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THE SCHOOL JANITOR
A STUDY OF THE FUNCTIONS AND ADMINISTRATION OF SCHOOL JANITOR SERVICE

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THE SCHOOL JANITOR: A STUDY OF THE FUNCTIONS AND ADMINISTRATION OF SCHOOL JANITOR SERVICE.¹

Chapter I.

INTRODUCTION.

REASONS FOR MAKING THE STUDY.

There are three reasons why the following study of the school janitor service has been made:

1. The importance of the janitor's position in a modern school system. This is seen by a consideration, especially, of his relation to the up-keep and sanitation of buildings in his charge, the health and safety of their occupants, the educative value of the janitor's work, and his influence upon pupils from a moral standpoint during the years most vital in the formation of character. These various relations are discussed in some detail in Chapter II.

2. The nonappreciation of the janitor's importance on the part of school officials and the public generally.

3. No comprehensive study of the subject has heretofore been made.

From these considerations, the need for such a study seems conclusive. If school boards, superintendents, principals, teachers, parents, and janitors themselves can be led to understand and appreciate the importance of the janitor as a responsible school officer, and can be shown wherein the service should be improved and the methods by which this may be accomplished, it is believed that a valuable service will have been rendered to the cause of public education.

OBJECTS OF THE STUDY.

In pursuing the study there have been two main objects of investigation, as follows:

1. The administration of school janitor service.

2. The functions of the school janitor.

The data and discussion in relation to administration are embraced in Chapter III, and include such matters as the selection and appointment of janitors, their compensation, living and office quarters, rating and promotion, tenure, method of employing and paying assistants, to whom janitors are responsible and their supervision, and the instruction and training of janitors.

Matters relating to the functions of the janitor are included in Chapter IV, under the general headings of daily cleaning of floors, periodic cleaning and treatment of floors, dusting, washing windows, and cleaning toilets.

¹ Numbers in parentheses in text refer to items of bibliography, p. 45.

PLAN AND METHOD OF STUDY.

Two lines of investigation have been pursued, under the following plan and method:

1. First of all, thorough research was made through the literature bearing on the subject, and any data which seems to be valuable and pertinent are either included or reference is made to them. In the bibliography, Chapter VII, will be found what is believed to be a fairly complete list of references to publications containing information of any importance on janitors and janitor service. These references are all numbered, and when a citation to any of them is made in the text, it is by the number corresponding to such publication in the bibliography. The sources embraced in this part of the investigation may be grouped in five classes, as follows:

(a) Books on school hygiene, which, as a rule, contain a chapter each on school housekeeping.

(b) Books on school administration, some of which also contain chapters on the cleaning and care of school buildings and grounds.

(c) Educational surveys. More than 50 school surveys were examined—all, in fact, of any importance that have been made, so far as could be determined. Most of these make some reference to the janitor service. About 25 of them contain data of more or less value in showing the actual conditions in the janitor service as found by the various survey experts and specialists.

(d) School reports containing information on the subject.

(e) Special articles in periodicals and in proceedings of educational associations on various phases of the school janitor question.

2. The second source of information was the replies received to a questionnaire sent to the superintendents of schools in all cities having a population of 2,500 or more. Following is the text of the questionnaire:

1. Are janitors selected and appointed by civil service or merit system?
 - (a) If so, send sample list of examination questions or your standard of requirements.
 - (b) If not so selected, who passes upon qualifications of applicants and recommends them to school board for appointment?
 - (c) Is a physical examination required?
2. Are janitors promoted on basis of merit or length of service?
 - If upon merit, who makes recommendation for promotion?
3. Do you have any school or classes for the instruction and training of janitors, either before or after appointment?
 - If so, what method is followed?
4. Do the janitors employ their own assistants?
5. Who pays janitors' assistants?
6. Are janitors employed for the entire year, or for the school term only?
7. Give salaries of janitors.
 - (a) Highest.
 - (b) Lowest.
 - (c) Average.
8. State the basis, or bases, upon which the compensation of janitors is fixed.
9. Are janitors paid additional amounts for extra service, e. g., when buildings are used by civic bodies?
10. Are janitors, in addition to salary, provided with living quarters?
11. To whom are janitors responsible?
12. What method of cleaning floors is employed?
 - (a) Ordinary dry-broom?
 - (b) Brush or broom with use of sweeping compound?
 - (c) Oiled brush?
 - (d) Vacuum cleaner?
13. How often are floors scrubbed?
14. (a) Are floors oiled? (b) If so, how often? (c) How is oil applied?
15. How often is dusting done?

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16. What method of dusting is used?
 - (a) Feather duster?
 - (b) Damp cloth?
 - (c) Any other method?
 17. How often are windows washed?
 18. How often are toilets cleaned?
 19. To what extent does the janitor have responsibility for discipline of pupils upon school premises?
 20. Are janitors unionized?
- Kindly send copy of school board rules and regulations regarding janitors, and special reports, if any, relative to janitor's work.

In reply to this questionnaire 1,109 returns were received. All answers were first carefully tabulated under their proper headings, and summaries were then made of all replies to each question. The data thus summarized appear in the various sections to which they belong throughout the study, together with whatever interpretation and discussion they seem to require.

A summary of results and conclusions growing out of the study will be found in Chapter VI.

Chapter II.

IMPORTANCE OF THE SCHOOL JANITOR'S POSITION.

Some well-known specialists in education are of the opinion that the janitor is about the most important person in a school system. Doctor Dresslar says: "The janitor of a modern school building is, next to the principal, perhaps the most important officer in the school" (90). Termon expresses the same opinion in the following language: "The position of janitor is a very responsible one; no other individual about the school building, unless it is the principal, has so much influence over conditions which affect the health of pupils (8). Another eminent school authority says: "A good janitor is harder to replace than a good teacher, and in most cases than a good principal" (1).

These statements are not extravagant. Most people, however, fail to realize their truth; in fact, most people never go so far as to give the subject any thought at all—not even the mothers and fathers of the children. That school boards do not have an adequate conception of the importance of the janitor as a school officer is evidenced by the fact that most janitors are still selected and appointed for personal or political reasons rather than on the basis of merit; and, strange to say, a great many superintendents and principals also fail to appreciate the importance and responsibility of the janitor as a vital factor in education.

DEVELOPMENT OF THE JANITOR SERVICE.

The cause for the nonappreciation of the janitor's position is not far to seek. It is due to the failure to realize that the requirements in this branch of the public service have grown along with the advancement we have made in educational matters generally, and especially in the matter of school buildings. In the days when almost any kind of a building was good enough for school purposes, the question of the janitor was not so important. About the only duties he was expected to perform were those of building fires and sweeping. Now there are literally scores of duties for him to perform, many of which are not usually considered by those who employ him. This development of the janitor's duties, both in variety and importance, makes it necessary that he now be

classed as a responsible and intelligent school officer, technically qualified to manage a modern school building, and with knowledge and skill in handling and caring for its expensive equipment. Following are five general requirements showing the importance of the janitor's relation to the school and its management.

SAFEGUARDS VALUABLE PROPERTY.

It is a matter of no small importance that the care and safeguarding of valuable school property rests upon the janitor. A man who is charged with the management and care of a building worth, say, \$200,000, a heating plant worth \$30,000, and other mechanical equipment worth perhaps \$25,000, is a man of some importance in the community; and hundreds of janitors have charge of school plants costing many times more than the figures given. Moreover, the janitor is responsible for keeping a check on the use of fuel, light, water, and supplies to the amount of many thousands of dollars every year. The common practice of selecting persons who are not suited for the positions, either by nature or training, has frequently resulted in inefficient service, wasted supplies, and early deterioration of valuable school plants—to say nothing of the indirect but far-reaching results which show themselves in school fatigue, languor, sickness, and more or less permanent physical defects which the children develop while in school and carry with them through life.

SETS HOUSEKEEPING STANDARDS.

In the second place, the janitor sets the housekeeping standards of the school. He is to the school what the housekeeper is to the home. His work in setting conditions of right living is valuable as a fundamental means of education. He not only sets standards of cleanliness and sanitary condition of floors, windows, toilets, basements, etc., but he also has large control over the attractiveness of rooms, yards, lawns, and the entire premises. The investigation shows that some buildings are not kept in a neat and cleanly condition, either inside or out, and that the grounds often present a ragged and unkempt appearance. In one city having a population of 157,000 (27), in addition to the usual accumulations of useless debris, the basements of school buildings are being used as hen-houses. In other cities both buildings and grounds are clean, attractive, and everything is in order.

Obviously, one of the school's chief duties is to inculcate in our children a taste for neatness and cleanliness, as well as an intelligent understanding of their importance. This should be done both by precept and example. Children from homes where housekeeping standards are high should not have them lowered at school, where they are supposed to prepare for right living; and children from homes in which the standards are too low should be shown at school, as far as possible, what correct housekeeping is. It is certain that the conditions under which children live in these schoolhouses for 5 days a week, 9 months a year, for 8 or 12 years, have much to do with establishing their own standards and habits of cleanliness and order when they leave school and set up homes of their own. Doctor Putnam is probably not far wrong in saying that we have been running our schools too much under the impression that they exist mainly to get children through the grades, or graduate them from high school, or prepare them for college, or train them to make money, instead of keeping in view the true object—"to make good mothers and fathers of better children" (5).

MORAL INFLUENCE OF THE JANITOR.

Again, the janitor's position in the school is important from the moral standpoint. The fact should be constantly borne in mind that we place in our school buildings practically every citizen of the country at his most critical age—the age not only of most rapid physical growth and development, but the age when moral and intellectual standards are set up, and when character and ideals are formed. The janitors who preside over these buildings necessarily come in close and intimate association with teachers and pupils, affording daily opportunity for moral service which must be tactfully and wisely performed. The reports received show that in 60 per cent of the cities the janitors have direct responsibility for discipline of pupils upon school premises. This responsibility extends all the way from merely reporting misdemeanors and irregularities to teachers and principals, to general supervision and authority at all times. In many cases the janitor has the same authority as teachers for discipline during school hours, particularly at recess and noon, and even greater responsibility before and after school. No teacher in a school comes into more vital contact with the boys than the janitor, especially in and around boys' toilets, in basements, corridors, and on the grounds. The position of school janitor, therefore, is not the place for a man of uncertain reputation or doubtful integrity; but along with his special training he should be a man of high intelligence and sterling character.

LARGE CONTROL OVER HEALTH CONDITIONS.

The janitor of a school building derives much of his importance from the large control he has over health conditions in which pupils and teachers must live. It is now generally recognized that the physical development of the child is just as important as the mental. Physical environment is the most important factor in the health and physical well-being of pupils; and the school officer who has most direct and continuous charge and control of the physical environment of school children is the janitor. The two details of environment which most affect health, as well as efficiency, are schoolhouse cleanliness and schoolhouse air; and both cleanliness and the kind of air which children must breathe while in the building—its temperature, moisture, degree of dustiness—depend largely upon the janitor.

Nervous disorders, dullness, pallor, colds, catarrh, and a group of symptoms called "school fatigue," have come to be recognized as common accompaniments of the educative process. Under these conditions, diphtheria, pneumonia, and tuberculosis more easily develop. It is probable that the overheated, excessively dry, dusty, and otherwise vitiated air of the average schoolroom, where children are compelled to congregate and where their health habits and ideals are formed, is largely responsible for the prevalence of these disorders, not only in school but also in after life. Moreover, diseases are frequently spread either by the germs being transmitted from one person to another through the air, or by a well person coming in direct contact with disease germs that have been deposited on desks, furniture, toilet fixtures, etc., which have not been promptly and thoroughly disinfected. Again, serious eyestrain may be caused by accumulations of soot and dust upon schoolroom windows. And all these things, in turn, have a direct bearing on methods of cleaning and manner of handling the school plant, which, in their last analysis, rest upon the efficiency and faithfulness of the janitor.

RELATION TO FIRE HAZARDS AND SAFETY.

Perhaps the most important matter resting upon the janitor in connection with his management and care of the school plant, is his responsibility in relation to fire hazards and the safety of children.

H. W. Forster, in his bulletin on Fire Protection for Schools (46), points out that the most effective safeguard against fire danger is to prevent fires from starting. This can only be done, of course, by removing, as far as possible, the causes from which fires originate. Some of the most common causes of fires in school buildings are overheated furnaces and carelessness in firing, leaky gas pipes, careless use of matches by smokers, accidental ignition of waste paper, spontaneous combustion among supplies and accumulations of rags, waste, old materials, etc. It is evident, therefore, that one of the principal elements in the removal of fire cause in school buildings is efficient house-keeping, and especially in keeping basements clean and in order.

Various inflammable liquids, such as benzene, gasoline, alcohol, kerosene, linseed oil, and turpentine, are used in connection with technical courses in school, as well as by the janitor for cleaning and other purposes. These liquids frequently find their way into buildings in considerable quantities. Some of them are spontaneously combustible and burn very rapidly when ignited, even to the point of explosion. Whether or not all such liquids are kept in safety cans at all times, and when not in use are carefully stored away in the safest possible place, either within or outside of the main building, depends upon the intelligence and faithfulness of the janitor. Such materials are frequently found carelessly scattered around, or thrown together in a corner or dark room in the basement, along with accumulations of broken seats, broken ladders, worn-out brooms and mops, waste, rags, and the like, some of which are more or less saturated with oil or wax and are subject to spontaneous combustion.

Such accumulations of inflammable material, old worn-out supplies, and junk of all kinds, are responsible for the very common origin of fires in basements of school buildings. The Indiana State board of health reports that more than 50 schoolhouse fires occur every year in the State of Indiana alone, and that most of them originate in the basement. (4) The well-known fire in St. John's Parochial School, Peabody, Mass., which occurred October 28, 1915, and in which 21 girls lost their lives, started in the basement containing a large amount of combustible materials.

A janitor who is careless or indifferent in regard to fire hazards, in the smallest details, should not be tolerated under any circumstances. His house-keeping should not only be maintained at such a standard as to prevent fires as far as possible, but he should be familiar with and know how to use the fire-fighting equipment, and should know beforehand just what he will do in case of fire. Such simple precautions, as keeping matches in closed metal or glass cases, the prohibiting of smoking in any part of the building, and seeing that all outside doors are kept unlocked during school hours are of the utmost importance. When the disastrous fire occurred in the Lakeview Grammar School at Collinwood, Ohio, on March 4, 1906, one of the vestibule doors on the first floor was bolted; a jam occurred there, the children became panic-stricken, and 73 pupils and two teachers were burned to death.

From all of the foregoing, it is apparent that the intelligence and care exercised by the janitor in keeping the building clean, and his efficiency in handling the entire school plant, constitute an important factor in safeguarding the lives of millions of children during the time they are required to stay in the school buildings we provide for them.

Chapter III.

ADMINISTRATION OF JANITOR SERVICE.

I. SELECTION AND APPOINTMENT.

METHODS USED.

