

ter sweeping, the dust upon the woodwork and furniture should be removed with damp cloths. The sweepings should be burned and the clothes soaked in the carbolic solution. In cold weather the sick person should be protected from the draughts of air by a sheet or blanket thrown over his head while the room is being aired. In summer the windows should be kept open sufficiently to secure free movement of air and agreeable temperature; in winter an open wood or coal fire should be kept constantly burning. The temperature of the room should not exceed 21° C. (70° F.) nor fall below 18° C. (65° F.). The patient should be kept in bed even during the mildest attacks, with only enough bed covering to secure comfort.

8. When the contagious nature of the disease is recognized within a short time after the beginning of the illness it is advised that all articles of furniture not necessary for immediate use in the care of the sick person, especially upholstered furniture, carpets, and curtains, should be removed from the sick-room. If the disease is well advanced this should not be done without first taking precaution to disinfect them properly.

9. When the patient is beginning to recover and the skin is peeling off, the body should be washed once daily in warm soapsuds, and afterward rubbed in oil or carbolated vaseline. This should be continued until all roughness of the skin has disappeared.

10. When the patient has recovered and the Board of Health inspector has authorized his discharge, the entire body should be bathed and the hair washed with hot soapsuds, the nose, mouth, and ears should be disinfected as far as practicable with antiseptic sprays, and a corrosive sponge bath of 1 to 2,000 to 1 to 5,000, according to the age of the patient, should be given. The patient should then be dressed in clean clothes (which have not been in the room during the sickness) and removed from the room.

The Health Department should be immediately notified, and disinfectors will be sent to disinfect the room, bedding, clothing, etc., and under no conditions should it be again entered or occupied until it has been thoroughly disinfected. Nothing used in the room during the sickness should be removed until this has been done.

11. The attendant or any one who has assisted in caring for the sick person should also take a bath, wash the hair, and put on clean clothes, before mingling with the family or other people, after the recovery of the patient. The clothes worn in the sick-room should be left there, to be disinfected with the room and its contents by the Health Department.

12. As contagion sometimes occurs after very prolonged intervals it is generally better to observe the rule that isolation should be practised until the completion of desquamation. Ashby<sup>23</sup> lays down the following rules in reference to the discharge of a scarlet-fever patient from quarantine. (1) If desquamation is complete scarlet-fever cases may be discharged at the end of the sixth week, although in order to secure absolute immunity it is wiser to delay until the eighth. (2) Cases complicated with nephritis, empyema, otitis, or glandular abscess, should be detained until the cure is completed. (3) While it is important that the desquamation should be as complete as possible, the detention of the patients beyond the eighth week in order that the last vestige of epidermis should be removed from the feet, etc., is unnecessary. Such detention is, however, often insisted upon by health authorities.

13. The uses of belladonna and other "specifics" as a means of prophylaxis are based upon untenable hypotheses. Scarlet fever often fails to spread even when a number of persons have been exposed and the danger of drawing incorrect conclusions from the use of drugs as prophylactics is very great.

The following are the best-known disinfectants:

**Heat.**—Continued high temperatures destroy all forms of life. Boiling for at least one-half hour will destroy all disease germs.

**Carbolic Acid.**—A standard solution is composed of six

ounces of carbolic acid dissolved in one gallon of hot water. This makes approximately a five-per-cent. solution of carbolic acid. The commercial colored impure carbolic acid will not answer for this purpose. Great care must be taken that pure acid does not come in contact with the skin. When practicable, the carbolic solution should be used as hot as possible. The cost of carbolic acid is much greater than that of the other solutions, but generally is much to be preferred. When the cost is an important element, the bichloride solution may be substituted for all purposes for which carbolic is recommended, excepting for the disinfection of the discharges, eating utensils, or articles made of metal, and of clothing and bedding, etc., which is very much soiled. Its poisonous character, except for external use, must be kept constantly in mind.

**Corrosive Sublimate** (bichloride of mercury).—A standard solution is composed of sixty grains of pulverized corrosive sublimate and sixty grains of the chloride of ammonia, dissolved in one gallon of water. This solution must be kept in glass, earthen, or wooden vessels (not in metal vessels).

The above solutions are very poisonous when taken by mouth, but are harmless when used externally.

**Milk of Lime.**—A standard solution is made by mixing one quart of dry freshly slaked lime with five quarts of water. Lime is slaked by pouring a small quantity of water on a lump of quicklime. The lime becomes hot, crumbles, and as the slaking is completed a white dry powder results. The powder is used to make the solution. Air-slaked lime has no value as a disinfectant.

**Formaldehyde.**—The use of formaldehyde gas for disinfection of rooms, clothing, and furniture, after the discharge of the patient, has now become general, and has proved superior to the older methods. The simplest, most convenient, and inexpensive apparatus for this purpose is the Schering lamp in which paraform pastils are burned, two pastils being used for each thirty-five cubic feet of air space. More powerful generators for the disinfection of very large areas are now commonly used by the Boards of Health, to whom the question of disinfection is generally referred.

The proprietary disinfectants, often widely advertised, and whose composition is kept secret, are relatively expensive and often unreliable and inefficient. It is important to remember that substances which destroy bad odors are not necessarily disinfectants.

**Diet.**—The diet should consist in easily assimilable food; the nearer this approaches a pure milk diet the better. Cold drinks may be allowed; cold-water lemonade, raspberry vinegar properly diluted, soda-water agreeably flavored, are grateful to the patient and preferable to warm and mucilaginous drinks. Though milk should form the principal article of food, light broths and soups, beef tea, chicken jelly, and, especially during convalescence, the various appetizing and wholesome preparations of food now so abundantly supplied may be given.

