur, these sequelæ of the second class are always of an inflammatory character, and in severe cases affecting vital organs, the safety of the patient depends upon the promptitude and vigour with which depletion is practised. They most frequently exhibit themselves between the tenth and twentieth day from the development of the primary symptoms, and are all of them ushered in by loss of appetite, languor, and in cases of children, fretfulness. They are often excited by errors in diet or exposures to vicissitude of temperature, though they do certainly occur without any such exciting cause, with sufficient frequency to justify the belief that they are, in reality, dependent on the original influence of the miasm which gives rise to the disease, of which they might, perhaps, be considered the latter stage, rather than a sequela. They are all accompanied or ushered in by a dry, heated condition of the skin; a suspension or great diminution of the secretion from the kidneys; a tense and rapid pulse.

The endocardial inflammation, though not the most common, is one of the most formidable of these sequelæ, and may be recognised by the extreme rapidity of the pulse, the disposition to sigh, and especially by the pain in the region of the heart, and soreness upon pressure. I have already indicated the plan of treatment which I think adapted to this case, when I alluded to it in the description of the disease. A decided and immediate impression should be produced by free venesection; a full dose of calomel should be given, followed by oil or citrate of magnesia; a blister should be applied over the region of the heart; the diet should be restricted to barley or rice water; the most positive quiet should be maintained, and if the febrile reaction be not subdued by these means, and the strength of the patient admit it, leeches or cups should be applied between the lower angle of the scapula of the left sid-

and the vertebræ, or over the region of the heart on the front of the thorax. Calomel and nitrate of potash should be given in small doses frequently repeated, and digitalis added in the form of infusion. Having by these means arrested the progress of the case, the patient must be kept in a state of perfect tranquillity of mind and body, and on the most rigid diet, till all symptoms of active inflammation are subdued.

In the case of an adult who had an attack of scarlet fever, so slight in its primary stages that she was not obliged to suspend the performance of her duties as the nurse of the child whose mother's case has been referred to, (see page 58,) the endocardial inflammation was very severe. Bleeding, cupping and blistering were all employed to the full extent to which it was proper to push them, and mercury to the production of severe ptyalism. Aconite in moderate doses was then resorted to and proved most useful, subduing the action of the heart and tranquillizing the nervous excitability. Under this treatment she perfectly recovered.

The dropsical effusion and the inflammation of the kidneys may be spoken of under one head, since they are at least intimately associated, and demand the same treatment, even if the former do not generally depend on the latter as the proximate cause, which I believe to be the true pathology of such cases. Where the affection is slight and the febrile reaction mild, a dose of calomel followed by a saline cathartic will often suffice to subdue the inflammation and arrest the progress of the effusion. Should the skin continue dry and husky, the tongue coated, the pulse quick and corded, great advantage may be expected from the use of the solution of acetate of potash or the effervescing draught with sweet spirits of nitre; and these failing to give relief, the nitrate of potash with the addition of small doses of calomel may be resorted to. If the fever be high and constant, bleeding will be not only well borne, but absolutely requisite. The blood drawn under these circum-

stances is always much cupped, and covered with a dense buffy coat, and the relief which follows the abstraction of it is very great; I have known the most urgent symptoms yield immediately.

Where there is any hesitation about the propriety of resorting to general depletion, cups should be applied to the loins, especially in those cases where the presence of blood in the urine without high arterial excitement indicates the existence of congestion of the kidneys. Indeed, I have found the abstraction of a small quantity of blood by cups applied to the lumbar region, as near as possible to the kidneys, a most satisfactory remedy in the febrile anasarca following scarlet fever. I have formerly in cases where there was great febrile disturbance, administered nitrate of potash and other diuretics during many consecutive days, without any benefit, and the resort to stimulating diuretics is still more pernicious. An active purging by calomel followed by castor oil or tartrate of potash and soda, has sometimes supplied the place of the cupping where it has been impossible to induce the parents or friends to consent to this measure. The first indication of improvement will be found in the restoration of the healthy action of the kidneys. Should this not take place very shortly, digitalis should be given.

The best form for exhibiting this remedy with reference to its diuretic effect is, certainly, the infusion, made according to the prescription of Withering, except that sweet spirits of nitre may be substituted with great advantage for the tinct. cinnamomi. The proper formula for the preparation of this infusion, is that given in the Dispensatory of Drs. Wood and Bache. The dose must of course be proportioned to the age of the patient. If there be much fever, and the urine be very scant and high-coloured, with deposit of brown flocculent matter, there can be no room to doubt the presence of active congestion or inflammation of the kidney, which will be best

met by the application of leeches or cups to the loins. I have found the perseverance in nitre and diuretic remedies in these cases without first removing the local inflammation by local blood-letting, to aggravate the sufferings of the patient without producing any increase of the secretion.