To the question, "Are janitors selected and appointed by civil service or merit system?" 1,087 replies were received. Of these, 796 answered "no"; 213 answered "merit"; and only 76, or less than 7 per cent, reported "civil service" as the method used.

It was requested that all cities using the civil service or merit system in the selection and appointment of their school janitors submit a sample list of examination questions, or a statement as to their standard of requirements. Some replied that they give no written or formal examination, and none of those reporting "merit" as their method submitted the desired list or statement. This points to the conclusion that in most of these cases the so-called merit system consists mainly of some oral questions, and a selection made largely on the recommendations which the applicant is able to produce. This may mean that there is an honest, intelligent effort made to secure men who are qualified by training and experience for the position, or it may mean that the applicant with the most influential recommendations gets the appointment, whether or not he is the best man for the place.

PHYSICAL EXAMINATION.

The returns show that only 73, or a little less than 7 per cent of the 1,087 cities reporting, require applicants for the position of school janitor to pass a physical examination. This would seem to indicate that improvement is needed along this line, inasmuch as good health and physical endurance are essential to successful and satisfactory janitor service.

BY WHOM RECOMMENDED.

An effort was made to ascertain who passes upon the qualifications of applicants and recommends appointment to the board of education in those schools where the civil service or merit system is not employed in the selection of janitors. A summary of the replies received is given in the following table:

TABLE 1.—Selection and appointment of janitors.

Recommended by—	Number of cases.	Recommended by—	Number of cases.
Superintendent of schools.....	342	Secretary or clerk of board.....	11
Buildings and grounds committee of the board.....	41	Chief engineer.....	4
Superintendent of buildings, custodian, or head janitors.....	41	Some member of board.....	2
Committee on janitors.....	30	Political leaders.....	1
Principal.....	19	Board acts as a whole without recommendation.....	157
Business manager.....	16	Total.....	677
Property committee of board.....	12		

The summary shows that in the largest number, 342, or 50 per cent of the cities, the superintendent of schools makes recommendation to the board; in 41, the committee on buildings and grounds; and in the same number, the superintendent or custodian of buildings. The committee on janitors recommends in 30 cases, and the principal in 19; while in 157 cities the board acts as a whole without outside recommendation. Only one of the cities reporting had the courage to say that recommendation for appointment of janitors is made by political leaders.

STANDARDS OF EFFICIENCY.

Several lists of examination questions were submitted by cities in which janitors are selected and appointed through the civil service system. One of these (from Newark, N. J.) is reproduced under Appendix A, in the hope that it may be suggestive to schools desiring to introduce the civil service method for determining the qualifications of applicants.

The importance of the janitor's position should be sufficient reason for requiring that in every case he pass an examination testing his fitness for the work he is expected to perform. Competitive examinations for janitors are just as necessary as for teachers, and all appointments should be made upon the basis of merit and demonstrated fitness, and never because of political influence, personal friendship, or the whim of the school board. Every school system should adopt for itself a minimum standard, below which janitors should not be allowed to fall. We have fairly well-established standards of efficiency in many other kinds of public service, as well as in private affairs, where less money is spent and where the service is less important from the standpoint of public welfare. Elementary teachers in most cities receive less pay than the janitors, and yet they are required, very properly, to reach and maintain standards of efficiency involving the expenditure of much time, money, and effort.

A few years ago the qualifications of a school janitor were not so exacting, but the proper operation and care of a modern school plant require a man with considerable and varied scientific knowledge and training. He should not only know how to build fires and keep them going, but he should know why a fairly even temperature should be maintained, and what the injurious effects upon the human system are when rooms become excessively hot or cold.

He should not only know how to operate a ventilating system, but he should have a clear understanding of the need of fresh, clean air, and the injurious effects of stale, impure air.

A school janitor should be required to have sufficient knowledge and training in mechanics to be able to handle and care for gas engines, electric motors, and switchboards, to control plumbing fixtures, to take proper precautions against the spread of fires, understand the use and management of thermostats, and the various modern aids to good sanitation. It is little short of a crime for a city to go to the expense of erecting modern school buildings and equipping them with up-to-date apparatus and fixtures, and then turn them over to janitors who do not know how to care for them, and who do not have the intelligence and training to understand their purpose or appreciate their value.

Before any one receives an appointment as janitor, it should be known that he has expert knowledge of the best modern methods of cleaning, sweeping, dusting, and general sanitation. He should know how to oil floors and keep them in condition; he should know the necessity for sweeping compounds and how to make them. It is no small task to keep several acres of floor space neat and sanitary in a schoolhouse full of children, and if a janitor is to be successful

he must not only have a genuine love for cleanliness himself, but he must know how to remove dirt and dust in the most effective manner. There is no sufficient reason why scientific knowledge and methods should not rule in the janitor service just as fully as in any other department of the school system.

Another matter that should always be carefully considered in the selection of a school janitor is the element of character. He should be a man of good morals and of good habits, and should have such a genuine interest in school boys as to altogether discountenance any tendency towards vulgarity or improper conduct in any part of the building or anywhere on the premises. In his daily contact with the boys in the basement, toilets, halls, and on the playgrounds, if he is coarse, careless, and immoral, or is a man of low or questionable habits, he will necessarily exercise a degrading influence upon them.

II. COMPENSATION OF JANITORS.

SALARIES PAID.

It was requested in the questionnaire that each city state the highest, the lowest, and the average salary paid to its school janitors. The main object in securing these data was to get the average salaries paid janitors for the purposes of comparing them with salaries paid other school officials, especially teachers.

Taking the average of all the replies received on this point, it is found that the average salary paid to janitors is \$980.42. It should be noted that this average is made up from cities in every section of the country, in some of which the salaries are very low. Furthermore, there is reason to believe that many cities, in getting the average submitted, included the very lowest amounts paid assistants and helpers, some of which are for part time only. If all such cases could be eliminated, as they should be, the general average would be somewhat higher.

It should also be borne in mind that the averages given are exclusive of the additional compensation received for extra service, such as evening schools, evening play centers, vacation schools, vacation playgrounds, free lectures, etc. This item would also raise the general average, inasmuch as 622 cities, or 65 per cent of those reporting, pay additional amounts for such extra service. A few cities also furnish living quarters to all or some of their janitors, and the value of these is, likewise, not included in the averages here given.

Even as it is, however, the average salary paid janitors, taking the country over, is higher than the average salary paid elementary teachers. This is indicated, in the first place, by some of the survey reports. In the city of Oakland, Calif. (28), for instance, it was found that kindergarten and elementary teachers are paid a minimum salary of \$790, and a maximum of \$1,200 per annum. The minimum salary paid school janitors is \$900, and the maximum \$1,200 per annum. In Elyria, Ohio (21), at the time the survey was made (1917), school janitors were paid from \$840 to \$1,260 per annum.

The median salary of elementary teachers in Elyria was \$700. The median salary of janitors in elementary schools was \$975, or \$275 more than for elementary teachers. The highest salary paid a principal of elementary schools was \$887.50, or \$372.50 less than the highest-paid janitor, and only \$47.50 more than the lowest-paid janitor.

In Table 2 are listed 50 cities in which are compared the average salaries of elementary teachers and the average salaries of janitors in the same cities. These cities are selected from all sections of the country, and are believed to represent the situation generally. In every city, except one, janitors are paid higher salaries than teachers—in some cases twice as much. The single exception is the city of Boston, where the average for teachers is \$1 more than for janitors.

TABLE 2.—Average yearly salaries of elementary teachers, compared with average salaries of janitors in certain cities.

Cities.	Teachers.	Janitors.	Cities.	Teachers.	Janitors.
Phoenix, Ariz.	\$410	\$800	Raton, N. Mex.	\$686	\$912
Fresno, Calif.	850	1,275	Corning, N. Y.	616	1,100
Denver, Colo.	852	1,375	Dunkirk, N. Y.	600	1,020
Boise, Idaho.	900	1,100	Charlotte, N. C.	425	860
Moline, Ill.	630	1,200	Fargo, N. Dak.	713	1,000
Oak Park, Ill.	750	1,300	Cleveland, Ohio.	791	1,500
Rockford, Ill.	544	1,130	Dayton, Ohio.	654	1,320
Indianapolis, Ind.	761	1,130	Elyria, Ohio.	700	1,350
Dubuque, Iowa.	538	1,116	Tulsa, Okla.	604	1,300
Marshalltown, Iowa.	600	1,050	Salem, Oreg.	675	810
Lawrence, Kans.	533	665	Easton, Pa.	546	900
Newport, Ky.	630	900	West Chester, Pa.	600	1,112
Augusta, Me.	519	900	York, Pa.	483	800
Boston, Mass.	1,001	1,000	Laurens, S. C.	473	720
Fall River, Mass.	646	1,170	Sioux Falls, S. Dak.	673	1,200
Malden, Mass.	679	1,100	El Paso, Tex.	687	900
Kalamazoo, Mich.	635	1,250	Marshall, Tex.	459	510
Duluth, Minn.	724	1,200	Ogden, Utah.	638	1,320
Minneapolis, Minn.	937	1,250	Portsmouth, Va.	489	1,200
Winona, Minn.	577	800	Richmond, Va.	578	1,000
Meridian, Miss.	478	720	Everett, Wash.	868	1,224
Missoula, Mont.	1,080	1,200	Seattle, Wash.	1,021	1,476
Grand Island, Nebr.	521	950	Kenosha, Wis.	585	1,320
Hackensack, N. J.	750	780	Madison, Wis.	634	800
Paterson, N. J.	606	1,000	Cheyenne, Wyo.	840	1,020

It is probable that salaries of teachers in some of the cities have been raised during the past year. It is also true that teachers' salaries are for the school term only, while 75 per cent of the janitors are employed for the entire year. But an average increase of as much as 50 per cent for teachers would still not bring them up to the average salary of janitors. In fact, as late as June, 1919, about the time the data in regard to janitors were collected, Dr. P. P. Claxton, United States Commissioner of Education, stated that "the average salary of school-teachers in the United States, 600,000 in elementary and high schools, including principals and special supervisors and expert teachers, is about \$825" (45), or about \$355 a year less than the average salary of school janitors. This does not mean, of course, that janitors are paid too much; but the salaries of janitors as compared with those of teachers have a direct bearing upon the importance of the position, and the need of standardizing this service through civil service entrance requirements, and in every possible way endeavoring to put it on a professional basis.

BASIS FOR DETERMINING COMPENSATION.

The important thing in connection with the compensation of janitors is not the specific rates of pay, but the basis upon which the salary schedule is made. Varying conditions in different cities and sections of the country will naturally govern the specific salaries paid, and consequently salaries may be expected to vary considerably; but the bases upon which wages are fixed are capable of being standardized, as they can be adapted to conditions in any locality.

Request was made in the questionnaire for a statement as to the basis, or bases, upon which janitors' salaries are determined. Of the 573 cities reporting on this feature, 95 stated that they have no established basis. It is probable that practically all of those which did not report likewise have no regular basis upon which salaries are fixed. The various answers received are given in the following summary, Table 3, a glance at which will indicate the great number and variety of factors which really enter into the cost of cleaning and curling for a school building:

TABLE 3.

Factors used in determining the compensation of janitors.	Cities reporting.
Size of building.....	179
Number of rooms.....	167
Size of building and grounds.....	30
Size of building and kind of heating apparatus.....	24
Floor area.....	19
Floor area, size of grounds, type of heating apparatus.....	13
Size of school.....	11
Size of building and grounds, and kind of cleaning equipment.....	7
Floor and window area, size of grounds, kind of heating apparatus.....	6
Size, character, and condition of building.....	3
Number of rooms and amount of floor area.....	3
Union wage scale.....	3
Size of building, number of windows, and type of heating apparatus.....	1
Size of building, number of teachers, and pupils, area of lots and walks.....	1
Floor area, paved area, and mechanical equipment.....	1
Cubic contents of building, glass area, yard, lawn, sidewalks.....	1
Number of rooms, number of trees, size of grounds, and kind of heating apparatus.....	1
Floor area and amount of coal consumed.....	1
Number of rooms, lineal feet of sidewalks, square yards of gymnasium.....	1
Number of rooms, number of fires kept, square feet ball space, size of lawn and playgrounds.....	1
Salary arbitrarily fixed—same for all buildings.....	1
No established basis.....	95
Total.....	573

It will be seen that the size of the building is given by 179 cities as the only basis used in fixing salaries, and in 167 cases the number of rooms is the only determining factor. Both of these are used in a few other cities in combination with other factors. It is quite probable that in many cases "size of building" and "number of rooms," as given in the reports, mean the same thing. It is surprising that either of these alone is used in such a large number of cases, and it is still more surprising that the actual amount of floor space is given in only 43 cases altogether, either alone or in combination with other factors. It is also remarkable that such a small number of cities mention the heating apparatus and other equipment as determining factors. The size of grounds is mentioned in 60 cases, while the important matter of window area comes in for recognition only eight times, and the character and condition of the building only three times.

Taken together, the reports indicate that in most cities the pay of janitors does not depend upon any recognized principle, but varies from building to building according to some traditional plan.

NUMBER OF ROOMS NOT AN EQUITABLE BASIS.

The common plan of fixing janitors' pay upon the basis of the number of rooms or size of building alone does not equitably distribute the salary in accordance with the service rendered. Such a scheme takes no account of the actual floor space in the rooms and corridors to be cleaned; of window area

to be washed; of lawns to be cut, which differ in size in most cities and very widely in difficulty of cutting; of sidewalks to be cleaned, which vary in area; of the age and condition of the building, or of floors and heating plant in the building, all of which vary widely and always react to the disadvantage of the janitors in the older buildings. It is probably true that all of the factors mentioned, which enter into the efficiency of the janitor service, cannot be taken fully into account, but it is believed that most of them can be evaluated, at least approximately, in making a salary schedule.

A STANDARD RATE FOR EACH CLASS OF WORK.

In some schools a flat rate per building or per room may approximate the amount that would be allowed on a floor space, ground area, cubic contents, or other basis. But a standard rate should be adopted for each class of work performed by janitors. This rate must necessarily be somewhat arbitrary and in accordance with the compensation deemed adequate to the service required. In the main, salary schedules for janitors can be arranged in terms of five classes of work, viz: (1) Heating, ventilating and supervision; (2) cleaning in the building; (3) care of yards and sidewalks; (4) care of lawns; (5) washing windows.

(1) Compensation for heating, ventilating, and supervision may be based upon the type of plant, the amount of work required in its operation, and the number of persons employed on the engineering and janitor force. Another plan is to base compensation for this item of work upon a classification of the buildings according to the number of cubic feet actually used for school purposes, and the character and condition of the buildings. The latter plan is probably the more equitable, inasmuch as the work required for each building can be ascertained with a greater degree of accuracy.

(2) A fair method of compensation for both daily and periodic cleaning of buildings is to allow a rate sufficient to cover the cleaning of free area, such as corridors, and to this amount add a certain sum for each room, depending upon the kind of room, and in some instances (for example, assembly halls) upon the size of the rooms and kind of seats; or, allow a rate covering the entire floor area as if it were all free area, and then an additional amount for each room, according to the kind and size of room. In the latter case, the amounts allowed for the different rooms should pay for the difference in labor required to clean these rooms and the labor required to clean the same amount of free floor area.

