a preservative. The serum was tried ineighty-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[87] 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[86] 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.*

[1] Historisch-Geograph. Pathol., vol. i., New Sydenham Soc. Translation, p. 172. [2] Amer. Journ. of the Med. Sciences, October, 1855. [3] Jahrbuch f. Kinderheilk., 1870. [4] Hebra: Diseases of the Skin. New Syden. Soc. Translation, vol. i., p. 218. [5] Lancet, 1883, i., 194. [6] *Ibid.*, 1885, i., 354. [7] *Ibid.*, 1883, i., 685. [8] Rehm: Jahrb. f. Kinderheilk., 1869, 4. [9] Vol. xi., 1878. [10] Ziemssen's Cyclop., vol. ii., p. 169. [11] Jahrbuch für Kinderheilk., 1875, viii. [12] Lancet, 1870. [13] Jahrbuch für Kinderheilk., i., 1870. [14] *Loc. cit.* [15] Vierteljahr. f. Dermatol. u. Syph., viii., 522. [16] Albuminuria, p. 320. [17] Jahrbuch für Kinderheilk., 1870, 411. [18] Gazette des Hôpitaux, 1885, lviii., 418. [19] Berliner klin. Wochenschr., 27, 1882. [20] *Ibid.*, 50, 1873. [21] Correspondenzbl. f. Schweizer Aerzte, No. 5, 1876. [22] Berliner klin. Wochenschr., 8, 1882. [23] Burkhardt-Merian: Volkmann's klin. Vorträge, 128, 1884. [24] Boston Med. and Surg. Journal, x., 228. [25] Gundrun: Med. News, 1882, xli., p. 231. [26] Baader: *Loc. cit.*—Hynes: Lancet, ii., 1870. [27] Deutsche med. Woch., x., 37-40. [28] Berliner klin. Wochenschr., 1868, No. 2. [29] *Ibid.*, 1868, No. 9. [30] Jahrbuch für Kinderheilk., 1872, v., 324. [31] The Practitioner, 1875, xvi., p. 21. [32] Lancet, 1885, ii., p. 795. [33] Charité Annalen, 1876, iii., p. 538. [34] British Medical Journal, No. 498, 1870. [35] Robuske: Deutsche med. Woch., October 8th, 1881.—Mitchell: Edinburgh Med. Journ., February, 1882. [36] Deutsche med. Woch., 31, 1885. [37] Jahrbuch für Kinderheilk., N. F., 1, p. 434. [38] *Ibid.*, viii., H. 2, p. 15. [39] *Ibid.*, N. F., 4, 1870. [40] *Ibid.*, iv., 166. [41] L'Union médicale, April 30th, 1882. [42] Wiener med. Wochenschr., 39, 1877. [43] *Ibid.*, 43, 1877. [44] Deutsche med. Wochenschr., 31, 1883. [45] Berliner klin. Wochenschr., 43, 1883. [46] A Treatise on the Diseases of Infancy and Childhood, Philadelphia, H. C. Lea. [47] Medical Record, ii., 1869. [48] Journ. of Cutan. and Venereal Diseases, vol. i., 1883. [49] Clinical Lectures and Essays. [50] Guy's Hospital Reports, 1879. [51] *Ibid.* [52] Kometschke: Wien. med. Presse, 1882, xxiii., 1483; Ffolliott: Brit. Med. Journ., i., 1879. [53] British Med. Journ., 1879, ii., p. 75. [54] Amer. Journ. of the Med. Sci., lxxxvii., 1884. [55] Page: Lancet, 1885, i., 887. [56] Archiv f. Gynäkologie, ix., Bd. 2, 1876. [57] Dublin Journal Medical Sciences, February, 1866. [58] Obstetrical Transactions, 1871, vol. xii., p. 58. [59] Berliner klin. Wochenschr., 47, 1872. See also Smith: Med. Times and Gaz., 1870, ii., 1053.—Schwarz: Wien. med. Wochenschr., 42, 1871.—Broadbent: Brit. Med. Journ., April 1st, 1876.—Barrs: Lancet, 1883, ii., p. 102.—Farrar: Lancet, 1875, i., p. 109. [60] Trojanowsky: Dorpat. med. Zeitschr., i., 1871. [61] Dorpat. Med. Zeitschr., iii., 1873. [62] Correspondenzbl. f. Schweizer Aerzte, No. 5, 1876. [63] L'Union médicale, 8, 1883. [64] Progrès médical, 1880, 47. [65] Wiener med. Jahrb., 2 H., 1882. [66] Transact. Patholog. Soc., London, 1877, xxviii., p. 435. [67] Handbuch der path. Anat. [68] Brocq: Journ. Cutan. and Venereal Diseases, August, 1885. [69] Journ. Cutan. and Venereal Diseases, April, 1883. [70] Dublin Journ. Med. Sci., March, 1885. [71] J. Lewis Smith: Pepper's System, vol. i., p. 534. [72] Ann. de Médecine d'Anvers, London Med. Rec., 1882, 52. [73] Volkmann's Sammlung klin. Vorträge, No. 128, 1880. [74] J. Lewis Smith: Pepper's System of Medicine, vol. i., p. 548. [75] British Medical Journal, 1886, ii., p. 813. [76] Class: Jour. Amer. Med. Assn., February 24th, 1900. [77] Rotch: Pediatrics, 1901. [78] Holt: Diseases of Infancy and Childhood, 1902. [79] Nothnagel's Encyclopedia of Practical Medicine, American edition, 1902. [80] Pearce: Boston City Hospital Reports, 1899. [81] Kober: American Journal Medical Sciences, 1901. [82] Baginsky: Berliner klin. Woch., 27, 29, 1900. [83] Moser: Berliner klin. Woch., 48, 49, 1902. [84] Moser: Wien. klin. Woch., 41, 1902. [85] Moser: Jahrbuch für Kinderheilk., 1903, 57, der dritten Folge, 7 Band, 1 Heft. [86] Stickler: Trans. Med. Soc., New Jersey, 1897. [87] Roger: Presse méd., 1896, iv., 425.

