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BUREAU OF EDUCATIONAL RESEARCH
COLLEGE OF EDUCATION

THE EVALUATION AND IMPROVEMENT OF SCHOOL BUILDINGS, GROUNDS AND EQUIPMENT

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EVALUATION AND IMPROVEMENT OF SCHOOL BUILDINGS, GROUNDS AND EQUIPMENT

It is the purpose of this circular, first, to present a brief treatment of the evaluation of school plants by means of score cards and, second, to give a somewhat more detailed discussion containing suggestions as to how school buildings, grounds and equipment may be improved or put to better use. The suggestions for improvement are intended to be as concrete as possible and in no case to involve the expenditure of large amounts of money. Indeed, some changes may be carried out without any expense whatsoever, whereas most of the others require very small sums.

I. THE EVALUATION OF SCHOOL PLANTS

Although school plants have been roughly evaluated ever since they were first constructed, it is only within the last few years that this evaluation has approached objectivity. During the last decade a number of score cards by which school plants and their equipment may be rated have been devised. Each of these is composed of a number of items, most of which apply to building plans as well as to buildings already in existence. In addition to the list of items, several cards provide, either as an integral or as an accompanying part of the scale, more or less detailed suggestions both as to the accepted standards and the most common deviations below these standards. Thus a superintendent or anyone may use these scales not only for actually rating a school plant or proposed plans but also for improving faults in an existing plant. It is true that these scales yield more reliable ratings when used by experts but they in general are simple enough and are accompanied by such directions that they can be used with profit by a school administrator who is willing to devote a little time to their study. In order to secure reliable ratings for buildings it is recommended that at least two, or better three, persons do the scoring and that their scores be averaged.

The most commonly used and best known score cards are the three prepared by G. D. Strayer and N. L. Engelhardt; the Score Card for Village and Rural School Buildings of Four Teachers or Less, the Score Card for City School Buildings (elementary schools)

and the Score Card for High School Buildings. The items to be considered in the evaluation of a school building have been weighted by determining the maximum number of points which may be allowed for each item. A total perfect score is 100. The cards are accompanied by manuals that discuss and elaborate them and supply the standards necessary for their proper use. They may be obtained from the Bureau of Publications, Teachers College, Columbia University.

J. O. Betelle has prepared a Checking Schedule for Projected School Buildings, which may be secured from the Bruce Publishing Company, Milwaukee, Wisconsin. This consists of a rather long list of items stated in question form which should be considered in the planning and construction of a school building. The items are not weighted nor are the standards given, except in a few instances, so that it is impossible to compute a score by using this schedule.

A School-Building Score Card for One-Teacher School Buildings has been prepared by J. E. Butterworth. It consists of a number of items with appropriate weights for each and is similar in form to the score cards of the Strayer-Engelhardt series. The total number of items is somewhat greater than in the case of the Strayer-Engelhardt Score Card for Village and Rural School Buildings. This card may be secured from the World Book Company.

Another similar card is the Score Card for Rural School Buildings prepared by the Division of Schoolhouse Planning of the State Department of Education of North Carolina. In form and structure it resembles the two previously described.

The Score Card for One-Teacher Rural School Buildings being prepared by E. J. Ashbaugh and P. R. Stevenson is probably the best for such buildings. Although printed, it is not yet in final form. It is similar to the Strayer-Engelhardt, Butterworth and North Carolina score cards in that it contains a series of items each of which is weighted. Its chief difference is that after each item three degrees of quality or merit, standard, fair and bad, are briefly described and the number of points credit to be given for each degree is indicated. For example, in the other cards, under *size of site* the statement is made that the playground should contain a certain amount of space for each pupil. If it contains less than this amount of space the scorer must judge as to the number of points to allow. On the Ashbaugh-Stevenson card the instructions state that a perfect score (30) is to be given for a site of two acres, a score of 15 for one acre and of 5

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for one-half acre. For other sizes, proportional scores are given. This card may be secured by addressing the authors at Ohio State University.

In addition to the score cards mentioned above, several others have appeared which are not confined exclusively to the building itself, but include also such items as those having to do with the organization of the school and the qualifications of the teachers. One such card is a blank for the Classification of Elementary Schools prepared by the Division of School Inspection of the Department of Public Instruction of Indiana and may be secured by addressing this department. A second is the Missouri Score Card for Rural Schools. Both cards contain weights for the various items so that actual scores may be computed. E. C. Witham has prepared a List of Points for School Measurement without weights which may be used in somewhat the same way as the Betelle Checking Schedule. Copies of this may be secured by addressing the author at Wilmington, Delaware. The author also describes the card in an article in the Journal of Educational Psychology for December, 1914.