It takes more time, and therefore costs more, to clean (sweep or scrub) a given area in a classroom than it does to clean the same area in a corridor. Also, it requires more time to scrub a toilet room than to clean the same area in the basement playroom.

The work involved in cleaning a high-school building usually varies greatly from that in an elementary school building of the same size, because of the presence of laboratories, lockers, and other special equipment peculiar to high schools. There is considerable extra work entailed in cleaning this special equipment, and superior qualifications are required of the janitor in charge to insure intelligent care of expensive apparatus. A just and practical method of allowing for this extra work would be to allow higher rates for the cleaning of special rooms, such as laboratories, manual training and domestic science rooms, and also an extra rate per thousand square feet for the entire floor area

of such schools to provide for the cleaning of such equipment as lockers, and for the general higher qualifications demanded in the high-school janitor.

Some cities have, in recent years, adopted the plan of paying for all cleaning on the basis of the cubic contents of the building, just as they do for the heating and ventilating service.

(3) Compensation should be allowed for the care and cleaning of yards and sidewalks at a specified rate per square foot or square yard for the entire area.

(4) The care of lawns should also be paid for on the basis of their total area, at a specified rate per square foot or yard, which is usually somewhat higher than the rate for yards and walks. In some cases there should also be a rate for the care of trees, according to their kind and number.

(5) Compensation for cleaning windows should be commensurate with the frequency with which local conditions require windows to be washed, and the area of glass to be cleaned. This class of work should include all windows, transoms, doors, and glass in permanent bookcases. Some cities allow a rate per square foot for each washing on both sides of the glass; others allow a rate per square foot per year for a specified number of cleanings on both sides.

Some standardized plan along the lines indicated should be worked out by every city, large or small, to suit its particular conditions. Of course, there will always be found in each building some conditions not present in all, and for which extra compensation should be allowed, such as night schools, community center meetings, care of swimming pools, and the like.

THE BOSTON SCHEDULE.

As a concrete example of a good salary schedule for school janitors, attention is called to the new schedule for the city of Boston, a copy of which is given under Appendix C. This schedule has been used by other cities, towns, and institutions as a basis for fixing the salaries of janitors, or for devising schedules of their own to suit their special conditions. In this schedule, five factors are used as a basis upon which to compute the compensation, viz:

1. Cleaning.
2. Heating, ventilation, and superintendence.
3. Washing windows.
4. Care of yards and sidewalks.
5. Care of lawns.

Compensation for factors 1 and 2 (cleaning, heating, ventilation, and superintendence) is according to the cubic contents of the building, at specified rates per cubic foot; compensation for factors 3, 4, and 5 (washing windows, care of yards and sidewalks, and care of lawns) is according to areas of such items, at specified rates per square foot. The sum of the amounts thus arrived at in any particular building is the annual compensation for its janitor service.

III. JANITORS' QUARTERS.

LIVING QUARTERS.

To the inquiry as to whether janitors, in addition to salaries, are provided with living quarters, replies were received from 1,089 cities. Of these, 22 indicate that they provide living quarters for all janitors, while 52 cities report

that such quarters are furnished to one or more of their janitors. In the remaining 1,025 cases, or 93 per cent of those reporting, janitors are not furnished with living quarters at all.

If a city undertakes to provide houses or apartments for its janitors in any way, it should be done in a more efficient manner than has usually been the case, as indicated by the various school reports, surveys, and other data at hand. With few exceptions, living quarters provided for janitors are located in the basements of the school buildings. They are usually at one corner, with about two rooms exposed on one side of the building, and an interior bedroom having no immediate connection with the outside. Generally, no effort has been made to give them a sunny exposure. As a rule, therefore, the janitors' flats are dark, cold, poorly ventilated, and are sometimes damp and unsanitary. In some cases they are reported to have no toilet facilities apart from those provided for the school children.

It is obviously a short-sighted policy which requires janitors to live in dismal underground quarters, not only because it is inhuman, but from the standpoint of the service itself; for the type of janitor who is satisfied, or even willing, to live in such places, is not usually the type of person who could be expected to render the kind of service a school needs. Either better quarters should be furnished, or the responsibility for housing the janitors abandoned altogether, and their salaries raised accordingly.

In some cities the by-laws of the board of education require that janitors shall live within a certain specified distance from their respective buildings. In New York City, for example, the maximum distance is 1,500 feet; but it is not always possible, especially in the congested foreign quarters, for a janitor to secure reasonable accommodations anywhere within the prescribed radius of the building in his charge. So, taking into consideration the protection of school children, as well as the proper performance of the janitor's duties, living quarters for his family are being provided on the roofs of all large new school buildings erected in New York, the same as is now done in many large office buildings. In the larger school buildings this would seem to have a decided advantage over the basement apartments, particularly for two reasons: Better living conditions can more easily be provided, and, if necessary, the janitor's family can be isolated in case of illness. However, it is believed that only in the largest cities, and then only in exceptional cases, should living apartments for janitors be provided in school buildings.

Typical provisions in regard to the residence of janitors are contained in the rules and regulations governing the janitor service in the city of Oakland, Calif., and are as follows:

SECTION 1. Each head janitor shall reside within a reasonable distance of the building or buildings under his charge. He shall see that his name and address and the number of his telephone, or of the nearest telephone from which he may be called, are on file in the offices of the principal and secretary-business manager. In case of change of address or telephone number, either or both shall be immediately reported in writing to both offices.

Sec. 2. It shall be the duty of each head janitor to fill out, post, and maintain, outside the main entrance of the building to which he is assigned, a card supplied by the board of education giving his name, address and telephone number, location of the nearest hydrant and fire-alarm box.

OFFICE ROOM.

Considering the importance of the janitor as an officer in a modern school system, more attention should be given to the question of providing him with

suitable office quarters in the building. In nearly all of the older buildings, and in some of the more modern ones, no provision has been made for a comfortable and properly equipped office or room set aside for the janitor's own use. If he is assigned any quarters at all, it is usually a little dingy room opening off from the coal bin, with a cement floor and whitewashed walls, or still worse, a small cleared space around the boiler, with some hooks or nails driven in the wall on which to hang his coat and hat.

The fact that the janitor's office must usually be located in the basement is no reason why it should be made uncomfortable and unattractive. It should not only be convenient to the boiler room, but should be so located that it is well lighted and receives at some time during the day the direct rays of the sun. A wood floor is probably the best for a business office, but one of cement is not objectionable if covered with suitable material.

In furnishing the room, two things should be kept in mind: First, comfort, in view of the fact that in extremely cold weather the janitor's hours at the building are very long—frequently from 4 or 5 o'clock in the morning until 10 o'clock at night, in order to keep his fires going strong enough. In the second place, it should be remembered that the janitor in a school system of any size has a great many duties to perform besides tending fires, cleaning, sweeping, and dusting. He usually receives the supplies, keeps account of the time of workmen in and around the building, and does various other things of a clerical nature. If he is to do this work efficiently, he should be provided with a good desk at which he can write and keep his accounts, and a cabinet in which to file his correspondence, bills, and other papers which he is obliged to handle. He should be provided with several chairs, and in many places it would be desirable to furnish him with a comfortable couch.

There should be direct telephone connection between the janitor's and principal's offices. Also, there should, of course, be direct connection from the janitor's office to the fire-alarm system; and where the building is equipped with a system of thermographs for indicating the temperature in each room, the recording apparatus should be installed in the janitor's office.

Adjacent to the janitor's office, there should be a small toilet room for his exclusive use, with a lavatory and hot and cold running water provided.

If school janitors were provided with comfortable and convenient office quarters along the lines above indicated, it would not only go a long way toward impressing them, as well as the entire school community, with the importance and dignity of the janitor's position, but would also pay large dividends, in the way of better service, on the small amount of money invested.

IV. RATING AND PROMOTION OF JANITORS.

METHODS OF PROMOTING.

Of the 918 cities reporting on the question of promotion of janitors, 667 make promotions upon merit, 80 upon length of service, and 270 upon both merit and length of service.

In cities where merit is the controlling factor in making promotions, information was requested as to who makes recommendation to the board of education. This information was furnished by 602 of the cities, the replies being distributed as shown in the following summary:

TABLE 4.—Promotion of janitors.

Recommended by—	Cities reporting.
Superintendent of schools.....	397
Superintendent of buildings.....	33
Supervisor of janitors (or head janitor).....	26
Committee on buildings and grounds.....	25
Business manager.....	17
Principal.....	15
Committee on janitors.....	9
Chief engineer.....	7
Secretary of board.....	5
Board acts without special recommendation.....	67
Total.....	602

KEEPING SERVICE RECORDS.

If promotions are to be made with fairness to all the janitors, it is very important that accurate service records be kept. It seems to be the practice generally to assign the best men to the larger buildings, and where pay is based upon the number of rooms or size of building, such assignment is really a promotion. But in most school systems no efficiency ratings of janitors are kept, and the personal judgment of the superintendent, principal, committee on janitors, or other officer or committee over them, controls nearly all promotions to the larger and better buildings, and to higher salaries.

It is no small task to rate the efficiency of janitors with entire fairness, owing to the great variety of duties devolving upon them. But it can be done, provided there is intelligent supervision and inspection, and if regular reports are made and records kept. In all efficiency ratings for promotional purposes there are several things which must be taken into consideration, such as: (1) Leadership, which includes organizing and executive ability; (2) Industry, which is always shown by the quantity and quality of work performed; (3) personality, embracing such qualities as force of character, personal appearance, manners, language, tact with children; (4) attitude—whether satisfied and loyal, or dissatisfied and complaining.

Along with the efficiency rating, proper credit should also be given for seniority of service.

A PRACTICAL PLAN.

A very simple, practical plan for classifying and promoting janitors and engineers according to merit is the one followed in the schools of Chicago. The Chicago board of education has classified all these positions in four groups, as follows:

Group A.—All positions of school janitors and engineers receiving a total salary of \$3,000 or more per annum.

Group B.—All receiving a total salary of \$2,500 per annum or more, and less than \$3,000 per annum.

Group C.—All receiving a total salary of \$2,100 per annum or more, and less than \$2,500 per annum.

Group D.—All receiving a total salary of less than \$2,100 per annum.

Instead of civil service promotional examinations, advancement examinations from group to group are held by the civil service commission at the request of the board of education, and no janitor or engineer can be transferred

out of his group, but must qualify for transfer to a higher group by passing the advancement examination consisting of a test on duties and operation of plants. Credit is given for both seniority and efficiency. An efficiency system has been devised, consisting of three factors, as follows: (1) Industry—weight 5; (2) Economy—weight 3; (3) Attitude—weight 2.

The mark given under each factor is multiplied by the weight attached thereto, and the general mark under the head of "quality of work" is the result of the total credits under the three factors, divided by 10, the total sum of the weights. The mark thus obtained, together with the credit given for seniority, determines each man's standing as compared with others in his group.

It is believed that a plan similar to the foregoing could be used by any city of considerable size for rating and promoting its janitors. Of course, the groups would have to be changed according to salaries paid and other local conditions. In the smaller cities, instead of classifying into groups, janitors could be rated according to merit and all placed in one list, and promotions made in the order of their grade and standing on the list. In any event, it should be well understood by all concerned that promotions to the better positions and higher salaries will always be made solely on the basis of merit and seniority, and never on account of politics or personal favoritism.

V. TENURE.

The inquiry as to whether janitors are employed for the entire year or for the school term only, brought 1,057 replies, distributed as follows:

For entire year.....	800
For school term only.....	143
Some for year, some for term.....	108
For 11 months.....	4
For term plus one month.....	1
For term plus one week.....	1

Total..... 1,057

It will be observed that 800 cities, or about 75 per cent of those reporting, employ their janitors for the entire year; 143, or a little over 13 per cent, for the school term only; while in 108 cities some are employed for the year and some for the school term.

In a study by W. S. Deffenbaugh of school administration in the smaller cities (11) it was found that in 958 cities, or 71½ per cent of those reporting, janitors are employed for the entire year, and in 390, or 28½ per cent, for the school term only.

YEARLY TENURE PREFERABLE.

It is believed that every school system, however small, should have its janitors, or at least some of them, on duty the year round. The additional amount paid for salaries during the summer vacation will be more than offset by economies in other directions, and there is usually plenty of work for competent janitors in and around the buildings during the entire time school is not in session. In the first place, buildings should have a thorough cleaning immediately after school closes, and again just before the opening in the fall. During the rest of the summer janitors should be able to make many minor repairs to the building and equipment, such as repairing seats and desks, locks on doors, adjusting loose shelves, putting in window glass, etc. Every janitor should also have the necessary knowledge and training to make

minor repairs to plumbing and heating apparatus. He should also be required to mow the grass, water the flowers, and trim the shrubbery, if any, and keep the entire premises in respectable condition.

Perhaps the best reason why janitors should be employed and paid for the entire year is the fact that a better class of men can be secured by that method, and the advantage would, therefore, be reflected in more efficient service throughout the year. Many cities lose more every year on account of wastefulness and inefficient service than it would take to pay the salaries required to employ first-class janitors.

VI. METHOD OF EMPLOYING AND PAYING ASSISTANTS.

The janitor force employed in the care and operation of a well-regulated school plant is made up of several grades of employees:

First, there is a supervisor of janitors if the system is a large one, or a head janitor in smaller systems, who has general supervision of all janitors and their assistants, inspects the work done, instructs janitors in their duties, and sees that each building is furnished with the necessary supplies, tools, and appliances.

Second, a janitor (sometimes called head janitor or janitor-engineer) in charge of each building, who is directly responsible for the operation, maintenance, and sanitary condition of the building and grounds in his charge. He is also frequently held personally responsible for any damage done to the building, grounds, fences, and other property in or about the building, caused by the misconduct, carelessness, or neglect of his assistants, and the cost of replacing or repairing same is deducted from his salary.

Third, janitors' assistants, janitresses, matrons, and other helpers employed for the detail work of firing, scrubbing, sweeping, dusting, oiling and mopping floors, cleaning windows, caring for yards and sidewalks, etc.

In very large buildings, there is usually a separate engineer for the mechanical equipment and a separate janitor for the housekeeping department, each of whom is held responsible for the proper performance of the work in his department, and each having as many assistants as may be deemed necessary.

There are many buildings, of course, where no assistants are employed, the janitor in charge of each building doing all the work himself. Wherever assistants and helpers are necessary, however, in the cleaning and care of school buildings, it is a matter of considerable importance as to which is the best method of employing and paying such assistants—whether the janitor and all his assistants should be employed and paid directly by the board, or whether only the janitor in charge of each building should be so employed, and he, in turn, employ and pay his own assistants and helpers. In order to ascertain the practice in this respect in different cities, these two questions were included in the questionnaire: "Do the janitors employ their own assistants?" and "Who pays janitors' assistants?"