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

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

Post-Office.—Schooley's Mountain. Hotel.

Access.—From New York viâ the Delaware, Lackawanna and Western Railroad, to Hackettstown, thence three miles by stage to springs; or viâ the Central Railroad of New Jersey to German Valley, thence two and one-half miles by stage; from Philadelphia viâ 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





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 schoolhouses 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

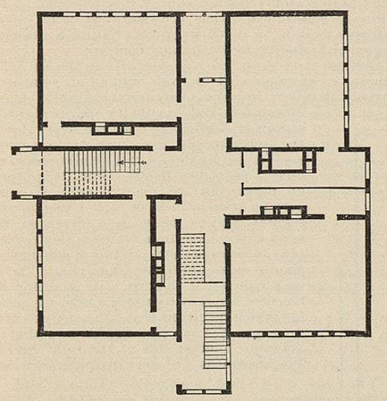

Fig. 4157.—A Good Single Floor Plan. Rooms well arranged for seating and lighting. (Shaw's "School Hygiene," The Macmillan Company.)

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, lighting, 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." [1]

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: [2] "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

long side of the room, those upon the outer rows are at some disadvantage in looking at objects on the wall behind the teacher, such as maps, etc.

*Blackboards.*—The best blackboards are made of slate-stone, and should be either black or dark green. If blackboards are not used, slated paper, cloth, or walls

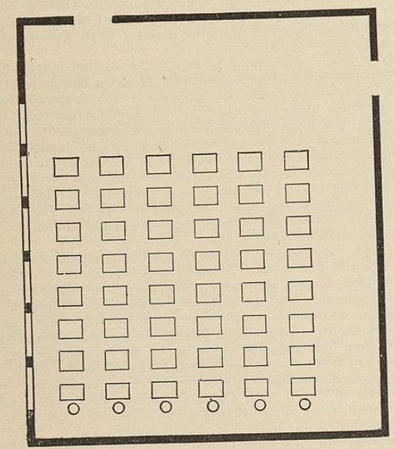

FIG. 4158.—Model Arrangement of Seats; Windows at Left of Scholars. (From Shaw's "School Hygiene," The Macmillan Company.)

may be prepared. For young scholars the bottom of the board should not be more than twenty-six inches from the floor, varying from that height to thirty-six inches for the older grades. Their width from top to bottom should be about four feet.