II. THE IMPROVEMENT OF SCHOOL BUILDINGS, GROUNDS, AND EQUIPMENT

As was stated in the introductory paragraph, the purpose of this second portion of the circular is to offer a number of concrete suggestions as to how school buildings, grounds and equipment may be improved or put to better use without the expenditure of large amounts of money.

One at all familiar with school architecture knows that almost all buildings prior to 1910 and many of those erected since that date fall far short of present-day standards. A number of their faults cannot be corrected without the expenditure of considerable sums of money. However, many things that necessitate little or no expense may be done to meet present-day requirements. Undoubtedly many of the matters to be mentioned are known rather commonly by teachers and administrators and are left undone because of oversight rather than of ignorance. Other discussions deal with items concerning which one is rarely enlightened by common sense, general information or courses in education, and which therefore are probably not known by the majority of teachers.

It will be found doubtless that many of the improvements suggested in this circular are needed in most school plants. Some admin-

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istrators may feel, therefore, that the number of improvements to be made is so great and the amount available so small that it seems hardly worth while attempting a start. The writer wishes to suggest that in the case of all except very new and up-to-date school plants it will be unwise probably to expect to make all the possible improvements within a year or perhaps even within two or three years. In other words, in case the improvements needed are numerous a comparatively long-time program for carrying them out should be drawn up. The most needed ones that can be made with the amount available may be remedied the first year, those next in importance, the second year, and so on, until all that are practicable have been taken care of. The improvements most needed will of course be very different in different places depending largely upon the previous condition of the plant. In general, however, they fall into three main classes. The first in order of importance, includes those improvements which have as their chief aim the immediate protection of life, that is to say, the prevention of serious disasters. Practically all in this class are in some way connected with fire protection, although they are discussed under a number of other headings also such as exits, entrances, stairways, etc. The second class includes those conditions which, if neglected, do not result in any immediate or great danger to life but in the long run exert unfavorable influences upon health. Such faults as lack of sufficient playground space and equipment, poor ventilation, insanitary drinking fountains, unsatisfactory lighting, etc., are considered in this connection. The third and less important class comprises those things that exert little or no influence upon the health of the pupils but that contribute to the effectiveness of the school work. Such items as blackboard space, bulletin boards, decorations, special rooms, etc., come in this class. Although it may not be desirable to make a building absolutely perfect in regard to all the items enumerated in the first class, before beginning any improvements of conditions listed in the second class, and so on, it is probably wise, as a general procedure, to give attention to the three classes of items in the order of their importance.

School sites. Probably the chief unfavorable criticism of most school sites is that they are too small. Often more land cannot be added without a fairly large outlay, but, in the case of schools in the outlying districts of cities or in rural communities, lots frequently can be purchased for relatively small amounts. In addition to lawns, walks, etc. there should be at least one hundred square feet of actual

playing space available for each pupil. Two hundred feet are better. In many cases where additional land cannot be bought, the playgrounds may be added to by removing sheds and other more or less temporary buildings which have no important uses, by reducing the amount of space devoted to lawns, by preventing the janitor from using portions of the grounds for ash piles, etc., and even by having adjacent streets or alleys closed to traffic. If the area is much too small, the situation can be relieved by having different recess periods for the children of the upper and of the lower grades.

It is generally recognized that school buildings and grounds should be as attractive as possible, yet many sites contain nothing or practically nothing except the buildings, the playground and perhaps a few trees. Shrubs and permanent vines cost little and add beauty to any building, new or old. Well-kept lawns show a general respect for order and for appearances. Even if the site is small, a lawn, at least in front of the building, may be kept. Trees should be on all school grounds; if necessary they should be planted, care being taken to protect them during the first few years of growth, and to place them so that they will not interfere with proper lighting in the school-rooms.