Internal medication may be held in reserve, a careful observation of all symptoms being meanwhile maintained and the conditions of the kidneys systematically ascertained by daily observation.

**Hydrotherapy.**—By far the safest and surest agent for reducing temperature in scarlatina is cold water which should always be tried before resorting to the use of antipyretic drugs, which are often dangerous, and the use of which should be discouraged. This may be applied in various ways. The simplest method is by frequent spongings with cold or tepid water under cover of the bedclothes. At the same time cold wet cloths may be applied to the head, and the patient may be permitted to suck small pieces of ice. In most cases it is better that the water be warm. The spongings may be repeated frequently during the day and night. In cases in which, with an elevated temperature, the eruption develops incompletely, or is much delayed in appearance, the body may be immersed in water somewhat cooler than its normal temperature. A cool bath (27° C. = 80° F.) has been

extolled as of singular virtue in such cases, and at times it is of the highest value. The tepid, even the warm bath, is probably of equal benefit in most cases. Recent writers have denied that efforts to "bring out" an imperfect or delayed scarlatina, eruption are of any avail. There can be no doubt, however, that treatment with this object in view is often successful. The hot bath, even with the addition of mustard, by exciting cutaneous hyperæmia, will often relieve the congestion of internal parts. Warm and hot drinks made from various vegetable substances were formerly much employed to "bring out" the eruption. They were given copiously, and often in combination with such diaphoretics as spiritus mildereri, spirits of nitrous ether, etc. This plan of treatment is not much practised to-day. The cold bath, which should be of a temperature not lower than from 24° to 27° C. (75° to 80° F.), should be reserved for cases whose temperature exceeds 40° C. (104° F.). The body should be immersed but for an instant, the benefit of the plunge consisting largely in the dilatation of the vessels of the skin through reaction. The cold pack is also of value in these cases. When the temperature steadily rises to an alarming degree, or when hyperpyrexia is developed almost at the outset; when, with or without well-developed exanthem, stupor or coma, or other grave nervous disorder, arises, and when the pulse becomes very rapid, feeble, and irregular, the maintenance of life depends upon the reduction of temperature. Here it is impossible to give hard-and-fast rules for conduct. Water below the normal temperature of the body still remains our most efficient means of reducing the excessive heat. The lower the temperature of the bath, the more rapidly is this result attained, but the shock of the sudden contact with the cold water may exert a depressing effect that may not speedily pass off. The body cannot remain in very cold water longer than a minute or so without exciting chattering of the teeth, lividity about the mouth, and a pinched appearance of the features and of the surface. The warm bath (32°-35° C. = 90°-95° F.) has been highly extolled as favorably influencing the course of scarlet fever when used at the very beginning. Thompson employed it thus constantly, and never lost a case treated in this manner. In a bath of from 27°-30° C. (80° to 85° F.) the patient may remain for five or ten minutes. These baths should be repeated as often as the temperature of the body becomes as high as 39.5°-40° C. (103°-104° F.). To avoid alarming the little patient, the bathtub may be covered with a sheet or blanket. Placing him upon this, he may slowly be lowered into the water. Upon removal from the bath the patient should be wrapped in a dry blanket. As the body soon dries under the protection afforded, rubbing with towels may be avoided. The skin should now be anointed with oil or other agreeable fatty substance. Refreshing quiet and sleep often follow this bath. In using the wet pack, a blanket may be spread upon a hard couch or bed covered with oil cloth; upon this a sheet wrung out in cold water is laid. The naked patient is stretched upon this sheet, which along with the blanket is wrapped about him snugly. The brief sensation of chilliness is soon replaced by one of warmth, and after a few moments the body breaks out into copious perspiration. This may be encouraged by hot drinks, and hot bottles to the surface. The patient should not remain too long in the pack, otherwise hyperpyrexia may rather be increased than diminished. In the intervals between the baths, in extreme cases in adults, an ice cap may be worn, and cloths wrung out in iced water may be applied to the epigastrium. The application of ice to the head in the case of infants and young children is, however, a dangerous practice owing to its depressing influence, and should rarely, if ever, be resorted to. Nothing can exceed the efficacy of the above-described method of treating scarlet fever with high temperature; but to secure its full influence, it must be pursued systematically and intelligently. The thermometer must constantly direct the actions of the physician. The prejudices of friends and attendants against the immersion of the

fevered body in ice-cold water will not extend to the use of tepid and cool baths, from which, indeed, equally good results may be obtained. The baths may have to be repeated at intervals of two or three hours for days before the fever begins to yield; or they may unhappily altogether fail to control the irresistible intensity of the disease. On the other hand, they frequently exert a most gratifying influence upon the course of the malady, the temperature becoming permanently reduced, the pulse quieter, fuller, and regular; jactitation, delirium, and coma being replaced by composure, consciousness, or natural sleep. Often an attack that appeared about to pursue a malignant course, under the influence of the bath becomes benign and terminates favorably. While exalted temperature that threatens to destroy life can, in the manner indicated, often be reduced, the course of the disease itself cannot be aborted. No remedy is known that can be said to exert a specific influence over it. Vaunted specifics have not withstood the test of experience.