Of the 946 cities reporting on the first question, 509 state that the assistants are employed by the janitors themselves. In the remaining 437 cities, such assistants are employed directly by the board.

There were 880 reports on the question as to who pays janitors' assistants. In 372 cases they are paid by the janitors, in 502 directly by the board, in 5 some are paid by the janitors and some by the board, and in one city (Cincinnati) by the "cleaning contractor."

Two objections are made to the plan of janitors engaging their assistants and paying them out of their own salaries. In the first place, it is said that this plan places the janitors under too strong temptation to employ a cheap grade of help in order to get the work done with the least possible expense; and in practice it has frequently worked out this way. The other objection urged is that the school authorities have no control over the character of persons so employed, such as parents would wish to have exercised in the selection of persons with whom their children come in such close daily contact.

This question was thoroughly investigated some years ago by the civil service commission of the Chicago Board of Education (38). The report includes the experience and opinions of a number of the larger cities of the country. The conclusion reached, following experiments and tests, was that it is more economical and efficient to have one janitor, janitor-engineer, or custodian in charge of all classes of work in connection with each building and its grounds, with authority and facilities for employing and paying all his assistants and helpers.

This plan has the advantage of placing the power of discipline and immediate dismissal in the hands of the janitor. Under the other system the janitor's sole remedy for nonattention to duty or insubordination is to report the matter to the school board, by whom an investigation is made, and if necessary the delinquent suspended by the president of the board and placed on trial before some official or committee. This is a lengthy process. It is not conducive to good administration, and tends to lower housekeeping standards.

It would seem that the first objection to janitors engaging and paying their assistants can be removed by the board employing the janitor and giving him a stated amount for himself, and then placing at his disposal a certain maximum sum per month or day which may be used only for paying his assistants. The other objection can be met by having a rule specifying the age limit, physical qualifications, and moral fitness of all assistants and helpers, and requiring that all such employees pass an examination accordingly. This gives the school authorities a check on the character and fitness of persons employed by the janitor.

It is believed that this plan is also better than the contract method used in some cities, in which case the janitor service is done under contract with the janitor, janitor-engineer, or custodian, at a specified amount a year, who hires and pays all his assistants, makes minor repairs, keeps the clocks in good order, etc. As a matter of fact, in all cases where the janitor is given one lump sum amount sufficient to compensate him and also pay his assistants, it is virtually getting the work done by contract.

VII. TO WHOM JANITORS ARE RESPONSIBLE, AND THEIR SUPERVISION.

TO WHOM RESPONSIBLE.

There were 1,065 replies received to the question "To whom are janitors directly responsible?" In 814 of the cities reporting, or about 76 per cent, janitors are responsible to the superintendent of schools or to the principal, or to both; in 125 cases, nearly 12 per cent, they are responsible directly to the board of education as a whole or to one of its committees—the committee on janitors, on buildings and grounds, on repairs, etc. In 48 cities the janitors are responsible directly to the superintendent or custodian of buildings; in 29 to the supervisor of janitors or head janitor; and in 20 cases to the business manager. Table 5 contains a complete summary of all the reports received:

TABLE 5.

To whom janitors are responsible—	Cities reporting.
Superintendent of schools.....	530
Principal.....	167
Principal and superintendent.....	117
Board of education or one of its committees.....	125
Superintendent or custodian of buildings.....	64
Supervisor of janitors, head janitor, or chief engineer.....	20
Business manager.....	30
Supervising principal.....	10
Secretary or clerk of board.....	10
Teachers.....	2
Commissioner of public buildings.....	2
Superintendent of maintenance and equipment.....	3
Truant officer.....	1
"No one".....	1
Total.....	1,063

SUPERVISION.

The fact that in 83 per cent of the cities janitors are responsible to the superintendent, principal or board of education, indicates that in most communities janitors are either subjected to no supervision at all, or else that such supervision is merely nominal. Very few members of school boards have the technical knowledge of heating and ventilating plants, and modern methods of cleaning, to enable them to properly supervise and direct such work, and the same thing is true of many superintendents and principals. Even where they do have the technical knowledge and training required, they do not generally give it the time and attention which this service demands.

Janitors, as well as teachers, need careful supervision. In large school systems, all janitors should be united in a department presided over and directed by a supervisor of janitors, who, in turn, is responsible to the superintendent of schools. He should be a competent engineer familiar with the various types of heating and ventilating systems, and the best methods of operating them. He should be familiar with accepted standards of school-house construction and arrangement, and the latest and best methods of keeping buildings in a clean and sanitary condition.

In cities of moderate size, such a man could very well act as head janitor in some large building, such as one of the high schools. He could profitably spend a portion of his time visiting the other buildings, supervising the janitors, and instructing both janitors and principals in methods of cleaning and caring for the buildings.

In the smaller school systems it is still more necessary to combine janitorial supervision with other duties; the most practical plan is for each principal to supervise the work in his own building; but supervision of some kind is necessary, if efficient service is to be secured.

VIII. INSTRUCTION AND TRAINING OF JANITORS.

There is probably no other governmental position of equal responsibility filled by appointees so entirely lacking in technical training and oversight as in the case of school janitors. As a consequence, most of our school janitor service is haphazard. Even among the better class of janitors, the work is usually done by rule-of-thumb methods, and such methods are sure to break down whenever there is a change in conditions.

LITTLE OPPORTUNITY FOR INSTRUCTION.

Very few janitors have had any opportunity for instruction in regard to the scientific principles underlying their work, and fewer still have had any training prior to their first appointment, in the sanitary care of school buildings. The only information they have about such matters has been "picked up," just as was the case with nurses before training schools were provided. Even where civil service examinations are held, there are few, if any, questions on sanitation, one reason being that candidates have had no opportunity for instruction. In a study of various school problems and conditions in the smaller cities by W. S. Deffenbaugh (11) it was found that of 1,248 cities reporting, only 66 give any examination in methods of sanitation to applicants for the position of school janitor, and in many of these such examination is merely perfunctory.

SCHOOLS, CLASSES, AND CONFERENCES RECOMMENDED.

Practically every writer who touches this janitor question at all recognizes the fact that if we are to have efficient school housekeeping we must have janitors who have been specially trained for their work, and all advocate schools, classes, lectures, conferences, etc., as the best means of accomplishing the desired result.

The fact that the janitor service in any city is on a civil service basis does not make schools and classes less necessary or desirable, any more than, in the case of teachers' meetings, institutes, and conferences. In such cases, and in all cases, programs should be arranged with a definite view of awakening the professional interest of the janitors through organized study and conferences, and by providing books, magazines, etc., relating to their work.

Some definite plan should be adopted and systematically followed by each city. The official who is centrally charged with the care of school buildings—superintendent of buildings, supervisor of janitors, janitor-engineer, or whatever his title—should organize a school or classes where janitors can secure instruction in the principles and methods relating to their positions, and all janitors in the service should be required to take this course.

From the loose, careless manner in which a great deal of the janitor service is rendered, it is evident that a large percentage of the janitors are not only ignorant of the principles underlying their work, but of the best methods of performing some of their most elementary duties, such as cleaning, oiling, and care of floors; how to make and use sweeping compounds; proper methods of dusting, washing windows, and cleaning toilets. Instruction that would bring about improvement even in such matters would be of great value in raising health and housekeeping standards, and could be given in any school system.

Moreover, janitors' conferences would be of great value in many school systems in bringing about a closer acquaintanceship among the men themselves. The surveys reveal the fact that frequently janitors do not know the names of men in other buildings. Methods used by one man are new to another, and valuable experiences are not shared. For example, some janitors use more coal than necessary, through lack of understanding of combustion and stoking; others waste water, gas, and electricity; on the other hand, some are skillful in saving, and in making the most of conditions. Some know how to oil floors satisfactorily, while others have the constant complaint of teachers and pupils. If janitors' organizations were formed for the purpose of studying janitorial

problems, where all such experiences could be discussed and examined intelligently, savings would be effected and better service would result.

SOME METHODS USED.

In order to ascertain what efforts are being made in various school systems to give instruction to janitors with a view to increasing their efficiency and raising the standard of this service as much as possible, these two questions were asked: "Do you have any school or classes for the instruction and training of janitors, either before or after appointment? If so, what method is followed?"

Of the 1,068 cities reporting, only 51, or less than 5 per cent, attempt to give instruction of any kind to their school janitors, the other 1,017, or 95 per cent, answering "no" to the first question. Two of the cities reporting affirmatively did not mention the method used. A summary of the 49 reports received as to method employed is given in Table 6, following, in very much the same language as received. This summary might have been somewhat further condensed, but it seemed best to present it this way, as each item given contains some variation from the rest. It will be noted that there is a great variety of methods reported—janitors' conferences; "round table" meetings; evening classes; lectures; instruction by superintendents and head janitors; courses by university extension departments, etc.

TABLE 6.—Instruction of janitors.

Methods used.	Cities reporting.
Weekly meetings (Saturdays) of all janitors; duties discussed by clerk and experienced janitors.	1
Monthly meetings for conference, instruction, and discussion of problems.	8
Four "round table" meetings each year for instruction by the superintendent.	2
Meetings twice a year.	2
Meetings for conference and instruction by superintendent.	9
Janitors' meetings; some books read; suggestions given.	2
7 or 8 lectures a year, of technical nature.	1
Occasional lectures.	1
Lectures twice a year.	1
Lectures and personal instruction, demonstrations, and discussions.	9
Lectures by experts from Iowa State College.	1
Courses given by extension department, University of Wisconsin.	1
Instruction by superintendent and head janitor.	4
Classes for janitors in evening school.	2
Night classes for 4 months, conducted by chief engineer.	1
Evening courses on ventilation.	1
Evening courses on fuel, combustion, etc.	1
Instruction in sanitation, heating, and ventilation.	1
School conducted by building department.	1
Method not given.	2
Total.	51

In explanation of the scope and character of some of these conferences, lectures, and courses, a few actual programs executed, subjects discussed, and outlines of courses followed are given herewith:

1. Following are the programs of three "janitors' conferences," held in the schools of Highland Park, Mich., during the school year 1917-18 (52):

Conferences October 23, 1917:

- I. Some elements of promotion in rank and salary.
- II. The chief janitor's technical knowledge.
Suggestive: (a) General facts about the heating plant; (b) economy in firing and stoking; (c) temperature, thermostats, and ventilation.
- III. Standards of work.

Conference January 8, 1918:

- I. Scientific demonstration of humidity and the impurities of the schoolroom.
- II. Uniformity, use, and economy of janitors' supplies.
- III. Standardization.

Conference April 16, 1918:

- I. The janitor as a moral force, relative to—
 - (a) The management of high-school pupils.
 - (b) The management of elementary pupils.
 - (c) Civic responsibility of the janitor.
 - (d) Playground democracy and the janitor.
- II. The janitor and the health conditions of the school.
 - (a) The janitor or the family physician, which?
 - (b) Foes of good health as related to the janitor.
 - (c) First aids the janitor should know.

2. The Oakland, Calif., board of education, recognizing the broader scope of the modern janitor's usefulness in a school, reports that it has elevated (?) his official rank to that of "School custodian." At the same time steps were taken to give these custodians the benefit of the advice of experts living in the vicinity, hearing upon the various phases of their work and responsibilities. A course of 17 lectures was first given in the spring of 1917 (59). No two were given by the same person, each lecturer being an expert in his particular subject. The subjects of these lectures, together with the official position of each lecturer, are as follows:

- Lecture 1. Introductory lecture: What the board of education expects of the custodian. By the president of the Oakland board of education.
- Lecture 2. What the superintendent expects of the custodian. By the acting superintendent of schools.
- Lecture 3. What the business manager expects of the custodian. By the business manager.
- Lecture 4. Cooperation between the principal and the custodian. By the president of the Principals' Club.
- Lecture 5. The custodian's relation to the pupils. By the secretary of the Principals' Club.
- Lecture 6. The custodian's relation to recreation and social center activities. By superintendent of recreation, San Francisco.
- Lecture 7. The custodian's part in the wider use of the school plant. By principal of the high school, Alameda.
- Lecture 8. Some conditions in the school environment which may affect the child's health. By assistant professor of epidemiology, University of California.
- Lecture 9. The use and care of drinking fountains. By a specialist on the subject.
- Lecture 10. How to treat emergencies at school. By professor of hygiene, University of California.
- Lecture 11. Fire prevention and control. By chief of Oakland fire department.
- Lecture 12. Heating and ventilating. By lecturer in architectural mechanics, University of California.
- Lecture 13. The operation of oil burners. By specialist on the subject.
- Lecture 14. The use and care of steam-heating apparatus. By specialist on steam heating.
- Lecture 15. Automatic temperature regulation. (Illustrated by models and slides.) By expert of temperature-regulating devices.
- Lecture 16. The operation and care of school electrical equipment. By supervising inspector, electrical department, city of Oakland.
- Lecture 17. The oiling of floors. By specialist on the subject.

3. Referring to the report of one city (Marshalltown, Iowa), that instruction is given by experts from Iowa State College, it should be explained that this is a brief course for janitors given by the department of engineering extension. The course is printed in a 48-page pamphlet used as a textbook for classes, or for instruction by correspondence, and comprises eight illustrated and practical chapters on the following topics (58): 1. Heat; 2. Heat travel; 3. Coal and combustion; 4. Methods of firing; 5. The heating plant; 6. Good and bad air; 7. Humidity; 8. Sweeping, cleaning, and sanitation.

When given as a short course one of these texts is furnished each man, and five evening meetings for recitation and discussion are conducted. The instructor also calls on each man individually during the day in order that he may take up the special problems of his plant.

This course is also given by correspondence for the benefit of janitors in charge of buildings in small towns where there is not a sufficient number to form a class.

4. One of the cities reporting (Oshkosh, Wis.), states that courses are given by the extension department of the University of Wisconsin. This course, inaugurated by Dr. Wm. D. Frost (47), embodies scientific and practical information which every janitor should possess. An outline of the course follows:

Ventilation:

The composition of the air.

The relative importance of the various components from a hygienic standpoint, including the amount of air required per head, per hour, etc.

Natural methods of ventilation, including the principles of air movements.

Mechanical methods of ventilation.

General principles.

Various systems.

Independence of heating and ventilating systems.

The effect of bad air on health, and the importance of pure air in maintaining the health tone.

Heating:

The necessity for heat.

The amount required.

The systems of heating and the advantages of each.

The effect of insufficient heat on health.

The effect of too hot rooms on health.

The effect of wide fluctuations on health.

Moisture in the air:

Moisture in normal air.

Moisture in air of heated rooms.

Effect on health.

Methods of testing and modifying humidity.

Water:

Dangers from impure water.

Dangers from common drinking cup.

Principles and types of sanitary fountains.

Cleaning:

Dust and its dangers.

Composition.

Effect on the system.

Air-borne diseases.

Methods of cleaning.

Dry sweeping and dusting.

Use of dust-layers and dust cloths.

Vacuum cleaners.