Playgrounds and their equipment. One of the most commonly neglected features of school grounds is the surface of the playgrounds. In many, if not most, cases the grounds are covered with the dirt dug out of the basement, with gravel, or with cinders. Often considerable areas of cement and brick are found. The best surface is probably sandy loam containing about 20 percent of sand. This has the advantage of drying rapidly, of being much less muddy than pure loam or clay in wet weather and of being less likely to injure pupils who fall or who are thrown down upon it. Cinders and cement and brick pavement have the first two advantages but not the third. In many cases a layer of sand spread over the playground will, after it has worked in, produce a very good surface.

It is not enough that the playground be of sufficient size; proper equipment is also important. Backstops for baseball, courts with posts and nets for tennis and volley-ball, basket-ball goals, swings, giant strides, teeter-boards, slides, etc. are all desirable. If these are purchased outright the cost will be considerable. It is possible, however, for the boys, not only in high school but in the upper grades, working under the direction of the manual-training or some other

teacher, to make and erect much of this equipment. Of the apparatus mentioned above slides are perhaps the most difficult to construct, but the writer has seen very satisfactory ones made by seventh and eighth-grade manual training classes. The material necessary costs a comparatively small amount.

Environment and approaches. Not infrequently the sides and rears of school sites and sometimes even the fronts face a row of more or less dirty, tumbled-down and generally disreputable barns, sheds, chicken-houses or other out-buildings. Often an improvement can be effected by an appeal to the community in general or merely to the property owners. Sheds so far gone as to be practically useless may be torn down, better ones repaired and painted and the general appearance of the school environment improved. The writer has known of instances when the owners were willing that the desired improvement be made but could afford neither the time nor the expense and the work was actually done by the boys of the school, during or outside of school time.

Especially in rural communities, the streets or roads leading to the school are likely to be bad. Often there are no sidewalks and the mud becomes several inches deep in rainy weather. In such cases a few loads of crushed rock, cinders or gravel spread in front of the school building make a decided improvement. Sometimes it is more important to give attention to the road or street, at other times the material may be used to make a walk or path, either along the road or on the school ground itself. An excessive amount of space should not be devoted to pavements or walks but where they are necessary suitable material should be used. A walk of any of the materials just mentioned, if two or three inches higher than the surface of the surrounding ground, is fairly satisfactory.

Exits and entrances. Among the most faulty, dangerous and inconvenient provisions in many old school buildings are the stairways and exits. Ordinarily their location cannot be changed without considerable expense. It is, however, frequently possible to add one or two exits where they are needed. For example, many buildings contain no direct entrance to or exit from the basement. By cutting the wall and taking away enough dirt on the outside to allow a few steps to be constructed, such an entrance often can be placed where it will be very convenient.

One of the most dangerous forms of construction is that in which a wide stairway leads into a wide vestibule with only one or two doors. Whenever possible, more doors should be added

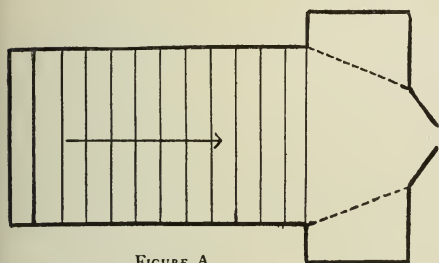


FIGURE A

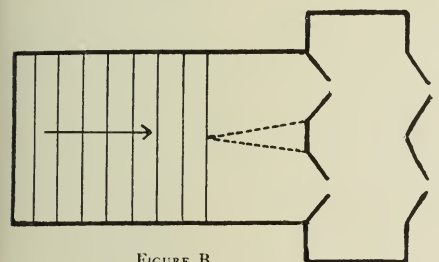


FIGURE B

so that their total width is practically the same as that of the stairs and vestibule. If this is not done, "pockets" are left in which children may easily be caught and crushed in case of fire or panic. If the walls are so constructed that additional doors cannot be cut, it is probably wise to construct a partition or to place bars as shown by the dotted lines in Figure A. Such partitions or bars remove the possibility of children becoming caught in the corners or pockets but do

not prevent that of a jam in the door because pupils cannot pass through as rapidly as they can approach it.

Another common form of construction is shown by Figure B. In this case a "pocket" is formed by the short wall between the two inner pairs of doors. Such a wall can often be reduced to a mere post and the doors widened. If this is impracticable, partitions or bars may be placed as indicated and may be erected by almost any shop class.

In some buildings doors are still found which do not contain fire or panic bolts, which open whenever pressure is applied against them from the inside. Without exception all outside exits through which pupils ever pass should be provided with these bolts. They are not necessary in the case of basement doors leading only to and from the janitor's quarters or the boiler room.