**Medicinal Treatment.**—Probably the most popular routine treatment of ordinary scarlet fever is that of carbonate of ammonia. When in cases of very elevated temperature the heart action flags, the pulse becoming rapid, feeble, and unequal, when delirium or stupor appears, the preparations of ammonia are demanded. The carbonate, in doses of one to three grains to a child five years of age, may be given every third hour in aqueous solution with milk, which in a great measure destroys the pungent, disagreeable taste; or it may be given in solution of the acetate of ammonia, a most commendable combination. The aromatic spirits of ammonia may be employed for the same purpose. Hoffman's anodyne, whiskey, or brandy is especially indicated when the nervous system shows alarming signs of perturbation, delirium, jactitation, stupor, etc. When strong cardiac stimulants are demanded, the fluid extract of digitalis in one-minim doses, for a child of five years, or strychnine in doses of gr.  $\frac{1}{100}$  to gr.  $\frac{1}{50}$ , should be given. Caffeine and camphor are also of use as adjuvants to the cardiac stimulants already mentioned. Purgation, which should usually be avoided, may at times become necessary. Small doses of calomel (gr.  $\frac{1}{4}$  to gr.  $\frac{1}{2}$ ) repeated every hour until the bowels are moved, generally act well. Castor oil is a harmless and safe, but nauseous agent. Rhubarb and scammony are also efficient cathartics; either may be given in doses of five grains to a child six years of age. When depression is profound, reliance should be placed on enemata in preference to active cathartics.

During the progress of the disease the expectant plan of treatment is most to be recommended. The daily bath or sponging should be continued. It is probable that renal complications are thus frequently avoided. The patient should be jealously guarded from draughts and dampness, and even the mildest cases should be kept in bed for at least ten days after the cessation of fever; nor should the patient be allowed to leave his room before the expiration of the third week. Out-of-door exercise cannot be resumed in disregard of season, or of barometric and thermometric variations. In midsummer, when windows and doors must remain open, the question of out-of-door exercise is rather one of danger to others than of personal risk; while in spring, autumn, and winter the risks of exposure are especially great. During these seasons the patient should not venture into the open air before the sixth or seventh week of perfectly normal scarlatina. During convalescence the daily baths should be continued until desquamation is completed, and daily inunctions with mild antiseptic ointments, such as carbolated vaseline or boracic ointment, will both expedite this process and minimize the dangers of contagion. No further medication besides an appropriate tonic will be required.

**Nasopharynx.**—If the angina does not exceed a simple hyperemia, mild alkaline antiseptic sprays applied frequently to the nose and throat by means of an atomizer are all that are required. If the patient is young and



resists vigorously this treatment, it should not be persisted in. If the nasal discharge is profuse and purulent, gentle syringing with such solutions as Dobell's, Seiler's, and alcohol is indicated. Should the throat develop the whitish curdy deposits of follicular inflammation and the erosions that so often accompany acute catarrhal pharyngitis, an antiseptic gargle will act beneficially and will correct foetor of breath, and to some extent disinfect the secretions and exhalations. For this purpose one of the subjoined prescriptions may be employed:

R̄ Acid. carbolic, cryst. . . . . ʒ ss.  
Glycerin . . . . . f. ʒ i.  
Aq. destil. . . . . q. s. ad f. ʒ vi.  
M. Sig.: Use as a gargle or spray.

Or

R̄ Tinct. ferri chlorid. . . . . f. ʒ i.  
Potass. chlorat. . . . . ʒ ss.  
Glycerin . . . . . f. ʒ i.  
Aq. destil. . . . . q. s. ad f. ʒ viij.  
M. Sig.: Use as a gargle or spray.

When the inflammation is more severe, and accompanied by more or less superficial ulceration, applications should be made with a probang or camel's-hair pencil. When the surface is foul and covered with offensive exudation, an excellent application is the following, first recommended by J. Lewis Smith:

R̄ Acid. carbolic . . . . . gr. iij.-vi.  
Liquor ferri subsulphat. . . . . f. ʒ ij.  
Glycerin . . . . . f. ʒ vi.  
M. Sig.: Apply with a brush three or four times a day.

Or the following:

R̄ Tinct. iodinii . . . . . f. ʒ i.  
Glycerin . . . . . f. ʒ vij.

Diphtheritic inflammation, if associated with the presence of the Klebs-Loeffler bacillus, calls for the treatment with the antitoxin of diphtheria, in addition to the local treatment of the nose and throat by sprays and gargles. Cauterization with silver nitrate, acid nitrate of mercury, chromic acid, or other agents should not be practised.

Tracheotomy should never be performed. A case of scarlatinal diphtheria which presents the symptoms which demand this operation, in the idiopathic disorder, is beyond the resources of surgical art.

**Lymph Nodes.**—Inflammation of the lymph nodes of the neck and of the adjacent connective tissue may be treated first by inunction of oil or cerate. In severer forms an ice bag, and when suppuration threatens, creolin or flaxseed poultices should be applied. Points at which suppuration appears should be incised early and freely to prevent burrowing. Gangrenous inflammation may sometimes be arrested by strong caustics. Iron, quinine, stimulants, and nourishing and supporting food should be administered in these conditions with a free hand, but always with care not to derange the digestion of the patient.