*Number of Stories.*—When it is practicable, the number of stories should be limited to two above the ground. This rule is especially applicable to that class of schools in which the scholars frequently pass from one story to another during the day.

*Basement.*—A basement should always be provided. Its walls and floor should be so constructed as to prevent access of dampness, and the walls should rise above the ground sufficiently to permit the entrance of sunlight.

*Hallways and Entrances* should be sufficiently ample to allow the building to be rapidly emptied in cases of emergency.

*Stairways.*—All stairways should be well lighted, and should be at least five feet wide, and should be broken by landings about half-way from top to bottom. Diagonal steps, or spiral stairways should not be permitted. Steps with six-inch risers and eleven-inch treads are easiest for school children, but six and one-half inches may be allowed for stairs in high schools.

*Floors.*—Floors should be made of well-seasoned hard wood, free from cracks. At the junction of the mop-board and the floor, a concave strip will allow better cleaning and sweeping (Fig. 4159). The floors between the occupied stories should be made as nearly sound proof as possible. Cornices, mouldings, and other projections which catch dust should be avoided.

Moist sawdust may be used in the cleaning of floors. Bad floors should be replaced, or treated by planing, and filling the cracks. Pure oil is not so good an application for floors as preparations containing a considerable proportion of wax or paraffin, since the oil darkens the floor and interferes with the light.

*Cloak-rooms.*—These should be provided, and furnished with shelves, and hooks for clothing, hats, and overshoes. They should be so arranged as to admit of free ventilation.

*Heating and Ventilation.*—The importance of the proper heating and ventilation of school buildings depends largely upon the climate or region in which the school-house is located. In the tropics where windows may be open throughout the year, an abundant and constant supply of fresh air can be had, and the question of heating is of little consequence. In temperate climates, however, the subject assumes greater importance.

The common modes of heating large school-houses are by hot air, steam and hot water. The two latter are generally preferable for large school-houses, since by them the rooms in different parts of a building can be warmed more equably than by hot air.

In rural districts a supply of fresh air may be introduced by means of jacketed stoves after the manner described in the nineteenth report of the State Board of Health of Massachusetts, p. 315.[3] The ventilation should be of such efficiency as to provide a supply of thirty feet of fresh air for each pupil per minute. The inlets and outlets should be of such size that the incoming warm air shall not have a velocity of more than four hundred feet per minute, and this inlet, for a room of standard size, should not have an area of less than four square feet. A wire screen of one-eighth inch wire, with meshes of one and one-half inches, is better than a cast-iron register. The inlet and outlet should be on the inner or warm side of the room, the inlet being placed about eight feet above the floor, and the outlet in the floor or very near it.

*Temperature.*—A temperature of 65° to 68° F. should be maintained during school hours. Dr. Lincoln recommends 66° as a proper standard. Most English authorities are in favor of lower temperatures than these.

*Humidity.*—Good ventilation requires a proper amount of moisture to supply the loss involved in heating the air to a sufficient degree to insure comfort. Various devices have been invented to supply this deficiency. The ordinary water-pots which are supplied with hot-air furnaces cannot be relied upon to produce a sufficient degree of humidity for health and comfort.