Methods and frequency of washing floors and woodwork.

Plumbing:

Elementary principles.

Care of traps and closets.

Periodic inspection.

Disinfection:

General principles.

Liquid disinfectants.

Gaseous disinfectants.

Deodorants.

Spitting:

Dangers from spitting.

Necessity of preventing.

Spittoons:

Forms.

Care.

REGULAR PROGRAMS NEEDED.

These occasional lecture courses and meetings for instruction, as well as the short courses outlined, are all well enough as far as they go; but the real need is for schools, classes, conferences, or instruction in some form, as a regular, established thing in every school system of any considerable size. An example of such classes are those maintained by the schools of St. Louis, Mo. (53). The meetings are held each Saturday forenoon. Among the regular instructors are the chief engineer, superintendent of shops and repairs, superintendent of janitors, superintendents of plumbing and electric work.

Such subjects as the following are discussed: The chemistry and use of soaps; effect of soap on varnish, paint, and woodwork; chemistry and physical properties of varnish, paint, and pigments; methods of cleaning and treatment of floors; dusting; nature and use of disinfectants; chemistry and properties of coal and all other fuels; principles of combustion and proper firing; care of boilers; oils and lubricants; air conditions and principles of ventilation.

After each lecture there is a free and open discussion of the subject, in which each one is urged to express his opinion and give his experiences.

The statement is made by the St. Louis commissioner of school buildings that these weekly lectures and conferences have been the means of greatly increasing the efficiency of the entire janitor and engineering force, and that there has been a reduction in the cost of operation and maintenance of approximately 25 per cent.

It is believed that, with some modifications, the course of instruction suggested by Doctor Dresslar in the Portland, Oreg., school survey (30) would admirably meet the needs of such regular meetings in most cities. This course, with some additions and slight changes, is outlined below:

1. Lectures by the superintendent and medical inspector on such subjects as the following:

- Dust and its dangers.
- The selection and placing of school desks.
- The care of blackboards.
- The disinfection of toilets and schoolrooms.
- The general management of basements.
- The care of the health of a janitor.
- The proper temperature of a classroom, and why.
- How diseases are transmitted.

2. Technical instruction by the school engineer, department mechanic, or other person or persons qualified to do so in the following subjects:

- How to build fires and stoke economically.
- The theory and supervision of thermostats.
- Plumbing fixtures.
- Sweeping compounds and how to make them.
- Oiling floors.
- Management of fans.
- The disposal of ashes and cinders.
- The management of vacuum cleaners.
- Sweeping and dusting.
- Protection against fires.
- Different methods of cleaning.

3. Special devices, or "tricks of the trade," set forth and illustrated by the most efficient janitors in the service.

4. Lectures by selected principals on:

- Fire drills.
- The care of school property.
- The general management of boys.
- The moral influence of janitors.
- Opportunities of a janitor.
- The care of playgrounds.

5. Discussion of the latest and best information relating to the work of janitors gathered from magazines and books.

Instruction and training as suggested in the foregoing pages would not only secure greater efficiency in the janitor force, but it would enable school authorities to establish entrance requirements and demand professional preparation of all applicants for janitorial positions. In other words, it would take the janitor's office out of the field of politics and favoritism, and introduce a system based upon merit.

Chapter IV.

FUNCTIONS OF THE SCHOOL JANITOR.

I. DAILY CLEANING OF FLOORS.

On the method of cleaning floors, reports were received from 1,097 cities. These show that 891 cities use brush or broom with sweeping compound; 276 use the pilled brush; 222 vacuum cleaners; 306 use two or more of the methods mentioned. Many school systems use the vacuum cleaner only in the high school, or other one or more of the most modern buildings.

VACUUM CLEANERS.

It is now generally known that the best method of removing dirt from floors, as well as from walls and furniture, is by the vacuum system. It is true that vacuum cleaning has frequently not proven a success, but it is believed that this has been due to the selection of the wrong type of cleaner, to faulty installation, or failure to operate the machine properly. Faulty installation has probably been the most common mistake.

In the survey of the public-school system of San Francisco, Calif., made in 1917 (34), it was found that while vacuum cleaning systems were installed in all the newer school buildings in San Francisco, most of the janitors used them but once a year—during the vacation period. Others used them occasionally to clean the rugs and carpets in the principal's office.

Other school surveys and reports indicate that this same condition prevails in a great many places. There are two reasons given for this failure to use the vacuum systems installed. First, the only openings to which the suction hose can be attached are in the halls, one opening to serve several rooms. This necessitates a long, heavy hose, entirely too heavy and unwieldy for a man to handle with any degree of satisfaction. In the second place, on account of the length, the friction of the hose is so great that the suction is reduced to such an extent that the force is not great enough to gather up the sand and dirt from the floors.

For these reasons, many hundreds of thousands of dollars worth of vacuum cleaning machinery installed in school buildings is not used enough to warrant the expense of installation.

From observations and time studies made a few years ago by the Chicago board of education (38), as well as reports obtained from other cities at the time, it was found that the labor cost for vacuum cleaning was about the same as for sawdust and broom sweeping, where the frequency of cleaning was the same. But the quality of the work must be considered as well as

the expense. Following are some of the advantages of the vacuum system of cleaning schoolhouses:

1. By this method the dirt and dust are gathered up from the floors and walls, and carried directly from the rooms to a central place of deposit, preferably in the basement, where they can not be of any further danger to the health of pupils and teachers.
2. The dirt that finds its way into the cracks of floors can only be removed by the use of the vacuum cleaner. Broom sweeping, even with the use of sweeping compounds, does not get the dirt and dust out of the cracks.
3. The vacuum method makes it unnecessary for the janitor to go over the room the second time in order to dust furniture, wainscoting, railings, etc., as no dust is stirred up. Valuable time, therefore, is saved.
4. A fourth advantage in the vacuum system is that by this method walls and ceilings may be cleaned without injuring them, and without throwing clouds of dust into the air.
5. Vacuum cleaning has still another distinct advantage. Teachers and pupils, especially in high schools, frequently find it desirable to stay after school hours on account of club meetings, work in laboratories and gymnasiums, rehearsals for plays, and the like; but in most cases the rules require them to leave shortly after the close of school. And even if they are permitted to stay, the atmosphere in the entire building is dusty when the cleaning work is being done. With vacuum cleaning, teachers and pupils could be permitted to stay after school hours, and the janitor could be permitted to start cleaning immediately upon the dismissal of school.

SWEEPING COMPOUNDS.

But in some places, especially in some of the older buildings, the installation of vacuum cleaning systems is hardly practicable, and some other method of cleaning must be followed.

Where it is impossible to secure the vacuum system, the next best method is to scatter sweeping compound on the floor, and then gather up the dirt and dust by the use of a fiber brush or broom. There are many standard preparations sold in the market under various names, which catch and hold the dirt until it can be gathered up into a pile and removed. These preparations are usually made with a basis of sawdust or paper, mixed with water, oil, or wax. Some of them are expensive, but any intelligent janitor can make his own sweeping compound at very small cost. Dampened sawdust, with a little clean sand and disinfectant mixed in, will be found just as effective as any of the patent compounds on the market.

It is found that in many places there is a prevailing belief among janitors that if floors have been oiled the use of sweeping compounds is unnecessary. As a matter of fact, sweeping compound reduces the number of dust particles to such an extent as to justify its daily use, both in halls and classrooms.

OILED BRUSH.

Oiled brushes are now being used to a considerable extent for removing dirt from floors. This is an ordinary brush furnished with a small tank containing kerosene. The kerosene feeds down slowly from the tank upon the brush and keeps it slightly moist. By keeping floors well oiled and using this type of brush in sweeping, the floors can be kept reasonably free from dust and dirt.

DRY BROOM.

The worst method used in the removal of dirt is that of dry sweeping with the old-fashioned broom, and it is surprising that as many as 137, or about 12½ per cent of the cities reporting, still use this method. This sort of sweeping removes only the coarse dirt, which is harmless because it can not be breathed into the lungs. The fine dirt, the only kind that is injurious, is stirred up and mixed with the air, to settle on desks, walls, woodwork and floors as soon as the sweeping is done.

TESTS OF VARIOUS METHODS OF CLEANING.

A study which throws a great deal of light on this phase of the subject is the series of bacteriological tests made by William D. Frost and Vermillion A. Armstrong (48). These tests are valuable because they show the effectiveness, or ineffectiveness, of the various methods of cleaning, and should serve both as an additional warning against the dangers of dust and dirt, and as an incentive to all school authorities to see that the most improved methods of cleaning are employed. Some of the main results of these tests are summarized as follows:

Dry broom.—In order to test cleaning by ordinary dry broom, a moderately clean floor was selected, the number of bacteria per sq. cm. was determined, and the floor was then swept. The results are shown in Table 7:

TABLE 7.—Cleaning efficiency of ordinary broom (bacteria per square centimeter).

Experiment.	Number found on floor.	Number after sweeping.	Percentage of bacteria taken up in sweeping.
1.....	73	9	.....
2.....	48	5	.....
3.....	28	3	.....
4.....	90	39	.....
Average.....	60	14	77

While this experiment shows that a number of the bacteria are removed by the operation, it should be recognized that a large portion of them go into the air only to settle on the floor again. A number of experiments which were made in another connection indicated that the number of bacteria in the air after sweeping, over and above those ordinarily present, was such that seven bacteria were falling on each square centimeter per hour; so that, if the room were tightly closed, it would not be long before the floor would have nearly as many bacteria as were found before sweeping.

Oil broom.—In Table 8 are shown the results of 10 tests made with a patent oil broom. These tests indicate that, as much as 87 per cent of the bacteria can be removed from the floor by the oil broom; but experiments 8 to 10 show that the use of this broom may actually increase the number—in this case there was an increase of 450 per cent. The broom with which the test was made had been used several times, and an effort had been made to thoroughly clean it before using the test; but this was found to be a difficult, if not impossible, task.

The bacteria increase was due to the number which still remained in the broom from previous usage, in spite of the cleaning.

TABLE 8.—Tests made with a patent oil broom (bacteria per square centimeter).

Experiment.	Number found on floor.	Number after sweeping.	Percentage of bacteria taken up in sweeping.
1.....	620	380	.....
2.....	1,008	541	.....
3.....	363	565	.....
Average.....	660	505	23
4.....	8,800	4,450	.....
5.....	6,500	8,600	.....
6.....	26,000	16,000	.....
7.....	19,500	15,300	.....
Average.....	17,875	11,067	37
8.....	4	23	.....
9.....	4	13	.....
10.....	3	18	.....
Average.....	4	18	1450

¹ Increase.

Sweeping compound.—In this test a patented product was used. The compound was sprinkled on the floor or put into a reservoir on the broom to be swept ahead of the broom. Results of the test are shown in Table 9.

TABLE 9.—Tests made with sweeping compound and broom (bacteria per square centimeter).

Experiment.	Number found on floor.	Number after cleaning.	Percentage of bacteria taken up in sweeping.
1.....			.....
2.....	448	126	.....
3.....	936	1,084	.....
.....	442	398	.....
Average.....	608	536	28

Vacuum cleaners.—For this test, two permanent systems were chosen, one in which the vacuum is produced by an electric fan, and the other by means of a steam aspirator. Of the many different types of portable cleaners, five were selected for use in this test.

Both of the permanent systems tested proved satisfactory from a sanitary standpoint. One removed 95 per cent of the bacteria from the floor, and the other 79 per cent. Of the portable types, several proved quite efficient, the different types removing 82 per cent, 77 per cent, and 57 per cent, due to variations in motive power, manner of construction, shape, and size of brushes.

In the permanently installed systems bacteria in the dirt are taken out of the room entirely, and if the discharge pipe is properly located, the bacteria

are a matter of no further concern. The condition is different in the portable systems, which discharge the air directly into the room. In some, the air has been filtered or strained through a bag; in others, the dust and bacteria are retained by a series of baffles. Thus it is ordinarily quite impossible to keep the bacteria from getting back into the room. It has been demonstrated that bacteria may be carried from one room into another by these portable cleaners, because they allow the escape of bacteria contained in the dirt. For this reason, traveling cleaners may be an actual menace to health, for if bacteria can be carried from room to room they can probably be carried from house to house.

II. PERIODIC CLEANING AND TREATMENT OF FLOORS.

SCRUBBING FLOORS.

It is evident that in many places there is too much washing and scrubbing of wooden floors. The old-time belief that the only way to have a clean, sanitary floor is to scrub it with water and soap still seems to be quite prevalent. A summary showing the frequency with which floors are scrubbed in the 923 cities reporting on this point, is given in Table 10:

TABLE 10.

Frequency.	Cities reporting.	Frequency.	Cities reporting.
Daily.....	0	Once a year.....	169
Twice a week.....	1	As needed.....	95
Weekly.....	42	Irregularly.....	6
Twice a month.....	18	Rarely.....	4
Monthly.....	121	When directed by principal.....	1
Once in 6 weeks.....	6	Once in 2 years.....	1
Six times a year.....	9	Once in 5 years.....	1
Five times a year.....	2	Never.....	32
Four times a year.....	55		
Three times a year.....	126	Total.....	923
Twice a year.....	234		

It will be seen that 42 cities scrub the floors weekly, 18 every two weeks, 121 monthly, 55 four times a year, 126 three times a year, 234 twice a year, and 169 once a year. In 95 cases the floors are scrubbed "as needed," and in 32 cities they are not scrubbed at all. But all except two of the 32 cities where the floors are never scrubbed report that the floors are regularly treated with oil, with a frequency ranging from yearly to monthly.

The best authorities agree that schoolroom floors should not be scoured except when absolutely necessary. Experience has demonstrated that too frequent washings have a very injurious effect upon most wooden floors. The alternate swelling and shrinking of the boards widen the cracks, cause the boards to warp, the grooves to split, and in the course of time the surface becomes rough and splintered. Moreover, the widened cracks become filled with dirt and mud, which dry and give rise to clouds of dust when the boards are walked over. If floors are once well cleaned, and then kept oiled or waxed, it is very seldom that they will need to be scrubbed or washed.

OILING FLOORS.

The large number of cities which report that their schoolhouse floors are oiled indicates that this treatment of floors is in more general use than it

was a few years ago. A summary of these reports is given in Table 11. There were 1,073 reports received in answer to the question as to whether or not floors are oiled. Of these, 890 cities, or about 83 per cent, reported in the affirmative, while 183, or 17 per cent, stated that floors were never oiled.

In the cities reporting on the frequency with which floors are oiled, it will be noted that the range is all the way from daily to yearly, the largest number in practice being 372, twice a year, and the next, 197, once a year. Those who are best qualified to speak on the subject state that as a general thing floors should be oiled at least two or three times a year.

Included in the following table is also a summary of the reports as to how the oil is applied. An oil mop, a brush with an oil reservoir, a sprayer or atomizer, and other special oiling devices under the head of "oilers," are given as the most common methods of applying the oil to the floors.

TABLE 11.—Oiling floors.