**Ear.**—Scarlatinal aural inflammation calls for special treatment, and whenever possible it should be referred to the aurist. The nasal douche should be used and the diphtheritic pharyngeal and nasal cavities should be repeatedly syringed with antiseptic solutions, for it is by the extension of the inflammation along the Eustachian tube that the severer forms originate. When the aural inflammation is established, inunctions of mercurial ointment, or of the oleate of mercury, or of iodoform ointment, should be made about the ear several times daily. When the tympanic membrane becomes strongly injected and bulges outward, paracentesis for the release of the pent-up exudation should be performed. Timely tapping of this membrane will often preserve the imperilled sense of hearing. This operation is especially commended by Buck and Olshausen. It is simple and very easily performed. The sensitiveness of the membrane may be

obtunded to a slight degree by the instillation of a four-per-cent. solution of muriate of cocaine. Pomeroy's directions for performing the operation are as follows: "A good-sized speculum is introduced into the meatus. Then an ordinary broad needle, about one line in diameter, with a shank of about two inches, such as oculists use for puncturing the cornea, should be held between the thumb and fingers, lightly pressed so as not to dull delicate tactile sensibility. The part being well under light, the most bulging portion of the membrane should be lightly and quickly punctured with a very slight amount of force. The posterior and superior portion of the membrane is most likely to bulge. The chorda tympani nerve usually lies too high up to be wounded. The ossicles are avoided by selecting a posterior portion of the membrane. After puncture the ear should be inflated by an ear-bag whose nozzle is inserted into a nostril, both nostrils being closed, so as to force the fluid from the tympanum. The puncture may need to be repeated at intervals of a day or two, provided that the pain and bulging return." "When pain and tenderness only are present, hot fomentations to the external ear, and to the parotid and mastoid regions, are very soothing. Laudanum and sweet oil, or a two-to four-per-cent. solution of sulphate of atropine instilled warm into the external meatus, often give relief. Frequently renewed solutions of cocaine are very efficacious. Bags of hot table salt, or of heated flowers of hops, are well-known domestic remedies. When perforation occurs spontaneously the hearing may be preserved, but partial deafness is often permanently established, and sometimes the sense of hearing is totally abolished. In such cases the ear should be frequently syringed with warm water, or with warm solutions of boracic acid followed by insufflations of boracic-acid powder. Granulations and polypi developing in the course of chronic otitis may be benefited and even cured by astringent powders and washes. Surgical interference will at times be necessary.

**Nephritis.**—When nephritis arises in the course of scarlet fever, or as a sequel, prompt measures for its relief must be adopted. Where it forms a feature of rapidly fatal malignant scarlatina, it may have no time to develop symptoms, or these may escape detection, or the virulence of the disease may throw the renal disorder into the background, or render attempts to treat it futile. In milder cases, and later, during the latter part of the first or during the second or third week, especial attention may be devoted to the treatment of nephritis. Slight albuminuria will occur, according to Mahomed, during convalescence, associated with constipation and a hard pulse, indicative of high arterial tension, without subjective symptoms, and remediable by a brisk purge. This author also asserts that a slight chilling of the surface is sufficient to cause transitory albuminuria. The patient should therefore be carefully protected, in the manner already indicated. Dietary management will go far toward preventing renal complications. A rigid milk diet, in all cases of scarlatina, is regarded by Jaccoud as absolutely preventive of nephritis. Though this may be an extravagant statement, it is certain that in scarlatina there is no better diet than one of milk. Should nephritis arise, it is the more important that the milk diet should be continued. From two to three or four pints may be given during the twenty-four hours, in small quantities, at brief intervals, the latter amount being sufficient for an adult without other food. If there are reasons why milk cannot be taken, light broths and soups and chicken jelly may be substituted, together with light farinaceous food. Buttermilk may at times be preferred, and bonny-clabber and slip or junket (milk sweetened and flavored and coagulated with liquid rennet) are often relished, and are excellent articles of food. Proper regard having been paid to the hygienic surroundings and nutrition of the patient, a brisk hydragogue cathartic should be administered, unless diarrhoea be already present. For this purpose there is nothing better than the compound jalap powder. For a child, from five to twenty grains of this should be ordered every night, as

required, the object being to secure several watery actions of the bowels every twenty-four hours. The proper dose for an adult is one drachm. The desired watery stools may also be readily secured by the saline cathartics if given in concentrated watery solution. The more drastic purgatives will rarely be required, except in uræmic intoxication and in extreme dropsy, when podophyllin, croton oil, elaterin, etc., may occasionally be employed with benefit. When dropsy is but slightly pronounced, purgation may not be required.

The action of the skin should next demand attention. Frequently during the day the body may be wrapped in flannels, wet or dry, as hot as can be borne; or the wet pack may be applied. When available, the steam bath or hot-air bath is to be strongly recommended. The hot plunge bath may also be employed most advantageously. Pilz has especially lauded this treatment. It should be used after the method of Liebermeister, by gradually increasing the temperature of the bath from 36° C. to 40° C. (96° to 104° F.), in a half-hour. Under its daily use dropsy speedily disappears. Diseases of the heart and lungs, while not positively contraindicating this plan of treatment, necessitate great caution in its application. Sudden chilling of the surface after the bath should be avoided. The imminence of the danger is usually proportionate to the degree of impairment of the function of the kidneys. In giving remedies to modify their action, none calculated to increase their hyperæmia should be employed. Exception can hardly be made in favor of juniper, which enjoys with some writers considerable reputation in scarlatinal nephritis, and digitalis has received very general approval as a most useful diuretic in acute nephritis. From one fluidrachm to a half fluid-ounce of the infusion (which is much the best preparation for the production of diuresis) may be given three or four times daily, the dose varying with the age of the patient. Its effects, however, are hardly as happy as when dropsy is associated with, or dependent upon, cardiac weakness. Diuretics that act specifically upon the secreting cells of the urinary tubules, the sedative or refrigerating diuretics, are to be preferred, as a rule, in the treatment of scarlatinal nephritis, and will often achieve most astonishing results. Of these the salts of potash are most efficacious—the citrate, the acetate, the bitartrate, and the bicarbonate. For slight nephritis and anasarca a lemonade made with bitartrate of potash will be taken with avidity, and will often almost magically increase the quantity of urine, reduce the dropsy, rapidly diminish the albuminuria, and cause a radical change for the better. Diuretin in five- to ten-grain doses may be combined with this with great advantage. This lemonade may be made by adding one drachm of cream of tartar to a pint of boiling water, into which a sliced lemon has been dropped. This quantity, properly sweetened, may be drunk during the day by a child five years of age. Water may be allowed freely, or any of the mild domestic infusions may be substituted for it, their virtue residing principally in the amount of fluid. The free use of water is especially to be recommended as unirritating, and tending to wash out of the tubules the exudate choking up their lumina. In more severe cases, where life is threatened through one or another form of uræmia, very energetic treatment will be required. Jaborandi may now prove useful. J. Lewis Smith, Hirschfeld, and others have commended its action highly. For a child two years of age, one-twentieth of a grain of pilocarpine may be given by the mouth every fourth or sixth hour, or the same amount may be injected hypodermically, and prove much more efficient. Both diuresis and diaphoresis will be promptly increased, and in favorable cases the uræmic symptoms will disappear. Hot saline injections, given by rectum and repeated several times a day are frequently of value in threatened uræmia. Uræmic coma and convulsions, developing suddenly or after progressive renal embarrassment, should be treated without reference to the scarlatina and upon general principles. A remedy of most undoubted value, at least for the control of convulsions, is chloral, which, if the patient be unable to swallow,