*Carbonic Acid* as an index of impurity in the air. The amount of carbonic acid in fresh outdoor air is about 3 parts in 10,000.* In order to secure the highest degree of comfort and health for the scholar who spends a portion of his time every day in the school-room, the amount of carbonic acid in the air should not be allowed to exceed 7 parts per 10,000. For the purpose of measuring the relative amount which may be present in an occupied school-room several devices have been invented, but none which have thus far been devised appear to be capable of giving as satisfactory results as a quantitative analysis of the air by a competent chemist. Dr. Haldane has recently brought to notice a new apparatus for which he claims that "the analysis after some practice can be relied on to within 0.5 volume on either side of the right result." The apparatus, however, requires very care-

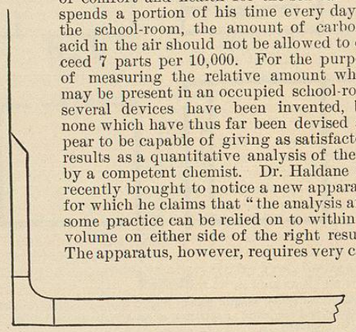

FIG. 4159.—Section of Concave Strip at Corners Between Mop Board and Floor.

ful manipulation, since "a variation of 0.1° C. in the temperature of the water in which the air burettes are immersed would, unless compensated, cause an error of fully three volumes per 10,000 in the analysis.† A simple apparatus which can be used by the teacher in any school-room for the purpose of determining, at least approximately and with facility, the relative amount of carbonic acid present in the air of the room, under the ordinary conditions of school attendance, is very much needed.

* Average of sixty-two analyses in summer and winter, in country air of Scotland. Dr. Haldane, in report of committee to inquire into the ventilation of factories and workshops, 1902, p. 93.

† *Loc. cit.*, pp. 117 and 120.





*Lavatories, Water-Closets, etc.*—The best location for these appliances, sometimes by an exclusive misapplication of terms called "sanitaries," is in a separate building outside the school-house. In consequence of the severity of the winters in northern climates, and the increased cost of heating, this is not always practicable, and these conveniences are usually placed in the basement in large buildings, especially where they are connected with the public sewer system. No system, however, should be tolerated in which the ventilation of the water-closets is in any way connected with the general ventilation of the school. They should be well lighted. If latrines or troughs are used, they should be so constructed as to admit of thorough cleansing and flushing with water. Systems providing for the drying or cremation of excreta in the basement of school-buildings require the most careful janitorship, and are not to be generally recommended.

*Urinals.*—These can be successfully maintained only in school-buildings connected with a public water supply. Slate or asphalt is the best material for construction. There should be an abundant flush of water, and a gutter at the bottom with a sufficient inclination to carry off the water rapidly to the drain or soil pipe.

The plumbing, the care, and management of the closets, latrines, and urinals should be of such good character as not to require the use of disinfectants or deodorizers. The substances often recommended to be placed in such places for the purpose of "disinfecting" the air do not disinfect, but merely substitute one smell for another.

*Outhouses in Country Districts.*—In districts not supplied with good systems of water and sewers, the maintenance of convenient and cleanly outhouses is a difficult problem, since, without the strictest attention on the part of teachers and janitors, they are likely to become sources both of physical and moral uncleanliness. Such outhouses should be located at least forty feet from the school-house, and there should be entirely separate buildings for each sex. These should also be separated by a tight board fence extending from the school-house, at least six and one-half feet in height. They should be provided with ample and well-cemented vaults, so constructed as to admit of emptying and cleansing without difficulty. They should be so made as to exclude all water from any source, except that contained in the excreta.

Provision should also be made for the storage of an ample supply of dry loam under cover. This can usually be obtained during the warm season. It should be applied daily during the time of school attendance, a sufficient quantity being applied each day to cover the fresh contents of the vaults.

*Water Supply.*—In cities it is customary to provide a supply of water from the public supply. As a general rule such water is pure and wholesome. On the contrary, instances have occurred in which the authorities have found it necessary to shut off the water of the public supply from the schools in consequence of serious pollution at the source. Lead pipe should not be used for the conveyance of water to the school-buildings nor for its distribution in them. It is desirable to have as many faucets on each floor as there are separate schools. There should also be opportunity for washing hands when coming from the closets and urinals, for which purpose soap and towels should be provided.