Frequency.	Cities reporting.	How oil is applied.	Frequency.
Daily.....	1	Mop.....	275
Twice a week.....	1	Brush.....	259
Weekly.....	10	Sprayer.....	124
Twice a month.....	3	Oiler.....	94
Monthly.....	25	Sprayer and mop.....	19
Once in 6 weeks.....	2	Cloth.....	11
Six times a year.....	6	Brush and mop.....	5
Five times a year.....	2	Oiled broom.....	3
Four times a year.....	43	Oiled pad.....	3
Three times a year.....	79	Oiler and mop.....	2
Twice a year.....	372	Oiled sawdust.....	1
Once a year.....	197	Sheepskin.....	1
As needed.....	73		
Never.....	183	Total.....	797
Total.....	1073		

A great deal has been said both for and against the use of floor oils. Boards of education have frequently been known to forbid their use entirely. The three principal objections urged are: (1) That the use of oil increases the fire hazard; (2) that it soils the clothing of pupils and teachers; and (3) that the oil has an unpleasant odor and is otherwise disagreeable.

It is believed that all of the objections are due to the use of poor quality of oils and to carelessness or ignorance in their application. Before the oil is applied, the floors should be thoroughly cleaned, and allowed to dry. Then a very light coat of hot oil should be spread over the floors, either by means of a brush made for the purpose, or sprayed over with an atomizer. The oil should be well rubbed in with a felt pad or woolen cloth, and all that is not absorbed carefully wiped up. The floors should then be allowed to dry for several days before the rooms are used. The oiling will, therefore, usually have to be done during the summer vacation, or the Christmas or Easter holidays. If the work is intelligently and carefully done, there can be no doubt that oil makes the best finish for schoolroom floors.

This treatment of floors, when properly done, has at least two distinct advantages, as shown by various tests and experiments: First, it preserves the floors and improves their wearing qualities; and, second, it reduces the number of floating dust particles and the number of bacteria in schoolroom air very much below what they would otherwise be.

The amount of germ-carrying dust in a room can be tested by exposing to the air, for a given time, a gelatin plate of standard size and material. This plate catches the floating germs and acts as a culture medium for the development of colonies of bacteria. The plate is then examined under the microscope, and the number of bacterial colonies counted. The results of such a test are given in the following table from Doctor Lambert (51) and show quite clearly the effect of floor oil on the number of bacteria in schoolroom air:

TABLE 12.

Plates exposed.	Colonies of bacteria.	
	Floors treated with oil.	Floors not treated.
5 minutes in still air.....	0	7
30 minutes in still air.....	2	12
5 minutes during sweeping.....	38	456
5 minutes just after sweeping.....	11	79
5 minutes beginning 10 minutes after sweeping.....	6	62
5 minutes beginning 15 minutes after sweeping.....	1	31

Other tests referred to by Lambert in the same article show that bacteria are no more numerous over an oiled floor four weeks after treatment than over an unoled floor two days after scrubbing; and that an old, worn floor is more sanitary when oiled than a new, well-laid floor which is not oiled.

III. DUSTING.

PREVENTION OF DUST.

Good school housekeeping is largely a matter either of preventing dust or of removing it. Attention has already been called to the fact that much can be done in the way of preventing dust by keeping the floors well oiled, the use of sweeping compounds, and by means of the vacuum cleaner. In addition to these improved methods of sweeping and treating floors, a number of other things can be done to prevent the manufacture and accumulation of dust in school buildings. Some of these are: Requiring the children to keep their shoes as free from dirt and mud as possible, for which purpose there should always be a liberal supply of good doormats; requiring, as far as possible, all play and physical training exercises out of doors, as it has been found that the stamping, marching, and play of children in the rooms and halls increase the amount of dust in the building many times over.

A great deal of dust can be prevented by using the blackboards only when actually needed; substituting the so-called "dustless" crayons for the soft chalks so generally used; collecting with damp cloths and removing the chalk dust from the trays of blackboards at least twice a day; taking all erasers from classrooms and cleaning them thoroughly at the close of each school day.

Basements, also, should have special attention with respect to dust, particularly when they are used for playground purposes. As a general thing, basements are not well ventilated, and the movement of children's feet over the cement floors produces a mineral dust, which is the most injurious kind of dust, on account of the sharp, cutting character of the particles. For this reason,

as well as for moral reasons, some cities have abolished basement play altogether.

FRESH-AIR CHAMBERS.

Where the building is supplied with a mechanical ventilating system, much can be done to keep the air pure and wholesome by keeping the fresh-air supply free from dust. The surveys and reports examined show that in a large percentage of buildings the fresh-air chambers are used as storage rooms. In them are often found piles of sand, kindling wood, oil cans, brooms, mops, old boxes and barrels, the accumulated trash of several weeks, and frequently all covered with a coating of dust. Even where the fresh-air chambers are not used for storage purposes, if the intake is on a level with streets, alleys, and sandy playgrounds, they must soon become dust-chambers through which the air must pass into the classrooms, to be breathed by teachers and pupils. Fresh-air intakes should be elevated 10 or 12 feet above the ground, and fresh-air chambers should, of course, be kept clean at all times.

FREQUENCY IN DUSTING.

As to the frequency with which dusting is done, the returns show that of the 1,043 cities reporting, 933, or about 89 per cent, dust daily. While this at first would seem to be a very good showing, yet it must be admitted that for as many as 110 cities, or 10 per cent, not to dust daily, the range being all the way from three times a week to never, is a little disappointing. Everyone knows that dusting should be carefully done every day. This should be done in the morning before pupils begin to assemble, all sweeping having been completed the evening before.

The frequency with which dusting is done in the cities reporting, and also the methods used, are shown in the following table:

TABLE 13.—Dusting.

Frequency.	Cities reporting.	Method used.	Cities reporting.
Daily.....	933	Damp cloth.....	776
Three times a week.....	22	Oiled cloth.....	181
Twice a week.....	38	Feather duster.....	130
Once a week.....	20	Dustless duster.....	41
As needed.....	13	Oiled duster.....	23
Irregularly.....	4	Treated cloth.....	16
Rarely.....	7	Dry cloth.....	16
Twice a year.....	1	Mop.....	5
Never.....	5	Oiled brush.....	3
		Chemical duster.....	3
		Medicated cloth.....	3
		Wool duster.....	1
		String duster.....	1
Total.....	1,043	Total.....	1,168
		Less number using 2 or more methods.....	166
		Actual number cities reporting on method.....	1,002

METHODS EMPLOYED.

If dust is to be kept down or effectively removed, the method used is of the utmost importance. There were 1,002 reports received on the method, or

methods employed, two or more methods being used in some cities. As will be seen from the table, 778 cities use damp cloth, 151 oiled cloth, 129 the feather duster, 41 "dustless" dusters, and 23 oiled dusters. The remaining 46 reports are distributed among various methods, as shown in the summary.

Dusting should be done in such a manner as to take up and remove as much of the dust as possible, and at the same time stir up and disperse as little as possible during the process. As stated in a previous section, where the vacuum system is in daily use, the dust is taken up and removed along with the coarse dirt, and dusting as a separate operation is largely eliminated. Where vacuum cleaners are not used, the method of dusting which has been found most effective is by the use of a cloth slightly dampened with water or moistened with oil or wax. The so-called "dustless" dusters now on the market usually consist of a piece of coarse cloth dipped in some oil preparation, and then allowed to dry until only enough oil remains in the meshes to catch and hold the dust.

The most inefficient way to dust is with the medieval feather duster, and the wonder is that this pernicious method still holds sway in the school buildings of so many progressive cities. The reports show, as stated above, that it is used either wholly or in part in 129 cities, or 12 1/2 per cent of all those reporting. It should not be necessary even to call attention to the fact that feather dusters should not be permitted in a school building. They do not remove the dust, but only stir it up, either to settle down again on furniture and woodwork or breathed into the lungs of occupants of the building. This method of dusting is worse than none at all, and should be prohibited by law.

WHY DUST IS DANGEROUS.

As already stated, dusting is one of the most important matters involved in the care of school buildings. Every janitor or custodian of a school building should not only know that dust is a common cause of ill health, but he should know the composition of dust and why the presence of dust particles makes the air children breathe so injurious; that in one cubic inch of good country air there are said to be 2,000 particles, while in a cubic inch of city air there are 3,000,000 particles, made up of dried manure and sputum, tobacco, ashes, soot, shop and house sweepings, decaying vegetation, bits of stone, glass, and cement. To these particles are frequently attached disease germs, and when such particles are breathed they irritate the air passages and make them fruitful soil for the growth of these germs, which multiply and produce colds in the head, catarrhal conditions of nose and throat, bronchitis, and tuberculosis. The prevalence of these disorders among people who live in cities, and the composition of dust in city air, should bring school and municipal authorities to realize the need of better housekeeping, cleaner streets, the elimination of all smoke and dust nuisances, and improved sanitary conditions generally.

Some one may say that school children will have to breathe this kind of air the rest of the 24 hours of the day, so why not while in school? The answer is, that it is the school's duty to keep the air in school buildings as free from dust and other impurities as possible, and if it can be kept purer and more wholesome there than that which must be breathed in the city generally, certainly something has been gained.

IV. WASHING WINDOWS.

It is evident that most schoolroom windows are not washed often enough. There is little use to provide a specified amount of window area, as compared

with the floor area in schoolrooms, if the glass is not kept clean after it has been installed.

Of the 1,000 cities reporting on the question as to how often windows are washed, 125, or 12 per cent, do not wash the windows oftener than once a year. In 302 cases, or 30 per cent, they are washed only twice a year; in 136, or 13 per cent, three times a year; and in 91 cases, four times a year. That is to say, as shown in Table 14, in 654 cities, or 64 per cent of those reporting, schoolroom windows are washed from once to four times a year. If the exact facts were known in regard to the 210 cases reporting "as needed" (which may mean much or nothing according to circumstances), it is quite probable that the above last named percentage would be very much larger. Only 68 cities, or 6 per cent, wash their schoolroom windows as often as once a month. By a reference to the table it will be seen that the largest number report a frequency of twice a year. It is believed that this, or even three or four times a year, is not sufficient as a general thing. Of course, the frequency must vary with the locality. In smoky manufacturing cities, it is sometimes desirable to have classroom windows washed on the outside every day or two; and there are very few cities and towns in which windows should not be cleaned at least once a month during the school year.

TABLE 14.—Washing windows.

Frequency.	Cities reporting.	Frequency.	Cities reporting.
Weekly.....	6	Twice a year.....	302
Twice a month.....	3	Once a year.....	125
Once in 3 weeks.....	1	As needed.....	210
Monthly.....	93	Irregularly.....	6
Once in 6 weeks.....	4	Occasionally.....	6
Six times a year.....	16	When required by the authorities.....	1
Five times a year.....	4		
Four times a year.....	91	Total.....	1,000
Three times a year.....	135		

TESTING DIFFERENT CONDITIONS.

An investigation made by the Boston branch of the Association of College Alumnae, referred to by Dr. Putnam (5), shows how varying conditions which exist at different buildings, even in the same city, require variations in the frequency with which windows must be washed, if they are to be kept clean. The rules required that the windows should be washed twice a year. The object of the investigation was to ascertain whether this was often enough, or whether with this number of washings there were any windows on which sufficient dirt accumulated to obstruct the light enough to injure the vision of pupils. A photometer was used to measure the amount of light admitted before and after the windows were washed (1) on the inside, and (2) after washing on both sides.

For this study, the school buildings were divided into three groups: (1) Those that were situated on high ground where there were no obstructions, such as trees and near-by buildings, to shade the windows; (2) buildings on streets of medium width, and surrounded by buildings the average height of which was less than that of the school building; or the buildings whose window area was somewhat less than it should be; and where smoke, dust, and other impurities were "present in average quantities;" (3) the worst class of buildings was made up of those located where there was a great deal of dust, smoke, and other impurities in the air, and where they were surrounded by tall buildings and by alleys, and which were old, with insufficient window area.

In order to have the intensity of the light as nearly constant as possible, all the tests were made on dull, overcast days.

The results of the investigation showed that in the best group of buildings the light was about 4 per cent stronger after washing the windows on the inside, and about 10 per cent stronger after washing on both sides.

In the second, or intermediate class of buildings, the light before washing was reported as being about half as intense as that of the best buildings, and the gain, both after the inside and outside washings, was about twice the gains shown, respectively, in the best buildings, or about 20 per cent in all. In other words, the windows of the second class of buildings were dirtier, both inside and out, and consequently needed washing oftener than those of the the best group.

In the third or worst class of buildings, it was found that before the windows were washed the intensity of the light averaged about one-fifteenth as much as that of the best buildings. The gain was about 21 per cent after washing on the inside, and about 6 per cent more than that after washing on both sides, or 27 per cent in all, showing that this group was also dirtier than the best buildings and needed more frequent washings.

Two weeks after the windows of all the buildings had been washed the light was again measured. The windows of the second or intermediate class had become three times dirtier than those of the best group, and those of the worst group had become six times dirtier. This would indicate that if the rule requiring all windows to be washed twice a year was sufficient for the best class of buildings, those of the intermediate and worst groups should be cleaned from three to six times as often.

The results of the investigation show that in cities where the school buildings are surrounded by such widely varying conditions, they should be grouped in the manner indicated, and a frequency rule for washing windows applied to each group, instead of requiring that all windows be washed the same number of times.

V. CLEANING TOILETS.

Many of the educational surveys examined state that the toilets were found to be in an insanitary condition. An examination of the reports on the question as to the frequency with which they are cleaned would seem to point toward the same conclusion. By referring to Table 15, it will be seen that only about 51 per cent of the cities reporting have the toilets cleaned daily. The frequency in the remaining 49 per cent ranges from three times a week to yearly. In 268 cities, or 27 per cent, toilets are cleaned weekly, and in 143, or 14 per cent, they are cleaned "as needed."

TABLE 15.—Cleaning toilets.

Frequency.	Cities reporting.	Frequency.	Cities reporting.
Daily.....	503	Four times a year.....	1
Three times a week.....	8	Three times a year.....	1
Twice a week.....	31	Twice a year.....	4
Once a week.....	268	Once a year.....	8
Twice a month.....	3	Irregularly.....	3
Once a month.....	11	Frequently.....	1
As needed.....	143	Total.....	987
Six times a year.....	2		

It is very important that schoolhouse toilets be kept scrupulously clean at all times. Disease germs are frequently found in great numbers upon seats, doors, and walls of toilets, and even on the handles of outer doors. Besides the routine daily cleaning of toilets, all toilet-room floors should be washed up at least once a week; and toilet seats, chains, and the handles of toilet doors, if any, should be washed frequently with a good germicidal preparation, not merely a deodorant—a distinction which school authorities, as well as other people, frequently fail to make. A deodorant merely neutralizes offensive odors, generally by substituting an odor that is pleasing for one that is not pleasing. A disinfectant or germicide destroys or renders harmless infectious matter and disease-producing germs.