Since the publication of the first edition of this work, Dr. Copland's Dictionary of Practical Medicine has reached the subject of scarlet fever. It is with no little satisfaction I find him dwelling with great earnestness on the same pathological view of the importance of the influence of the scarlet fever miasm on the kidneys. He says, "The prevention of the affection of the kidneys upon which the most frequent of the secondary diseases or sequelæ of scarlet fever chiefly depend, should be a principal object in the treatment of this malady. During desquamation, and early or advanced convalescence—for a month at least after the disappearance of the eruption—the patient's diet and regimen should be strictly prescribed, however mild the disease may have been." There is great reason to adopt the view inculcated by Dr. C., that the tendency of the miasm producing scarlet fever is to the production of congestions and inflammation of the kidneys, just as it is to the analogous affection of the fauces and throat. In this view of the case, the affection of the kidneys and the dropsical effusion would be transferred to the class of sequelæ we have just had under consideration. The following note of a case in which I was consulted, was furnished me during the passage of this sheet through the press.

"HARTFORD, April 18th, 1858.

"MY DEAR SIR:—At Mr. ———'s request, I send you the important points of the disease under which your little grandson is labouring.

"I shall give you such data as will enable your family physician to give you as correct an idea of his situation without seeing him; and should be most happy to receive any sugges-

tions from him, (either directly or through you,) which may occur to him.

"He came to his bed with a mild attack of scarlet fever, about the 12th of March. There was no sore throat or other complication during the course of the eruption.

"The second week, there was a mild anasarca of the upper half of the body, without constitutional disturbance. This gradually gave way, and he slowly but on the whole satisfactorily improved, until the 10th of the present month, when he appeared to have taken a sudden cold.

"For a day or two he had considerable fever, rapid pulse, troublesome cough, with short, hurried respiration. The second day, his face was quite fully bloated, and the urine presented a dark appearance—evidently blood which had been retained in the kidneys or bladder some little time. Quantity at first scanty.

"*April* 12*th.* The above symptoms existing, with dulness in the lower third of the left pleura. Inclined to sleep. Bowels constipated. Ordered digitalis and iodide of potassa, alternated with protiod. mercury.

"*April* 13*th.* Had an uncomfortable night from coughing; otherwise, would have slept. Not as much fever. Bowels moved. Urine increased in quantity, and much the same appearance. Could not obtain a specimen to test. Medicine continued.

"*April* 14*th.* A much better night. Urine freer, and bowels open. Obtained about six ounces of urine. In the bottom of the vessel is quite a quantity (say ʒi) of fresh blood. Nitric acid added to two ounces turns the entire quantity white, and the precipitated albumen reaches about half way to the surface. Heat gives me, upon the surface, a quantity about equal to the white of one egg to—say—four ounces of urine. Under the microscope I find abundant blood discs, with epithelium and pus globules. No uriniferous casts.

Ordered tincture of iron, alternated with the digitalis and hydriodate of potassa. Generous but plain diet.

"*April* 15*th*. Is considerably improved in general appearance. Pulse slower, soft and regular. Less dulness over the lungs. Coughs but very little. The same general appearance of urine as seen in the vessel. Albumen slightly diminished. Blood and pus the same.

"*April* 16*th*. Patient is dressed, and says he feels well. Appetite good. Anasarca entirely gone. Dulness of left side nearly gone. Urine the same.

"*April* 17*th*. Appears quite well, except pale and weak. Albumen diminished nearly one half. Other characteristics the same.

"*April* 18*th*. Same as yesterday. Albumen a little less. Medicine continued."

The child recovered.

But of all the manifestations of disease which mark the progress of scarlet fever, none are so much to be dreaded as the cerebral affections which occur at the period now under consideration. By some authors we are taught that meningitis is suddenly developed; and proves fatal either by giving rise to serous effusion, or by terminating in the secretion of pus, or lymph. I have never met with cases in which I had reason to suspect the results last mentioned. The serous effusion is comparatively of frequent occurrence, and is sometimes poured out so rapidly as to produce convulsions and death, before the proper means for relief can be applied. In other instances the effusion takes place more gradually, but with an equally fatal tendency.