may be injected in full doses under the skin or into the rectum.

After the more acute nephritis has subsided and convalescence promises to become established, iron becomes one of our main reliances, in virtue of its combined hæmatic and diuretic properties. The Mistura ferri et ammoniæ acetatis will generally be found to be the best of the old preparations. Recently many new and excellent preparations of iron in organic combination have been put upon the market. Quinine is also a remedy of great value in the treatment of convalescence from scarlatinal nephritis. During the height of the inflammation, local treatment is often of great importance. If fever is intense, the pulse full and strong, and if pain and tenderness in the back are pronounced, the abstraction of blood, by leeches or cups, from the loins will often prove beneficial. Large sinapisms and poultices may be applied over the kidneys. Besides assuaging the irritation they tend to promote diuresis and diaphoresis. For obvious reasons, turpentine should not be employed as a counter-irritant in these cases. Ascites may occasionally be so excessive that the pressure exerted upon the kidneys interferes with the action of therapeutic agents, and impedes the functional activity of these organs. Paracentesis abdominis, by relieving this compression, will often be followed by copious diuresis and the rapid disappearance of general anasarca. Cases of scarlatinal nephritis which pass into chronic Bright's disease, as rarely happens, will require the treatment appropriate for this condition. During convalescence the usual precautions will be necessary. The treatment of other complications and sequelæ of scarlet fever is not peculiar, and will require no special notice here.

**Serotherapy.**—In 1896 Josias, of the Trousseau Hospital, gave an account of the treatment of a case of scarlatina with Marmorek's antistreptococcus serum. The results apparently were inconclusive, and subsequent trials by other investigators have proved equally so. Quite recently the efforts to secure a specific antitoxic serum for scarlatina have received a new impetus, and have given rise to much discussion.

Baginsky, of Berlin, claims to be the first to call attention to the association of a streptococcus with scarlet fever, and he has announced that Dr. Aronson has demonstrated an anti-scarlet-fever serum, which, as he believes, will prove specific in this disease. Priority is disputed by Moser,<sup>83</sup> who asserts that, with Pirquet, he previously had shown this association, which was also independently found by Salge as a result of agglutinating reactions, the peculiarity of which was first demonstrated by van de Velde and Paltauf. The first antistreptococcus serum, he says, was produced by Marmorek, and Aronson's was perfected on similar lines, while his own is based on different principles. Aronson's test comprises a macroscopic, and not the microscopic agglutination reaction on the peculiarity of which Moser bases his claims of priority. Out of ninety-nine cases of fatal scarlatina, Moser has been able to cultivate<sup>84, 85</sup> streptococci from the blood in the heart in sixty-three cases. These results accord with those of previous investigations, and make it probable that streptococci play an important part in the disease. On the other hand, the use of ordinary antistreptococcus serum has not proved of use in treating the disease. Moser points out that this may be due to the fact that there are different varieties of streptococci. The organism isolated from scarlatina differs from other varieties found in other diseases, in being almost innocuous for rabbits, and in possessing different agglutinating properties. Moser therefore prepared a special immune serum from streptococci obtained from scarlet-fever cases. As there is no proof yet that the organism is the same in all cases, he produced a polyvalent serum by injecting horses with increasing doses of the mixture of living cultures obtained from different cases of scarlet fever. The organisms were grown on bouillon, and were not passed through animals. After months of such treatment the serum was drawn off and preserved in a sterile condition, without any addition of



a preservative. The serum was tried ineffectively in forty-four cases. At first the dose was too low. Later, better results were obtained, doses of 180 c.c. being used. Possibly the serum was more potent in the later cases. The individual doses varied from 30 to 180 c.c.; the latter amount is now chiefly used. In seventeen cases classed as mild or moderately severe, there was no mortality. In sixty-two cases classed as severe and apparently hopeless there were sixteen deaths. The earlier the injection the more favorable is the result. The chief clinical result is the rapid improvement in the general condition. With early injection the rash may not fully develop, or may fade much sooner than usual. The disturbances of the central nervous system disappear in a short time, while the temperature and pulse often show a critical fall. The symptoms of heart weakness are favorably influenced. The throat clears up more quickly, and although superficial necrosis is not prevented, Moser has not observed deep destruction. As yet, nothing can be said about the effect of serum on the renal and middle-ear complications. The whole course of the disease is shortened, and convalescence occurs much sooner. Injections of normal horse serum had no effect on the course of the disease. Serum rashes were often noted, but joint pains and abscess formation were rarer. A much larger number of observations must be made before a definite opinion can be held in regard to the efficacy of this form of serumtherapy in scarlatina. The results already attained certainly warrant further investigation along the same or similar lines.