Direct sunlight is the best disinfectant, and the prevalence of disease germs in toilet rooms is frequently due to the fact that these rooms are so located, and face in such a way, that the direct rays of the sun are shut out during the greater part of the day, and in a great many cases altogether. Sunshine and cleanliness will prevent and destroy more germs than any artificial disinfectant known. "Sunshine, Supervision, and Soap," has been suggested as a worthy sanitary slogan for every school, not only in connection with the care of toilets, but in all other housekeeping matters as well.

Chapter V.

RURAL SCHOOL JANITORS.

It was not the intention to make a study at this time of rural school janitors, but in following out the various lines of investigation in connection with city schools, some facts and figures have been gathered incidentally which throw a good deal of light upon the janitor service in rural communities, and it is thought that a few of these are of sufficient value and interest to be included in the present study.

THE OHIO SURVEY.

An intensive study of 659 rural and village schools in 88 counties, in the State of Ohio, (29) reveals a condition in regard to rural school janitors which is more or less typical of the service throughout the country. The following tables give in a condensed form the data collected by the survey commission in reference to the frequency of dusting, kinds of dusters used, scrubbing, sweeping, and the pay of teachers for doing janitor work:

Dusting.

	Township.		Special district.	Village.	High school.
	One room.	Centralized.			
Number of schools visited.....	592	17	13	13	22
Number of schools reported on.....	497	15	12	13	20

Dusted.	Per cent.				
	One room.	Centralized.	Special district.	Village.	High school.
Daily.....	61.2	66.7	58.3	92.3	75.0
Twice a week.....	26.4	20.0	41.7	7.7	25.0
Once a week.....	6.2	13.3			
Less than once a week.....	3.1				
Actual number dusted less than once a week.....	15				

Kinds of dusters.

	Township.		Special district.	Village.	High school.
	One room.	Centralized.			
Number of schools visited.....	592	17	13	13	22
Number of schools reported on.....	575	16	12	13	20
Using—	Per cent. ¹				
Yarn duster.....	3.0	12.5	.....	38.5	21.0
Dry cloth.....	67.6	25.0	91.7	53.8	40.0
Damp cloth.....	24.2	31.3	16.7	15.4	35.0
Treated cloth.....	4.0	12.5	8.3	30.8	25.0
Feather duster.....	11.0	31.3	.....	23.1	40.0
Actual number using feather duster.....	83	5	0	3	8

¹ Percentages do not total 100 per cent because in some schools more than one kind of duster is used.

Scrubbing.

	Township.		Special district.	Village.	High school.
	One room.	Centralized.			
Number of schools visited.....	592	17	13	13	.....
Number of schools reported on.....	559	10	13	12	.....
Scrubbed.	Per cent.				
Never.....	3.7	.....	.....	.....	.....
Once a year.....	68.2	60.0	76.9	31.3	.....
Twice a year.....	20.0	.....	.....	16.7	.....
Three times a year.....	8.2	10.0	.....	16.7	.....
Four times a year.....	4.8	30.0	23.1	33.3	.....

Sweeping.

	Township.		Special district.	Village.	High school.
	One room.	Centralized.			
Number of schools visited.....	592	17	13	13	22
Number of schools reported on.....	574	14	13	13	21
Swept.	Per cent.				
Daily.....	57.7	57.1	76.9	100	81.0
Twice a week.....	30.7	35.7	.....	.....	.....
Once a week.....	11.0	7.1	.....	.....	19.0
Less than once a week.....	7	.....	23.1	.....	.....

Pay of teachers for janitor work in one-room township schools.

Number of teachers.	Number reported on.	Per cent receiving per month—				Number receiving no pay (illegal).
		More than \$2.	\$2.	Less than \$2.	Nothing.	
353	322	20.2	37.3	40.1	2.4	8

It will be observed that 61 per cent of the one-room township schools reported on were dusted daily, and that 9 per cent were dusted once a week, or less.

About 11 per cent of the schools used the deadly feather duster, while 24 per cent used damp cloths in dusting.

The report also shows that floor oil for the prevention of dust was used by 11.6 per cent of the township schools.

Nearly 4 per cent of the doors of the one-room township schools were reported as never scrubbed, 68 per cent as scrubbed but once a year, and less than 5 per cent as scrubbed four times a year.

Of the one-room township schools, 57 per cent were swept daily. All of the 13 village schools inspected were swept daily. Out of 614 elementary schools of all kinds, 73 were swept only once a week, or less.

The report further shows that only 5.2 per cent of the one-room township, 43.8 per cent of the centralized township, 7.7 per cent of the special district, and 52.3 per cent of village schools visited use any sweeping compound.

THE ILLINOIS SURVEY.

In the Illinois school survey (25), made in 1917 under the direction of L. D. Coffman, one of the studies embraced the rural schools of 18 counties, in which there were more than 3,000 schools. Obviously, it was impossible for the commission to visit them all. So, the superintendent of each county was asked to select for visitation his best school, his worst school, and two of his average schools; the basis of the selection being the building and its equipment, and the interest manifested by the community in the school. Following this plan, 78 schools were visited by a member of the survey staff, accompanied in a few instances by the county superintendent. From the report of this survey, the following facts are gleaned in regard to janitor service:

As a rule, the teachers did their own janitor work—what little was done. In many cases there was apparently no attempt to keep the grounds clean and attractive and the toilets were in a very insanitary condition.

Sweeping.—Floors were not generally well swept. There was dust in corners and under the desks, and food upon the floors. The sweeping was frequently done in the morning.

Dusting.—No intimation as to how dusting was done. The only statement on this point is that when sweeping is done in the morning, the dusting is a "useless piece of work."

Blackboards.—For the most part, blackboards were reported to be in a fairly clean condition; likewise, the ledges and erasers. However, in 16, or 20 per cent, of the schools visited, the ledges of blackboards were reported full of chalk dust.

Scrubbing floors.—As a rule, floors had been scrubbed in the fall before the opening of school. Except in rare instances, it was found that rooms were not scrubbed oftener than once a year.

Walls.—In many of the schoolrooms the walls and ceilings were begrimed with smoke, the papering loose and discolored—a fertile soil for disease germs.

Windows.—Even in the best of schools the windows were seldom washed.

JANITOR WORK BY TEACHERS.

In 357 of the 650 classrooms visited by the Ohio Survey Commission, the teachers did the janitor work, 353 of whom were in one-room township schools. Contrary to law, 8 of these received no pay for their services. Over 40 per cent received less than \$2 per month.

Both the Ohio and Illinois survey reports show that in some districts poorly paid teachers have immaculate school buildings and grounds only as a result of their own efforts and their determination to live in clean surroundings. They are frequently without either the material or moral support of their communities. In some cases the teacher has to scrub the school building before school can be opened in the fall.

The real trouble, not only in Ohio and Illinois, but almost everywhere else, lies in the fact that most of the rural school districts consider the care of school buildings of little or no importance. Teachers should not be expected or required to do their own janitor work in order that they and the children may have clean buildings. To pay teachers a few dollars extra per month for this sort of service, or to employ a man or woman in the neighborhood to do a minimum of janitor service for a mere song, or to get pupils to do the work, does not meet the situation.

Doctor Dresslar makes the suggestion (2) that a competent man could be employed in each rural district to give his entire time throughout the year to the care and up-keep of the school property in his district. Such a district janitor could sweep and clean every schoolroom once a week, "keep the yard free from unsightly piles of ashes, care for the outhouses, and make light repairs. During the vacations the buildings could be cleaned more thoroughly. Such a janitor should be responsible to the supervising principal and make regular reports to him. The daily cleaning, dusting, care of fires, etc., would still devolve on the teacher and pupils."

CENTRALIZED SCHOOLS.

In all progressive rural communities the tendency is to abandon the one-room buildings, on account of lack of attendance or other cause, and to replace them by the centralized school. In many instances all the rural schools of an entire township are consolidated at one point, where a large school building is constructed with ample provision not only for all grade schools but also for a township high school.

This new type of rural school building has made necessary a new rural school officer—the janitor. In the one-room building the teacher may act both as instructor and janitor, as already stated, but in the modern consolidated building, with its up-to-date system of heating and ventilation, sanitary drinking fountains, sanitary toilets, adjustable seats, electric lighting, gymnasium, assembly room and public auditorium, a janitor must be employed not only to care for the building, but to supervise the many details connected with the efficient working of the entire equipment.

We have already seen that the importance of the janitor's position has not been generally recognized by city school officials, and so it is not to be wondered at that in the rural districts the importance of the janitor and his work in relation to the welfare and efficiency of the school is almost wholly unap-

preciated. While great progress has been made in the construction of better school buildings, little or no progress has been made in the method of selecting janitors to care for and manage them. Politics still dictates the choice in most cases; in others, the position is "raffled off" to the lowest bidder. Not infrequently the man who has most fully demonstrated his ability as a failure in other occupations is made school janitor through sympathy.

In a certain township in Indiana (4) an expensive consolidated grade and high-school building was erected, equipped with modern heating and ventilating system, sanitary drinking fountains, modern toilets and plumbing throughout, and every possible provision made for the safety and welfare of the pupils. But the service of fans, furnace, and fountains proved to be very unsatisfactory. When an inspector from the State board of health visited the school he had no difficulty in locating the trouble. The janitor did absolutely nothing except sweep the floors (with a dry broom), shovel coal into the furnace, and wheel the ashes out. He knew less than nothing about heating, ventilation, and cleanliness, and in fact he was himself shiftless by nature and personally dirty. When one of the trustees was asked why such a man was employed, he replied that this man had a hard time getting along, and that the township had to keep him and his family every winter, "so we thought if we gave him this job he wouldn't be on the township any more." Here was a man who, because he had proven himself incompetent and a complete failure, was given charge of this splendid new building and its valuable equipment, and, what is of far greater importance, was made responsible for the health and safety of 200 school children.

In citing this case, the Indiana State board of health says that it is by no means an isolated instance. There are hundreds of school janitors, not only in Indiana but in every State in the Union, both in country and city, who have no technical knowledge or training, and who are incompetent and unfit, physically, mentally, and morally, for the positions they hold, but who continue to hold their places and draw their pay either because the authorities place partisan politics, personal favoritism, and false economy above the present and future welfare of their children, or because they wholly fail to appreciate the importance of efficient school housekeeping.

As the country districts become more densely populated, and as school consolidation increases, the janitor will become more and more a necessary rural school officer. Rural boards and trustees must, therefore, in some way be brought to understand what modern conditions require a school janitor to do and be.

In the consolidated school building, the same service is required, and, of course, the same principles apply, as in a modern city school building. The only important difference in the two situations is that, in any one rural community there is only one janitor, with probably a few helpers; consequently, he does not have the opportunity for meetings and conferences that city janitors have. In order to meet this condition as far as possible, the following suggestion is made for the instruction of rural janitors and the development of their professional interest:

Bring together in a janitors' institute at least once a year all janitors of the county, such institute to be presided over by the county superintendent of schools, or, better still, by a county supervisor of janitors. At such an institute, extending through one week, there could be short courses of instruction, conferences, and lectures on special subjects. Proper provision should be made for compensating all janitors who attend, as in the case of teachers in attendance upon institutes. Increased efficiency and improved service would more than offset the small expenditure involved.

Chapter VI.

SUMMARY OF RESULTS AND CONCLUSIONS.

IMPORTANCE OF THE POSITION.

1. The importance of the school janitor's position is seen from the following considerations:

(a) His responsibility in the management and care of valuable school property.

(b) The educative value of his work in setting housekeeping standards.

(c) His influence upon pupils from a moral standpoint.

(d) The large and continuous control he has over the physical environment and health conditions of the school.

(e) His responsibility in relation to fire hazards and the safety of children.

2. Owing to the nonappreciation of the importance of the janitor's position by parents and school authorities, improvement in the janitor service has not kept pace with the advancement made in school buildings, nor with the progress in matters of school hygiene and sanitation.

ADMINISTRATION.

1. Only 76 cities out of 1,085 reporting, or 7 per cent, use the civil service method in the selection and appointment of school janitors. Every city should give civil service examinations, or have some other effective merit system for testing the fitness of applicants for the position, just as well as in the selection and appointment of teachers, nurses, and other public officials.

2. Out of 1,067 cities, only 73 require applicants for the position of school janitor to pass a physical examination.

3. The average annual salary of school janitors in the United States is found to be \$966.42, or about \$355 more than the average salary of elementary and high-school teachers in the country, including principals, special supervisors, and expert teachers.

4. Very few cities have any equitable basis for determining the salaries of janitors in accordance with the intelligence and skill required and the amount of work to be done.

Every school system should have a standard rate for each kind of service. Salary schedules can be arranged in terms of five classes of work, viz: (1) Heating, ventilating, and supervision; (2) cleaning in the building; (3) care of yards and sidewalks; (4) care of lawns; and (5) washing windows.

5. Accurate efficiency ratings should be kept of all janitors, which, along with seniority of service, should govern in making promotions to the higher and better-paid positions.

6. A comfortable, well-furnished office room should be provided in every school building for the sole use of the janitor.

7. It is questionable whether living quarters for janitors should be provided within school buildings, except in the largest cities, and then only in special cases.

8. About 75 per cent of the cities employ their school janitors for the entire year. This method is both more efficient and economical than that of employing them for the school term only.

9. It is good administration, as well as more economical and efficient, to have one head janitor, janitor-engineer or custodian in charge of all classes of work in connection with a building and its grounds, with authority and facilities for employing, paying, disciplining, and discharging all assistants and helpers.

The main objection to this method is removed by giving the janitor a specific amount for himself, and placing at his disposal a certain maximum sum per month which can be used only for paying assistants.

10. Janitors, as well as teachers, need careful supervision. Every school system should have a supervisor of janitors, if the system is a large one, or a head janitor in a small system, to supervise and instruct the others, and direct them in the details of their work.

11. Janitors should understand the principles underlying their work. They have, however, had little opportunity for instruction. Prior to their first appointment, most of their information has been "picked up," as was the case with nurses before training schools were provided.

Only 51 cities out of 1,088, less than 5 per cent, attempt to give instruction of any kind to their school janitors. Every school system should provide classes, conferences, or lectures for the instruction and training of such employees. With a view to arousing their professional interest, they should also be provided with books, magazines, and papers relating to their work.

Regular weekly meetings for instruction and conference are reported to have greatly increased the efficiency of the janitor force, and reduced operating and maintenance costs as much as 25 per cent.

FUNCTIONS.

1. The most effective method of removing dirt from floors, walls, and furniture is with vacuum cleaners—when properly installed and operated. About 20 per cent of the cities use this method, either wholly or in part.

The next best method is brush or broom with sweeping compound. About 82 per cent of the schools use this method, either altogether or partly.

The worst method, used by 12½ per cent of the cities, is the ordinary dry broom without sweeping compound.

2. Wooden floors should not be scrubbed except when absolutely necessary.

3. Treatment of wooden floors with floor oil two or three times a year is an effective means of reducing the amount of dust and increasing the wearing qualities of the floors. The objections that the oil increases the fire hazard and soils clothing are removed by the use of a good grade of oil properly applied.