In country schools the supply is often obtained from wells, and special attention should be paid to their proper location in order to secure them from pollution. If there is any doubt as to the quality of the water, it should be submitted to a competent chemist for analysis. School-house wells should be thoroughly pumped out at the close of the vacations in localities where the water is not used through the vacation. Water for the schools should not be kept in open pails, and the use of a separate drinking cup for each scholar should be encouraged.

*School Baths.*—The provision of places for bathing in connection with the public schools, as introduced recently in a few cities, undoubtedly exerts a decided influence, moral as well as physical, upon the children of those schools, an effect which extends to the homes of such children, among a large portion of whom the facilities for bathing are of the most limited character. Added to this, in schools which are provided with swimming tanks, the instruction given in this art has the advantage of being both healthful and of a life-saving kind. The swimming tank adds materially to the cost of maintenance, on account of the fuel required to keep a large body of water at a proper temperature. Shower baths are now provided in connection with several of the public schools in New York, Boston, and other cities. In the town of Brookline, Mass., a public bathhouse erected in close proximity to the high school-house gives abundant opportunity to scholars in the public schools both for bathing and swimming all the year round.

*School Furniture.*—Since the scholar spends a large part of his school life seated upon some sort of seat, and, in all the higher grades, provided also with a desk, it is of the highest importance that these two articles of furniture should be as correctly made as possible. In an article by Dr. W. H. Burnham the following requirements are given:[4]

1. The height of the seat should be about two-sevenths that of the body.
2. The width should be about one-fifth of the length of the body, or three-fourths the length of the thigh.
3. The seat should slope downward a little toward the back, and be slightly concave, having bevelled edges in front.
4. A back rest is essential for hips and shoulders.
5. The correct "difference" or vertical distance from the seat to the edge of the desk is that which permits the child when sitting erect to place both forearms on the desk, without raising or lowering the shoulders.
6. Of equal importance is the "distance"* of the seat from the desk, which may be (*a*) "zero," (*b*) "positive," or (*c*) a "negative" distance, necessitating facility in adjustment.
7. A desk slope, preferably of fifteen degrees for writing, with capacity for adjustment to other purposes.
8. Strength, durability, and simplicity of construction.
9. Surfaces easy to clean, and unfavorable to the accumulation of dust.
10. A moderate price.

The principal objections to badly contrived school seats and desks are the liability to produce eye-strain and distortion of the spine. Almost any sort of seat may produce one or the other of these effects if pupils are kept continually sitting for long periods of time, without exercise, and especially if they are engaged in writing for lengthy periods. There is, however, a decided choice in school furniture, and the tendency is constantly in the direction of improvement (Figs. 4160 and 4161).

According to Janke the edge of the desk should be of such height above the seat as to be opposite the navel of the scholar who sits erect, so that, in placing the forearm upon the table to write, the elbow must be bent a little to one side and to the front of the scholar.[5]

Much improvement has been accomplished in the United States by means of adjustable desks, so constructed as to admit of change and adaptation to the wants of scholars at an age when growth is most rapid.

Shaw says: "Desks and seats should be adjusted vertically twice a year, at the opening of school in Septem-

* Janke describes the "distance" as the horizontal interval between a vertical line touching the front edge of the seat, and another vertical line let fall from the edge of the desk. If these lines coincide, the "distance" is *zero*; if the desk overlaps the seat, the "distance" is *minus* or *negative*; if the edge of the seat falls to the rear of the edge of the desk, the "distance" is *plus* or *positive*.

ber, and again in February or March; and at whatever time during the year a pupil enters school or is transferred to another room, his seat should be adjusted to him."[2] Desks should be constructed to fit the children.

According to Hope and Browne: "Short lessons at bad desks are likely to be less injurious than long confine-

FIG. 4160.—From Shaw's "School Hygiene."

ment at the most perfect."[1] The sitting posture is in itself bad, and should be counteracted by active exercise. Hence the use of blackboards for drawing and writing by beginners in place of copy-books is earnestly advised. In most American schools at the present day fixed seats and desks are in use, but in Germany several authorities give preference to movable seats and desks, on account of the facility thus offered for cleansing the floors[6] (Figs. 4162 and 4163).