Roger<sup>87</sup> attempted, in a single case, to treat scarlet fever by injecting into a vein 80 c.c. of serum taken from the blood of a patient recently convalescent from scarlet fever. The case was apparently comatose at the time of the experiment, and recovery took place, but no conclusion can be drawn from this single instance. Obviously it is not a method practicable for general use, and is only of scientific interest.

**Preventive Inoculation.**—Stickler<sup>86</sup> in 1897 attempted to produce a mild type of scarlet fever by inoculating children with subcutaneous injections of mucus obtained from the throats of recent cases of scarlet fever. The results of the experiment showed that the symptoms produced were practically as severe as those of the typical cases of scarlet fever, and that preventive inoculation on the principles of vaccination for the smallpox was impracticable. Incidentally his experiments showed that the secretions of the mouth and pharynx of scarlet fever are highly virulent, as all the symptoms of scarlet fever appeared, with hardly any incubation period, within from two to twenty-four hours. *I. E. Atkinson.*

Revised by *Maynard Ladd.*

<sup>1</sup> Historisch-Geograph. Pathol., vol. i., New Sydenham Soc. Translation, p. 172. <sup>2</sup> Amer. Journ. of the Med. Sciences, October, 1855. <sup>3</sup> Jahrbuch f. Kinderheilk., 1870. <sup>4</sup> Hebra: Diseases of the Skin. New Syden. Soc. Translation, vol. i., p. 218. <sup>5</sup> Lancet, 1883, i., 194. <sup>6</sup> Ibid., 1885, i., 354. <sup>7</sup> Ibid., 1883, i., 685. <sup>8</sup> Rehm: Jahrb. f. Kinderheilk., 1869, 4. <sup>9</sup> Vol. xi., 1878. <sup>10</sup> Ziemssen's Cyclop., vol. ii., p. 169. <sup>11</sup> Jahrbuch für Kinderheilk., 1875, viii. <sup>12</sup> Lancet, 1870. <sup>13</sup> Jahrbuch für Kinderheilk., i., 1870. <sup>14</sup> Loc. cit. <sup>15</sup> Vierteljahr. f. Dermatol. u. Syph., viii., 322. <sup>16</sup> Albuminuria, p. 330. <sup>17</sup> Jahrbuch für Kinderheilk., 1870, 411. <sup>18</sup> Gazette des Hôpitaux, 1885, lviii., 418. <sup>19</sup> Ibid., 50, 1873. <sup>20</sup> Berliner klin. Wochenschr., 27, 1882. <sup>21</sup> Correspondenzbl. f. Schweizer Aerzte, No. 8, 1875. <sup>22</sup> Berliner klin. Wochenschr., 8, 1882. <sup>23</sup> Burkhardt-Merian: Volkmann's klin. Vorträge, 128, 1884. <sup>24</sup> Boston Med. and Surg. Journal, x., 228. <sup>25</sup> Gundrun: Med. News, 1882, xli., p. 231. <sup>26</sup> Baader: Loc. cit.—Hynes: Lancet, ii., 1870. <sup>27</sup> Deutsche med. Woch., x., 37-40. <sup>28</sup> Berliner klin. Wochenschr., 1868, No. 2. <sup>29</sup> Ibid., 1868, No. 9. <sup>30</sup> Jahrbuch für Kinderheilk., 1872, v., 324. <sup>31</sup> The Practitioner, 1875, xvi., p. 21. <sup>32</sup> Lancet, 1885, ii., p. 795. <sup>33</sup> Charité Annalen, 1876, lii., p. 538. <sup>34</sup> British Medical Journal, No. 498, 1870. <sup>35</sup> Robuske: Deutsche med. Woch., October 8th, 1881.—Mitchell: Edinburgh Med. Journ., February, 1882. <sup>36</sup> Deutsche med. Woch., 31, 1883. <sup>37</sup> Jahrbuch für Kinderheilk., N. F., 1, p. 434. <sup>38</sup> Ibid., viii., H. 2, p. 15. <sup>39</sup> Ibid., N. F., 4, 1870. <sup>40</sup> Ibid., iv., 166. <sup>41</sup> L'Union médicale, April 30th, 1882. <sup>42</sup> Wiener med. Wochenschr., 39, 1877. <sup>43</sup> Ibid., 43, 1877. <sup>44</sup> Deutsche med. Wochenschr., 31, 1883. <sup>45</sup> Berliner klin. Wochenschr., 43, 1883.

all that pertains to the physical welfare of the child in the course of instruction, both subjectively and objectively, including his own physical condition, and the effects of his environment. That the subject is attracting increased attention is evident from the enactment of laws relating to the ventilation and sanitary condition of school-buildings, the restriction of contagious diseases among school-children, and the medical inspection of schools. About one-fifth of the entire population is under instruction in the schools, either public or private, at a period of life when good health and its preservation are matters of the highest importance.