Stairways. The typical old school building of more than one story contains well-worn stairways of wood with storage closets beneath them. These stairways are frequently from six to twelve feet wide or else are arranged in nest form, that is, two or more stairways meet at a landing half-way between the floors from which two

or more continue to the next floor. Stairways eight feet or more in width are rendered less dangerous by a partition or banister down the middle. A couple of handrails at each side, one high and one low, are also desirable. The erection of a partition or banister and the attachment of handrails is something that can be done often by manual-training classes. The doors of storage closets under the stairs ought to be nailed or locked tight and never opened, the closets having first been emptied. There are so few articles commonly stored around a building which are not inflammable that this space ought not to be kept open to receive them.

When stairs become worn and need new treads the old wooden ones should be replaced by fireproof non-slip material. If nothing better can be afforded, cork linoleum may be used.

The nests of stairways mentioned above should be destroyed whenever possible and a single stairway substituted for each nest. The fact that two or more columns of children proceeding in different directions may enter the same landing at the same time provides an element of grave danger in case of sudden exit.

Corridors. Comparatively few of our school buildings have corridors that are too narrow but many have those that are much wider than necessary. Partly because this added width is available, corridors are very often used as cloakrooms, storage-rooms, gymnasiums, and for various other purposes. Such use often cannot be avoided if the building is to be used to best advantage. Care should be taken, however, that whatever equipment or apparatus is placed in the corridors is back against the wall or in recesses so that there is no danger of its interfering with the progress of pupils. A clear space ten feet in width is sufficient in main corridors and from eight to ten in others. The lighting and decoration of corridors is also frequently neglected. This, however, will be treated later.

Heating and ventilating. The heating and ventilating systems found in most school buildings cannot be materially altered without incurring a considerable amount of expense. Those that do exist are so commonly misused and fail to yield the best results of which they are capable that a few suggestions as to their use are not inappropriate. The greatest emphasis should be placed on the point that the operation of the heating and ventilating systems ought to be well understood by all who must use them. The janitor frequently understands them only fairly well, the principal poorly, and most of the teachers scarcely at all. Often the janitor and teachers uninten-

tionally work at cross-purposes to each other. A teachers' meeting near the first of the year, including a trip through the building, may well be devoted to a discussion of these systems.

A chief fault of hot-air heating is that the air supplied is commonly too dry. Every hot-air furnace should be supplied with a tank from which water evaporates into the air sent through the building. There are very few furnaces into which such a tank cannot be inserted. Often when the tank is there it is not kept full of water. In case the registers are in the floor it is usually possible and desirable to place a shallow pan of water under each register.

Most buildings of any size contain some provision for ventilating other than by opening windows. The older buildings usually contain one inlet and one outlet through which circulation is supposed to be maintained because of the fact that warm air rises and cold or stale air falls. Although this system is very rarely satisfactory, it is undoubtedly better than nothing. All too often teachers close the inlet or outlet of both, alleging as the reason that drafts are caused if they are left open. If drafts are strong they can be avoided by seating pupils away from direct exposure or they can be turned aside by deflectors. The same is true of systems in which circulation is aided by means of coils or fans. Frequently there is a belief that the ventilating system will not work when the trouble is that those using it do not make it work.

In the case of rooms that must rely upon open windows for their supply of fresh air, window boards for each window with blocks on the window casing to hold them are needed. The boards should ordinarily be about a foot in width and the blocks so placed that the boards make an angle of about 30° away from the window. That is, the bottom of the board should be against the window sill and close to the bottom of the sash, and the top about six inches away from the window.

In any system in which the teacher must regulate the amount of fresh, cold air introduced into the room it is necessary that more heat be furnished than is required to keep the room at the proper temperature, otherwise the teacher cannot admit sufficient outside air without lowering the temperature too much. Janitors and firemen frequently complain that they fire up enough to get the rooms to the proper temperature but that the teachers let in so much cold air that the rooms become chilly. In the opinion of the writer, teachers

rarely admit more fresh air than is desirable, and the janitor usually should be instructed to provide more heat.