As an instance of the serious effects produced by want of adaptation of school furniture to the ages and heights

FIG. 4161.—From Shaw's "School Hygiene."

of children, Dr. C. F. Scudder reports that twenty per cent. of the girls in the grammar grades of the Boston schools were round-shouldered, as a result of malpositions due to defective desks and seats.[7] In several rooms he found girls who differed seven years in their ages, and nearly twenty-two and one-half inches in height, seated at desks and in seats of exactly the same size. In one school eighteen per cent. of the scholars, when sitting back in their seats, could not touch the floor with their heels.

To counteract the ill effect of bad postures, even when properly adapted seats are supplied, periods of relief, together with exercises intended to correct bad habits of this sort should be given, to be repeated several times during each school day. During the first school year such periods should be more frequent than in the later years of school life. During the first year the child should not be confined at his desk more than one-third of the time.

Notwithstanding all that has been said and written in recent years about the importance of physical culture in schools, the tendency is still to train the mental faculties

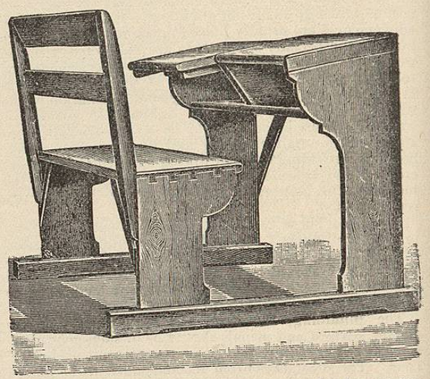

FIG. 4162.—Double Seat, used in German Schools. Movable and durable, but clumsy.

at the expense of the physical development of the scholar. There is consequently a decided necessity for devoting a greater share of each day's work to physical exercise. The recess should be maintained, and at least fifteen minutes in each session should be given "in which all scholars should, so long as the weather and climate permit, go out of doors, and engage in some form of physical activity" (Shaw). And this period of relaxation should be in addition to the regular systematic exercises which should form a part of the programme of each school day.

THE MEDICAL INSPECTION OF SCHOOLS.—In most European countries at the present day, the sanitary au-

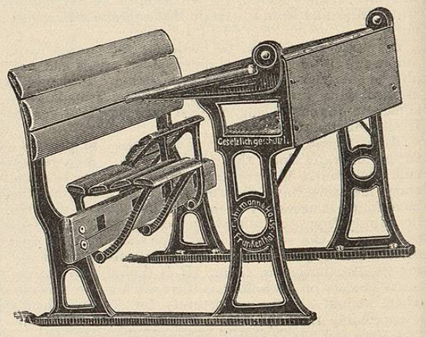


FIG. 4163.—German Double Seat. Movable.

thorities exercise some sort of supervision over the public schools.[8] The well-known work of Dr. Janssens at Brussels has for years served as a model in this direction. In France, as early as 1842, it was ordered that every





public school should be visited by a physician, who should inspect the localities and the general health of school children. New regulations defining explicit duties of such medical inspectors in Paris were adopted, and went into effect January 1st, 1884.*

The first systematic medical inspection of schools in America was inaugurated in the Boston schools in 1894 on the advice of Dr. S. H. Durgin, chairman of the Boston Board of Health. Since that time New York, Philadelphia, Chicago, Hartford, Milwaukee, and other cities have adopted a similar course. The principal object at first aimed at was the search for unrecognized cases of infectious diseases, by which means it was believed that much could be done toward preventing their spread. Much good, however, can be accomplished in other directions toward improving all those conditions, both subjective and objective, which relate to the health of school children.

In Boston the city is divided into fifty districts, each of which is provided with an inspector who visits each of the schools in his district daily in the morning. Children who appear to be ill from any cause, and especially those suffering with incipient infectious diseases, are sent to their homes. The teachers soon become familiar with the work and render efficient aid to the inspectors.