**SCHOOL-BUILDINGS. SELECTION OF SITE.**—The site should be chosen with reference to the convenience of a majority of the population for whom the building is intended, having in view a reasonable probability of future increase. It should be well back from the street, and not on a main street or thoroughfare. The neighborhood of noxious and offensive, as well as noisy trades, should be avoided. Nor should it be near the line of a steam railway. Proximity to liquor saloons should be avoided. Fortunately in some States, a definite distance is prescribed for such nuisances, so far as proximity to school-houses is concerned.

The location should not be overshadowed by a hill of greater height than the school-building, especially upon its western side. The size of the site, including the playgrounds, should be largely determined by the number of pupils to be accommodated, a space of thirty square feet being desirable for each pupil.

The site should be capable of thorough drainage, and should be graded to a higher level than that of the contiguous streets. The soil of the immediate neighborhood should also be dry, and there should also be opportunity to obtain a supply of pure drinking-water.

**School-Building.**—In the planning of school-houses, the school-room should be the unit first considered. According to Shaw, "the school-building should be a number of

ing, and the needs of the eye and ear of the pupil. A minimum of 15 square feet of floor space and 200 cubic feet of air space for each pupil should be insisted upon. For a room intended for forty-eight pupils these conditions may be secured with a height of 13 feet, length 30 feet, and width 25 feet. A greater length than 30 to 32 feet is not admissible since the scholars in the rear row of seats would be subjected to unnecessary eye-strain when looking at blackboards or other objects at the opposite end of the room.

**Lighting.**—The amount of glazed surface admitting light to a school-room should be from one-sixth to one-fourth as much as the floor space of the room, in order to provide sufficient light for all parts of the room in cloudy weather. This limit, however, may not be sufficient in case of obstruction by trees, houses, or adjacent hills. In crowded cities, and other places where well-lighted locations are not available, the use of ribbed glass, and Luxfer prisms is recommended for the purpose of increasing the illumination. In the Building Rules of the Board of Education (England) are the following excellent suggestions:

"The light should, as far as possible, and especially in class-rooms, be admitted from the left side of the scholars. All other windows in class-rooms should be regarded as supplementary, or for summer ventilation. Where left light is impossible, right light is next best. Windows facing the eyes of teachers or scholars are not approved. In rooms fourteen feet high any space beyond twenty-four feet from the window wall is insufficiently lighted. Windows should never be provided for the sake merely of external effect. All kinds of glazing which diminish the light and are troublesome to keep clean and in repair should be avoided."

Rooms having a northern exposure should, other things being equal, have a more liberal provision for light than those with a southern exposure. According to Shaw: "If a school-room is insufficiently lighted and more light cannot be admitted from the left or near, the windows placed on the right should have their sills eight feet above the floor, and the amount of light admitted by such windows should in no instance be strong enough to overpower the light admitted from the left."

**Spaces between Windows.**—The windows should be placed with as little space as possible between them, to avoid the production of alternate bands of light and shade which are injurious to the eye.

**Height of Windows.**—The windows should extend as near to the ceiling as possible, since the higher they extend the better the illumination. Windows arched at the top decrease the illumination.

**Height of Window Sills.**—The English rules advise a height of at least four feet above the floor. Some authorities advise a height of five feet, but this would interfere too much with the amount of glazed surface. Large single panes of glass for upper and lower sash allow the least obstruction of light, and readily admit of cleaning.

**Color of Walls.**—No color should be used which absorbs light. Reds are to be avoided. Yellow is not restful to the eye. A pale greenish-gray, nearly white, appears to be the best suited for school-rooms.

**Window Shades.**—Window shades are useful in bright sunny days, and especially when the ground is covered with snow, to modify the effect of light. They should roll up from the bottom and should be somewhat darker than the walls. The direct rays of sunlight should not be allowed to fall upon any occupied desk.

**Arrangement of Seats.**—The best arrangement is that which allows the pupils to face one of the shorter sides of the school-room, the windows being at the left of the scholars as they sit in their seats. It is also best to have the aisle at the side opposite the windows considerably wider than that upon the side next the windows. This allows some freedom of movement about the blackboards, as well as space for other school exercises (Fig. 4158).

If the seats are arranged so that the scholars face the

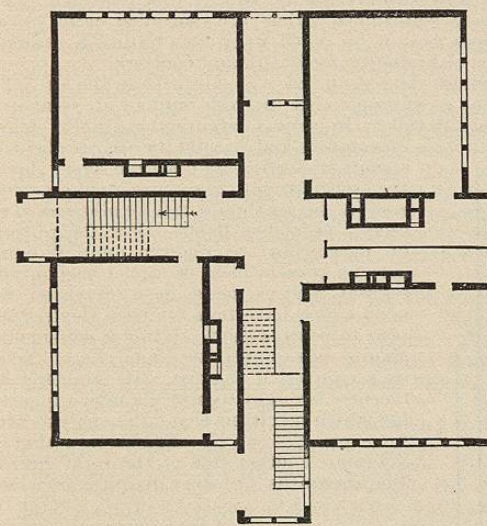


FIG. 4157.—A Good Single Floor Plan. Rooms well arranged for seating and lighting. (Shaw's "School Hygiene," The Macmillan Company.)

school-rooms properly disposed, and not a whole cut up into school-rooms, whose size and arrangement are dependent upon the size and shape of the building."

The general shape of the school-room should be oblong, with the aisles running lengthwise of the room. This allows proper lighting of the desks (Fig. 4158).