It is rather common for schoolrooms to be provided with thermometers but in many cases they are so placed that they do not indicate the temperature existing in the greater part of the room. The best method for determining the temperature is to suspend the thermometer on a string near the center of the room at a height of five or six feet. This position, however, has certain disadvantages, as it does not look very well, necessitates the teacher crossing half the room to ascertain the temperature and frequently distracts the pupils. It may be desirable therefore to hang the thermometer upon the wall, at a height of five or six feet, and in a place where it will record as nearly as possible the temperature of the larger part of the room. In other words it should not be placed close to any inlet or outlet of either hot or cold air nor where it will be struck by a direct current from an inlet.

Fire protection. Every building of two stories or more, which does not have fireproof stairways in enclosed fireproof stairwells, needs adequate fire escapes. To be adequate they must be numerous enough so they can be entered by the pupils either from their room or from an adjoining and connecting room. This adjoining room should not be the corridor, nor should the pupils need to approach very near the door leading into the corridor. Standard fire escapes are entirely of metal, straight, not circular or winding,¹ wide enough for two children to march abreast, and reach all the way to the ground. Only those that are enclosed are safe to use in icy weather. Exits to fire escapes should always be by means of doors equipped with panic bolts, not by windows. All windows or doors directly under or beside fire escapes should contain fireproof wireglass in order to obviate the danger of the escapes being rendered useless by the fire.

A sufficient number of fire hose on each floor so that every part of the building can be reached is needed. This protection is not possible always in old buildings without much expense. A sufficient number of hand fire extinguishers, however, can be provided for any building. Of the ordinary small type the standard is one for every 2000 square feet of floor surface, or in other words, about one for

¹A possible exception to this requirement may be made in the case of enclosed circular chutes down which the children slide.

every two classrooms. Their location should be such that they are easily visible and obtainable in case of need. Frequently buildings, which are provided with a sufficient number of extinguishers, derive practically no protection because the extinguishers are of the type that must be filled at stated periods and no care is taken to see that this is done.

In a model building the heating plant is separated from the rest of the building and is in a fireproof enclosure. Unless this was planned for when the building was erected, a change will prove very expensive. However, the situation can often be improved by spending a comparatively small amount. If, as sometimes happens, the heating plant is in a fireproof enclosure with wooden doors between it and the rest of the building, fireproof doors can be substituted. If the furnace is found with bare wooden joists and flooring above it, a layer of metal lath and plaster decreases the danger.

Exit lights to be used in case of fire ought to be provided at all exits. It is best to have regular exit signs in red and white with lights inside but it is fairly satisfactory to use single red bulbs. Many buildings have been provided with these exit lights but no care has been taken to replace broken bulbs, or make other repairs, such as disconnected wiring, etc.

Cleaning and general care of the building. Wooden floors require a coating of oil occasionally, perhaps twice a year, to keep them in good condition. Sometimes objection has been made to the use of oil upon floors because of the danger of soiling clothing. If, however, high-grade oil is secured and properly applied this danger, although greater with pine than with maple floors, is very slight. Too much oil should not be applied at first and all that the floors have not absorbed should be removed within a few hours or perhaps within a day. It is best to let several days elapse after this before the floors are used again.

As comparatively few of our buildings are equipped with vacuum-cleaning systems, the chief reliance is still upon the brushes or brooms. The use of sweeping compounds sprinkled over the floors before they are swept insures much better results. Slightly oiled cloths used when dusting prevent the dust from rising.

Artificial lighting. Although it is becoming the practice in all school buildings to place electric lights, they are rarely installed properly. The two important criteria of installation are that there be plenty of light and that there be no glare in the eyes of the pupils.

This latter requirement practically necessitates indirect lighting. In case the building is already wired a few more outlets in each classroom may be provided at comparatively small expense. The proper number is from six to nine. Symmetrical distribution ordinarily is the best. The lighting of stairways, corridors, and basements is often even more inadequate than that of classrooms, and here again, if the wiring has already been done, it is a comparatively simple matter to provide a few more outlets.

Water supply. Every school building needs one sanitary drinking fountain for each fifty or seventy-five pupils. These fountains should be so located as to be easy of access from classrooms, gymnasiums, playrooms, and playgrounds. In case there is no city water system installed in the building, sanitary fountains can be connected with tanks. Instead of the ordinary faucet used on the typical water tank a fountain may be procured and attached. It is even possible to attach a fountain to the pump at an ordinary well so that while one child pumps another may drink.