Some years since, I was attending a young gentleman of about fifteen years of age, who was apparently convalescent from a severe attack of simple scarlet fever. He was an only son, and the object of intense anxiety to his parents. My directions about diet and exposure were carried out with great

care; and yet the fever, and suspension of secretion from the skin and kidneys, supervened at the end of the second week. I at once resorted to purgatives and nitrate of potash. On the third day I was summoned to see him lying entirely comatose, with slow pulse, dilated pupils and cool skin. There was no metastasis of the effusion to the brain, for his whole body was œdematous. Recognising at once the urgency of the case, I tied up his arm and bled him largely, and then put him on the use of small doses of calomel and nitrate of potash, with the infusion of digitalis. At the end of forty-eight hours the kidneys resumed their natural action, and in less than a week the whole train of symptoms had disappeared. These cerebral symptoms depend on the effusion of fluid into the ventricles or at the base of the brain, rather than on any vascular congestion, or inflammation of the membranes, and are consequent upon the same causes as those which give rise to the anasarca; the bleeding acts by curing the condition of the kidneys, upon which the whole series of symptoms depends, as well as by withdrawing a portion of the blood, rendered unhealthy by the retention in it of matters which should have been eliminated by the skin and kidneys.

Among the most formidable of the sequelæ is the effusion of serum into the cavity of the pleura, or the parenchyma of the lungs, giving rise to the most distressing orthopnœa. Depending on the same cause as the cerebral cases just noticed, it requires the same treatment, which should be pursued with the same degree of energy.

I have never seen a case of dropsical effusion following scarlet fever, which was not materially aggravated by the early resort to tonic or stimulating remedies. When the effusion, whether general or local, has been absorbed and discharged through the kidneys, but not till it has entirely disappeared, it will be proper to administer some mild tonic; small doses of quinine in the first instance, followed by some of the

preparations of iron, especially the lactate or tartrate, with fresh air and a good diet. It must not, however, be forgotten, that the convalescence from these attacks is slow. It is even possible that many months may elapse before the patient is restored to a condition of entire health.

The Rheumatic Fever I have always found yield promptly to properly graduated doses of Dover's powder. Should the pulse be tense and quick, and the suffering prolonged, bleeding would be appropriate in this case also.

Diarrhœa depends upon the irritation produced by the acrid matter swallowed from the throat, and is most likely to occur after very severe anginose or malignant cases. It is quite possible that ulceration of the mucous membranes may be thus induced, keeping up this unpleasant disease a long time, and retarding the restoration of the strength of the patient. Opiates and mild absorbent remedies are the agents upon which we must rely in such cases, and we shall generally find the disease yield to them. I have, however, known the irritation transmitted from the ulcerated membrane to the mesenteric glands, and the patient has died, worn out by profuse discharges and hectic fever, after weeks of suffering.

There are other instances in which a condition of the blood like that which is found in some cases of typhoid fever, is produced; either as the result of the original miasm, causing the disease, or the consequence of the febrile action itself, or of the influence of a diseased constitution of the individual patient. There is hectic fever, with profuse sweating attending on the state of sleep; and a degree of nervous irritability which is scarcely tolerable, either by the patient or attendants. Such cases generally recover and require a treatment conducted upon simple, rational, principles. The blood is vitiated and impoverished by the action of a poison and the interruption of the normal process of assimilation and excretion. No remedies can be supposed capable of producing a prompt

change and restoration of these functions, much less of that healthy condition of the organism which is the result of this normal action. Iodide of potash, or a solution of citrate of iron and extract of cinchona in sherry wine, during the intermissions, and the solutions of the salts of potash during the febrile paroxysms, are the drugs most appropriate; so soon as circumstances will permit, the influence of fresh air will be found highly beneficial.

A wholesome diet is especially important, and yet the fastidiousness of the irritable convalescent stomach often taxes to the utmost the inventive powers of the physician and attendants to provide articles which shall be acceptable and not injurious. Some degree of acquaintance with the science of cookery and familiarity with the mode of preparation of food, will, in such cases, be of great value to the physician. The cutting censure of common medical dietetics uttered by Dr. Chapman nearly half a century since, is perhaps less applicable to the diet list of doctors now than then, yet is still not without an edge. "You condemn your patients to eat what your own stomach revolts at."

This acquaintance with culinary science and art is as important to the treatment of the convalescence from Scarlet Fever, as is the knowledge of its pathology to the administration of remedial measures during the primary stages; and it should never be forgotten that the apparatus of the good physician is not limited to the contents of the shop of the pharmaceutist, but embraces within its legitimate scope, the air, the sunshine, the fruits and flowers of the earth; all things pleasant to the eye, grateful to the ear, acceptable to the palate, and capable of assimilation by the stomach and its collatitious organs.

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THE END.