The question of the size of the school-room has received much attention, and has been made the subject of experiment until definite standards may now be recommended, depending upon the ventilation, heating, light-

<sup>46</sup> A Treatise on the Diseases of Infancy and Childhood, Philadelphia, H. C. Lea. <sup>47</sup> Medical Record, ii., 1859. <sup>48</sup> Journ. of Cutan. and Venereal Diseases, vol. i., 1883. <sup>49</sup> Clinical Lectures and Essays. <sup>50</sup> Guy's Hospital Reports, 1879. <sup>51</sup> Ibid. <sup>52</sup> Konetschke: Wien. med. Presse, 1882, xxviii., 1483; Ffollott: Brit. Med. Journ., i., 1879. <sup>53</sup> British Med. Journ., 1879, ii., p. 75. <sup>54</sup> Amer. Journ. of the Med. Sci., lxxxvii., 1884. <sup>55</sup> Page: Lancet, 1885, i., 887. <sup>56</sup> Archiv f. Gynäkologie, ix., Bd. 2, 1876. <sup>57</sup> Dublin Journal Medical Sciences, February, 1866. <sup>58</sup> Obstetrical Transactions, 1871, vol. xii., p. 98. <sup>59</sup> Berliner klin. Wochenschr., 47, 1872. See also Smith: Med. Times and Gaz., 1870, ii., 1053.—Schwarz: Wien. med. Wochenschr., 1883, ii., p. 102.—Farrar: Lancet, 1875, i., p. 109. <sup>60</sup> Trojanowsky: Dorpat. med. Zeitschr., i., 1871. <sup>61</sup> Dorpat. Med. Zeitschr., iii., 1873. <sup>62</sup> Correspondenzbl. f. Schweizer Aerzte, No. 5, 1876. <sup>63</sup> L'Union médicale, 8, 1883. <sup>64</sup> Progrès médical, 1880, 47. <sup>65</sup> Wiener med. Jahrb., 2 H., 1882. <sup>66</sup> Transact. Patholog. Soc., London, 1877, xxviii., p. 435. <sup>67</sup> Handbuch der path. Anat. <sup>68</sup> Brocq: Journ. Cutan. and Venereal Diseases, August, 1885. <sup>69</sup> Journ. Cutan. and Venereal Diseases, April, 1883. <sup>70</sup> Dublin Journ. Med. Sci., March, 1885. <sup>71</sup> J. Lewis Smith: Pepper's System, vol. i., p. 534. <sup>72</sup> Ann. de Médecine d'Anvers, London Med. Rec., 1882, 52. <sup>73</sup> Volkmann's Sammlung klin. Vorträge, No. 128, 1880. <sup>74</sup> J. Lewis Smith: Pepper's System of Medicine, vol. i., p. 548. <sup>75</sup> British Medical Journal, 1886, ii., p. 813. <sup>76</sup> Class. Jour. Amer. Med. Assn., February 24th, 1900. <sup>77</sup> Hotch: Pediatrics, 1901. <sup>78</sup> Holt: Diseases of Infancy and Childhood, 1902. <sup>79</sup> Nothnagel's Encyclopaedia of Practical Medicine, American edition, 1902. <sup>80</sup> Pearce: Boston City Hospital Reports, 1899. <sup>81</sup> Kober: American Journal Medical Sciences, 1901. <sup>82</sup> Baginsky: Berliner klin. Woch., 27, 29, 1900. <sup>83</sup> Moser: Berliner klin. Woch., 48, 49, 1902. <sup>84</sup> Moser: Wien. klin. Woch., 41, 1902. <sup>85</sup> Moser: Jahrbuch für Kinderheilk., 1903, 57, der dritten Folge, 7 Band, 1 Heft. <sup>86</sup> Stickler: Trans. Med. Soc., New Jersey, 1897. <sup>87</sup> Roger: Presse méd., 1896, iv., 425.

**SCHOENLEIN'S DISEASE.**—See *Morbus Maculosus Werthofii.*

**SCHOOLEY'S MOUNTAIN SPRINGS.**—Morris County, New Jersey.

**Post-Office.**—Schooley's Mountain. Hotel. **Access.**—From New York via the Delaware, Lackawanna and Western Railroad, to Hackettstown, thence three miles by stage to springs; or via the Central Railroad of New Jersey to German Valley, thence two and one-half miles by stage; from Philadelphia via the Philadelphia and Reading Railroad to German Valley, etc.

Schooley's Mountain is a broad plateau in the northern part of New Jersey, 1,200 feet above tide water, overlooking the Musconetcong Valley on the north and German Valley on the south. The scenery in the vicinity is varied and picturesque, and the neighborhood abounds in beautiful walks, drives, landscapes, etc. Among the near-by points of interest are Lake Hopatcong, Budd's Lake, and the romantic Delaware Water Gap. The chalybeate spring, situated half a mile from the hotel (the Heath House), has enjoyed for many years a reputation as a ferruginous tonic. The analyses which have thus far been furnished are not entirely satisfactory. It is an established fact, however, that the iron is present in relatively small quantity. The waters are recommended in cases of general debility, and of torpor of the liver, and in renal and bladder disorders. At the Heath House is another spring, which has been analyzed by Prof. George H. Cook, State geologist. It appears from this analysis that the water is rich in mineral ingredients. Nevertheless, so far as we can learn, it is not used for medicinal purposes. The Heath House and cottages consist of several detached buildings, none of them over three stories in height, with accommodations for three hundred and fifty guests. They are situated in the midst of a beautiful lawn of twenty-five acres. It is stated that the temperature here averages ten degrees lower during the day, and from fifteen to twenty degrees lower during the night, than at New York or at Philadelphia. *James K. Crook.*

**SCHOOL HYGIENE.**—The physical conditions attending the education of the child at school are quite as important as his mental training. School hygiene embraces