Lavatories, with hot water when possible, soap, and towels, should be provided for the use of the children. Liquid soap, contained in a holder from which a few drops at a time may be taken, is preferable to bars or cakes. Paper towels, so arranged that only one can be extracted at a time, are also desirable.

Natural lighting. One of the most serious faults of our older school buildings is the small amount of wall space devoted to windows. Standard classrooms contain window area from one-fifth to one-fourth as great as their floor area, while corridors, stairways, and other parts of the buildings need enough glassed area to give sufficient light. In many buildings windows can be enlarged or more provided, but in some this is impossible without unduly weakening the walls. All windows that have been provided, however, should be used. The writer has been very much impressed with the fact that teachers seem to have a natural inclination to shut out much of the light that might enter a schoolroom. Time and again on cloudy days, in rooms containing not over one-half or two-thirds enough window area, he has seen blinds drawn to cover half or more of each window. Unless direct sunlight would enter, there is no reason why any portion of a properly located window needs to be covered with a blind. If, as is sometimes the case, windows are placed in the front of the room they should be permanently covered with dark blinds. The same may be true in some situations where windows are

at the right or even at the rear, but it is probably better to have some shadows caused by light coming from more than one direction than to have an entirely inadequate amount of light.

Except in the case of rooms, which must be darkened at times for the use of a lantern or for other special reasons, blinds should be translucent and very light in color. A dead white, however, is not satisfactory. It is best to have double blinds hung in the middle of the window so that the lower one may be pulled down to cover the lower sash and the upper one up to cover the upper sash. If dark blinds are necessary, they should be provided in addition to and not instead of the light ones, and may be single and hung at the top of the window.

Color scheme. The best color scheme for a classroom is very light. For ceilings white or light cream and for walls light buff or very light green are best. The dado may be slightly darker than the walls. The finish should be dull but smooth. In corridors a similar scheme is good, although it is permissible to have the dado somewhat darker. Many buildings, the interiors of which are comparatively dark and gloomy, may be greatly improved by refinishing in the proper color.

Blackboards. One who has not investigated the matter probably will be surprised to learn that many of the blackboards in our school-rooms are from six inches to one foot too far above the floor. For children in the first grade, the proper height is about twenty-four inches. One inch may be added for each grade, thus reaching a height of about thirty-two inches for high-school use. Boards that are too high can be lowered, but this is comparatively expensive. However, low benches, a few inches in height and about eighteen inches in width on which the children can stand, may be provided at a very small expense. They may be temporary and movable, or built in permanently. Although they detract from the appearance of a room and may add slightly to the janitor's labors, they are worth while in the case of boards three inches or more above the standard height. Not infrequently rooms are insufficiently provided with blackboards, for unless half of the children in the room can be accommodated at once, the work is almost sure to be hindered. Ordinarily blackboards across the front and one side of the room should give enough space.

Bulletin boards. Every classroom ought to have a bulletin board. Ordinarily the best location for this is directly above the blackboard.

In case such a board is not built in, a strip of suitable material, perhaps twelve inches in width, may be placed above the blackboards, at least above the one at the front of the room. The best material is cork but soft wood does fairly well. Even a strip of burlap or other heavy cloth to which objects may be pinned is better than nothing at all.

Cloakrooms. The ordinary cloakroom, whether it is a separate room or merely a portion of the wall of the corridor, contains only a row of hooks upon which clothing may be hung. These hooks are usually so located that the clothing hangs directly against the wall, and the possibility of ventilation is considerably reduced. Hooks mounted upon a board supported at a distance of four to six inches from the wall are a decided improvement. In case children of several grades use the same cloakroom, the hooks should be placed at different heights. The construction of the supports and the placement of hooks can be handled easily by a manual-training class. Such a class can prepare also umbrella racks, shelves or racks for rubber shoes and, if necessary, shelves for lunches, hats and caps, etc.