The principal diseases detected by such inspectors, as shown by the experience of inspectors in different American cities, are the specific infectious diseases of childhood, whooping-cough, measles, mumps, chickenpox, diphtheria, scarlet fever, influenza, and tuberculosis, also laryngitis and tonsillitis, rhinitis, acute bronchitis, suppurative diseases of the ear, acute catarrhal conjunctivitis, imperfect sight, and contagious skin diseases, especially pediculosis, which often proves a serious pest among school children.

*Eyesight.*—Every possible means should be used to prevent impairment of the eyesight of school children, since the demands of school life impair the eyesight of a very large percentage of those who pass through the curriculum of several years.

The types employed in printing school books should produce letters of the most legible character, and the lines should be amply spaced or leaded. Cohn advises that the length of the lines should not be more than 10 cm. (4 inches).

White paper with a dull, unreflecting surface is best for the eyes of school children.

Blackboards should be kept clean and black, and should not be allowed to become gray in consequence of retention of particles of chalk. As a general rule, slates are not so good as paper. They become greasy, and the writing is generally more illegible than when it is written upon paper. Other sanitary reasons are also urged in forbidding their use.

Children should not be permitted to assume bad postures while writing, since they also injure the eyesight. The pupil should sit erect, and the book should not come nearer to the eyes than twelve inches.

*Testing the Eyesight and Hearing.*—Every teacher should know how to make the common tests for eyesight and hearing, which should be applied soon after the beginning of the school year, so that children who are found to be short-sighted or defective in hearing may be properly seated near the front of the room.

In schools where medical inspection is regularly made, this examination should be conducted by the medical inspector. Children are often punished or regarded as dull, when there is either a defect of the vision or of the hearing. Defects of the eyesight should be reported to the parents, so that a thorough examination may be made by an oculist and the proper glasses furnished.

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* Palmberg's "Public Health and Its Applications."

**SCHWALBACH** is a spa situated in the province of Hesse-Nassau, Prussia. It lies in the valley of the Münzenbach, about twelve miles from Wiesbaden, and five miles from the health resort Schlangenbad. Its elevation is 972 feet above sea level, and as it is well protected against all but the southerly winds, its climate is mild and well suited for invalids. There are eight mineral springs at Schwalbach, known as the Wein-, Stahl-, Rosen-, Paulinen-, Ehe-, Neu-, Linden-, and Adelhaid-Brunnen. There is but little difference in the composition of the waters of these springs. The following is the analysis of two of the springs, as made by Fresenius. In 1,000 parts there are, of:

| | Wein-Brunnen. | Linden-Brunnen. |
|---|---|---|
| Ferrous bicarbonate | 0.057801 | 0.009902 |
| Manganous bicarbonate | .009085 | .004680 |
| Sodium bicarbonate | .245345 | .042417 |
| Calcium bicarbonate | .572129 | .423277 |
| Magnesium bicarbonate | .605120 | .395257 |
| Ammonium bicarbonate | ..... | .022215 |
| Lithium bicarbonate | ..... | .002033 |
| Strontium bicarbonate | ..... | .001048 |
| Sodium chloride | .008630 | .017622 |
| Sodium sulphate | .006193 | .016156 |
| Potassium sulphate | .007469 | .009414 |
| Sodium nitrate | ..... | .003541 |
| Sodium phosphate | Trace. | .000438 |
| Aluminum phosphate | ..... | .000197 |
| Silicic acid | .046500 | .032821 |
| Organic matter, etc | .000046 | .000003 |
| Total solids | 1.558318 | 0.965921 |

The gases are carbonic acid and a very small proportion of sulphureted hydrogen.

Schwalbach is a favorite health resort, and is visited by several thousand guests every year. The diseases for the relief of which a course of treatment at this spa is recommended are anæmia and chlorosis, epilepsy, chorea, progressive muscular atrophy, neuralgia, neurasthenia, hysteria, and other functional and organic nervous disorders, Bright's disease, diabetes mellitus, chronic vesical catarrh, and various affections of the female sexual organs.

The waters are employed externally and internally, according to the individual indications, and facilities are afforded for pine-needle, mud, vapor, and other baths. The season lasts from May to October. There are excellent accommodations for visitors.