Seats and desks. The standard equipment of a classroom in this respect consists of individual adjustable and movable seats and desks, except in Grade I or perhaps in Grades I and II, where tables and chairs are better. Such equipment is found in comparatively few classrooms. As it becomes necessary to buy new seats and desks, the modern type should be purchased and the old thus gradually replaced with the new. The typical school building at present is equipped with non-adjustable seats, with perhaps a few adjustable ones here and there, which perhaps have not been adjusted. In general if a building contains a comparatively small number of adjustable seats, they should be divided about equally among the different rooms and should be readjusted from time to time as the pupils change. The next best thing to having adjustable seats is to have at least three sizes of non-adjustable seats in each room. Experience will show the proper proportion of each size to have, but from year to year a few seats probably will need to be moved from one room to another. In general smaller seats should be placed near the front of the room, and larger ones near the rear. If for any reason children must use seats too large for them, low footstools of the proper height prevent discomfort and even injury. The proper height is that which allows the feet to rest solidly upon the stool as they should upon the floor.

Not infrequently the desk tops become very much scratched or disfigured, sometimes merely from ordinary wear, sometimes from willful acts. Such desk tops are a real hindrance to school work and an encouragement to further carving. Frequently they can be planed, sandpapered and refinished. Usually this can be done more easily after they have been removed from the desks. Much if not all of this work can be done in the school shop.

General equipment of classrooms. There are dozens of articles which any classroom needs in order that satisfactory work may be done. These of course vary somewhat with the grade and subject taught. The writer merely wishes to mention a few which can be homemade either by the teacher or by a manual-training class. The list given is not all-inclusive but is illustrative of a number of such articles: aquarium, bookcase, dictionary holder, flag holder, pointer, sand table, supply cabinet, table, umbrella stand, window stick.

Decorations. It is decidedly important that the various parts of a school building, both classrooms and corridors, be supplied with appropriate decorations in addition to the actual finish of the walls. Chief among the decorations to be used are pictures. Often expensive pictures cannot be purchased although in some cases they may be procured through an active and interested parent-teacher or similar organization. A number of appropriate pictures, however, can be secured. Some of our popular magazines publish reproductions of great paintings which may be framed at small expense and are certainly better than nothing. In almost any community there are a number of individuals who have pictures which they are willing to donate to the school. Of course many such pictures are of little worth or are even positively undesirable but they may be accepted and eventually, if not immediately, relegated to inconspicuous places. In other cases the owners will lend their pictures. Various organizations exist which maintain traveling exhibits that may be secured for a time at slight cost. The writer does not wish to suggest the necessity of a large number of pictures. Three or four good ones of fair size are enough for a single classroom, although more may be added without giving a crowded appearance. In general the best one or two of the pictures should be hung at the front of the room and most of the others at the right, assuming that the light comes from the left. Corridors are sometimes used more or less as art galleries and often are made very attractive. In addition to pictures there are other

desirable decorations. Busts or statues, bas-reliefs and other forms are available. Portions of the pupils' work may be exhibited and changed from time to time. Indeed changes may be made with pictures and other more permanent decorations, especially if the building is so used that pupils, in the course of their school career, spend most of their time in a few rooms. An exchange of pictures between rooms every few months causes little trouble and is often distinctly worth while. Such exchanges may be so planned that each pupil will in time come in contact with each picture in the building.

Special rooms. The ideal elementary school building possesses a number of rooms devoted to special uses, the ideal high-school building a still larger number. Comparatively few buildings contain satisfactory rooms for all of the uses suggested. Many rooms, however, either disused at present or used for storage, may be devoted to a worth while purpose. For example, it is not uncommon to find basement rooms, which merely require cleaning up or perhaps the laying of a good floor or the installation of more artificial light, to make fairly satisfactory playrooms. In a school of any size such a room will not be able to accommodate all of the pupils but if it can take care of even the pupils of one or two grades at recess or at other intermissions in bad weather it is certainly worth while. It may be used by the lower grades, or the privilege may be rotated from grade to grade. If the ceiling is high enough it may be fitted up as a gymnasium and may be equipped with apparatus much of which can be made by the boys of the seventh and eighth grades or of the high school.²

In other situations when such a room is not desirable for a playroom it may be used as a lunchroom, cooking or sewing-room, manual-training room, general-science room, bicycle and sled room, or in some other way. Tables and cases for sewing, cooking and science rooms and even benches for manual-training rooms can be made by the boys under their teacher's direction.

Not infrequently buildings contain one or more rather small rooms of which little use is made and which may be converted into fairly satisfactory libraries, teachers' rest rooms, nurses' rooms, etc. Here again much of the equipment can come from the school shop. In the case of teachers' rest rooms the teachers, perhaps aided by patrons, often supply part or all of the furniture.

²See p. 7 for a description of equipment made by school boys.







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