4. Much can be done to prevent dust in schoolrooms by (1) keeping floors well oiled, (2) the use of sweeping compounds, (3) using vacuum cleaners, (4) requiring children to keep their shoes as free as possible from mud and dirt, (5) requiring, as far as practicable, all play and physical training to be done out of doors, (6) using blackboards only when actually needed, (7) giving special attention to the care of basements, and (8) keeping the fresh-air intake and chamber free from dust.

5. While 89 per cent of the cities report that dusting is done daily, 12½ per cent of all those reporting still use the feather duster, which only stirs up the dust but does not remove it. Where the vacuum system is not used in cleaning, the best method of dusting is by means of a cloth slightly moistened with water, oil or wax.

6. Most schoolroom windows are not washed often enough. In 854 cities out of 1000, or 84 per cent, the windows are washed from once to four times a year. As a precaution against possible injury to the eyes of children, window glass should be kept as clean and clear of dust and dirt as possible. The frequency of washing required varies with the locality.

7. Toilets should be cleaned daily; and toilet seats, chains and handles of toilet doors should be washed frequently with a good disinfectant.

STANDARDIZATION.

The investigation shows that there is very little agreement as to definite standards of janitor service in different cities. That better standardization would result in improvement needs no argument. It also seems clear that any school system could easily establish fairly definite standards for practically all phases of this service by giving it the attention it deserves.

1. Every city could establish standard entrance requirements by civil service examinations or other effective merit system.

2. While specific salaries paid will necessarily vary in accordance with local conditions, the basis upon which compensation is fixed can be standardized so that the rates of pay will be fair and just to all concerned, and in accordance with the amount and character of service rendered.

3. We have reasonably definite requirements in the matter of ventilation. We are told that, in order to keep the air in a schoolroom pure, there should be 200 cubic feet of air space provided for each pupil, with an inflow and exit of about 30 cubic feet of fresh air per occupant per minute. We have ways by which the amount of air flowing in and out can be measured, and so it is feasible to insist upon the proper standard of fresh air in every room.

4. In regard to temperature, most authorities agree that a temperature ranging between 65° and 70° is about the correct standard for schoolrooms, and that it should never be allowed to get above or below these limits. Excessively high or low temperatures, or sudden and wide fluctuations, are injurious to health and impede the child's progress in school. With all the information at hand in regard to temperature, and the ease with which it may be measured and controlled, every city should see to it that correct standards in this respect are maintained in all of its school buildings.

5. We also have approximate standards in regard to air moisture. About 50 per cent has been fixed as the lower limit of relative humidity, and 70 per cent as the upper limit. It has been found that, in order to maintain the same relative humidity at a temperature of 68 degrees, air requires six times as much moisture as it does at 20 degrees. Since we have ways and means for introducing moisture into the air, and have apparatus and methods for measuring and controlling the degree of saturation, it is possible to maintain a fairly definite standard of humidity in schoolroom air.

6. There are also accepted principles in the matter of schoolroom lighting. It is agreed that the clear window area of a schoolroom should be from one-sixth to one-fourth of the floor area, according to locality and obstruction of surrounding objects. This has a direct bearing on the matter of cleaning, because dirty windows mean a reduction in the amount of light admitted, varying from 10 to 50 per cent, according to the amount of dust and dirt which is allowed to accumulate, either inside or out. It would seem, therefore, that definite standards could be established for lighting, and also in regard to the frequency with which windows in any locality should be cleaned.

7. It is, of course, not quite so easy to set standards in the matter of dustiness as in some of the other important details of school housekeeping. We have thermometers for measuring temperature, hygrometers for measuring humidity, anemometers for testing air currents, and photometers for measuring the intensity of light, but so far no instrument has been devised for standardizing schoolroom dustiness. About the best practical method for measuring dustiness is that used by good housekeepers—rubbing a white cloth lightly over surfaces after they have been cleaned. If the cloth is soiled, the cleaning has not been well done, and should be done over.

8. In general, an essential factor in standardizing the cleaning and care of buildings and grounds is the adoption of a regular schedule of work to be done. Every school system, large or small, should have such a schedule. This should include directions as to the frequency with which floors are to be swept, oiled, or washed; stair rails, door knobs and woodwork cleaned; windows washed; toilets cleaned; yards and sidewalks looked after; walls brushed down; blackboards and erasers cleaned; dusting done, etc. And not only the frequency, but the methods by which the work is to be done should also be specified.

Where it is practicable to do so, if janitors can themselves have a part in planning the details of their cleaning schedule and making the rules for their guidance, they will probably take greater interest and pride in seeing that they are carried out. But in any event, a regular program is absolutely necessary if buildings are to be kept clean. To require a janitor to keep the building "in a sanitary condition," or leave him to do things "as needed," is not sufficient. In Appendix B will be found a set of rules and regulations for the cleaning and care of school buildings and grounds, now in force in the city of Minneapolis, Minn., which can be modified and adapted to conditions in any particular city.

BIBLIOGRAPHY.

I. BOOKS ON SCHOOL HYGIENE.

1. Ayres, Williams, and Wood. Keeping the schoolhouse clean. *In their Healthful schools.* Chapter X.
2. Dresslar, Fletcher B. Cleaning schoolhouses. *In his School hygiene.* Chapter XXIV.
3. Hong and Terman. School housekeeping. *In their Health work in the schools.* Chapter XIII.
4. Indiana. State Board of Health. School janitors.
5. Putnam, Helen C. School janitors, mothers, and health.
6. State of New Jersey. Department of public instruction. The teaching of hygiene and safety.
7. Terman, Louis M. The physiology of ventilation. *In his The hygiene of the school child.*

II. BOOKS ON SCHOOL ADMINISTRATION.

8. Bennett, Henry E. School housekeeping. *In his School efficiency.* Chapter VIII.
9. Chancellor, William E. Janitor service in city public schools. *In his Our city schools: Their direction and management.*
10. Cubberley, Elwood P. The school properties department. *In his Public school administration.* Chapter XXIII.
11. Deffenbaugh, W. S. School administration in the smaller cities. U. S. Bureau of Education. Bulletin, 1915, No. 44.

III. SCHOOL SURVEYS.

12. Akron, Ohio. Survey report on the schools of Akron. 1917. By H. L. Brittain.
13. Alton, Ill. Survey of the public schools. 1918.
14. Anderson, Ind. A report on the school system of Anderson. 1917-18.
15. Blaine, Wash. A survey of the Blaine public schools. By Herbert Galen Lull. University Extension Journal, Seattle, Wash., 1914.
16. Brookline, Mass. Educational survey of the public schools. 1917.
17. Buffalo, N. Y. Examination of the public-school system of the city of Buffalo. 1916. A survey.
18. Butte, Mont. Report of a survey of the school system. By Survey Commission. 1914.
19. Colorado. A general survey of public high-school education in Colorado. By William A. Cook. University of Colorado Bulletin, Vol. XIV, No. 10, 1916.
20. Denver, Colo. Denver school survey. Part 4, 1916. By J. T. Byrne.

21. Elyria, Ohio. Educational survey of Elyria, Ohio. United States Bureau of Education. Bulletin, 1918, No. 15.
22. Grafton, W. Va. School survey report. 1913.
23. Grand Junction, Colo. Survey of the city schools. 1916.
24. Grand Rapids, Mich. School survey, Grand Rapids. 1916. Chapter XIII, "Buildings and Equipment." By John F. Bobbitt.
25. Illinois school survey. 1917. Embracing 3,000 rural schools in 18 counties. By L. D. Coffman.
26. Janesville, Wis. Educational survey. 1918.
27. Memphis, Tenn. The public-school system of Memphis, Tenn. United States Bureau of Education. Bulletin, 1919, No. 50. Part 1.
28. Oakland, Calif. Survey of the public-school system. 1915. By Elwood P. Cumberly.
29. Ohio State School Survey Commission. Report. A cooperative field study, conducted by H. L. Brittain. An intensive study of 650 rural and village schools in 88 counties. 1914.
30. Portland, Oreg. School survey. Chapter XIII, "The school plant." By Fletcher R. Dresslar.
31. St. Louis, Mo. Survey of public schools, 1917. Part 2, "Hygiene of school buildings." By Fletcher R. Dresslar.
32. Salt Lake City, Utah. School survey. 1915. Chapter X, "The school plant." By Louis M. Terman.
33. San Antonio, Tex. Survey of the public-school system. 1915. By John F. Bobbitt.
34. San Francisco, Calif. Survey of the public school system of San Francisco. United States Bureau of Education. Bulletin, 1917, No. 46.
35. Springfield, Ill. Survey of the public schools. 1914. By Leonard P. Ayres.
36. Sterling, Colo. Survey of the public schools. 1917. (See Colorado State Teachers' College Bulletin, August, 1917.)

IV. SCHOOL REPORTS.

37. Bridgeport, Conn. Report of the examination of the school system of Bridgeport. 1913. "Cost of janitor service." By James H. Van Sickle.
38. Chicago, Ill. Board of Education. Report by Civil Service Commission on engineer and janitor service. 1913.
39. Detroit, Mich. Detroit Bureau of Governmental Research. Report on organization and administration of the engineering and janitorial service of the Board of Education. January, 1917.
40. Huron, S. Dak. Report of superintendent of schools. 1916-17.
41. New York City. Department of Education. Division of Reference and Research. A school for janitors. Semiannual report, July 1, 1915. p. 158.
42. New York State University. Department of Education. Division of School Buildings and Grounds. Janitor service. Eleventh annual report, July, 1917. Vol. III.

V. SPECIAL ARTICLES.

43. American School Board Journal, October, 1911. Janitor work in Wisconsin schools.
44. ——— February, 1920. Standardization of janitorial service.
45. Claxton, P. P. Recent facts on teachers' salaries. School Life, June 1, 1919.
46. Forster, H. W. Fire protection for schools. Prepared and printed for the United States Bureau of Education, 1919.
47. Frost, William D. Our short course for janitors. In National Education Association. Journal of Proceedings and Addresses, 1911. p. 920-92.
48. ——— and Armstrong, Vermillion A. Bacteriological tests of various methods of cleaning. In National Education Association, Journal of Proceedings and Addresses, 1911. p. 985-90.
49. Jones, Reuben W. The school janitor. American School Board Journal, February, 1912.
50. Journal of Education, July 20, 1911. Efficiency of janitor service in care of school premises.
51. Lambert, John. Preparations for the prevention of dust in schools. The Child, January, 1912.
52. Mickens, Charles W. Janitorial supervision in Highland Park, Mich. American School Board Journal, January and February, 1919.

53. Milligan, R. M. The public-school janitor and janitorial service. *National School Building Journal*, December, 1919-January, 1920.
54. National Education Association. *Journal of Proceedings and Addresses*. Department of Science Instruction. Summary of recommendations by committee on janitor service. July, 1913.
55. Richardson, Robert E. The selection and supervision of janitors. *American School Board Journal*, May, 1918.
56. Rose, Henry B. The care of school buildings. Report of sixth annual meeting. National Association of School Accounting Officers, 1917.
57. Shupleigh, Frederick E. The compensation of school janitors. *American School Board Journal*, December, 1916.
58. Smith, Kenneth G. Iowa State College. A short course of instruction for janitor-engineers.
59. Talbert, Wilford E. Abstracts of a series of lectures on janitor service, given in Oakland, Calif., March 26 to May 4, 1917.
60. The chief, New York City, 1912. *The Janitor and Janitor-engineer*.
61. Wilson, Guy M. Standardization of janitor service. In *National Education Association. Department of Superintendence. Journal of Proceedings and Addresses*, 1912.

APPENDIX A.

SAMPLE EXAMINATION QUESTIONS.

The following are the questions used in an examination for the position of janitor in the public schools of Newark, N. J., held Wednesday, January 31, 1917:

EXPERIENCE

- NOTE.**—Full, clear and definite answers are required. General or evasive statements will not be credited. Candidates are also cautioned to be accurate in all statements relating to experience. Any false statement will serve to disqualify in this and future examinations.
1. Have you ever been previously examined by this commission?
 2. If so, for what position? (Give date and title of examination.)
 3. Were you successful in the examination?
 4. Do you use intoxicating beverages? If so, to what extent.
 5. What is your exact age?
 6. What is your exact height?
 7. What is your exact weight?
 8. With respect to your education, state fully and in detail the names and locations of the schools you have attended. State whether you are a graduate of any grammar, high, or private school, and date of your graduation.
 9. Are you employed now? If so, what is the nature of your employment? If not, how long have you been unemployed?
 10. Have you ever been employed as a janitor in charge of a school building or any other public building? Give full particulars.
 11. What experience have you had in the work of a janitor, cleaner, or helper? State particulars.
 12. What experience have you had in the care and operation of steam engines, boilers, and electrical apparatus? State particulars.
 13. What experience have you had in the operation of heating and ventilating plants? State particulars.
 14. What experience have you had as a machinist? State particulars.
 15. To what extent have you had charge and direction of others? State details.
 16. State what other experience, in addition to the foregoing, you have had which would tend to fit you for the duties of this position.
 17. Give a list of the positions you have held during the last five years, including the length of time employed, the nature of the work done, and the salary received in each case.

18. Give the names and addresses of five responsible persons for reference.

SPELLING.

- | | |
|-----------------|-----------------|
| 1. Janitor. | 14. Ventilate. |
| 2. System. | 15. Window. |
| 3. Ladder. | 16. Honesty. |
| 4. Sanitary. | 17. Careful. |
| 5. Healthful. | 18. Important. |
| 6. Entrance. | 19. Undertake. |
| 7. Supplies. | 20. Blackboard. |
| 8. Cleanser. | 21. Daily. |
| 9. Respect. | 22. Property. |
| 10. Control. | 23. Complain. |
| 11. Assistant. | 24. Teacher. |
| 12. Promptness. | 25. Room. |
| 13. Heater. | |

ARITHMETIC.

1. If a man earns \$1,000 a year and spends \$14.60 a week, how much will he save in one year?
2. In a certain school there are 668 present on Monday, 700 present on Tuesday, 824 on Wednesday, 812 on Thursday, and 848 on Friday, what is the average number of pupils present per day?
3. A school janitor, in charge of a school building containing 18 rooms, receives \$6.50 per month for each room. If he pays out \$40 per month for help, how much does he earn per month?
4. A certain school uses 4 tons of coal per week; how many tons of coal will be required to run this school from November 1 to April 1?

DUTIES.

1. Assuming that you have been appointed janitor in charge of a modern 24-room school building, outline fully your duties.
2. As janitor in charge of a large school building, what would be your daily routing of work, and what things would you look after personally?
3. Give a complete set of instructions to both male and female assistants as to their conduct and work under your charge.
4. Explain fully the proper attitude of the janitor in charge toward the pupils, and his responsibility in connection with the order and discipline of the school.
5. Your school is furnished with new desks and equipment throughout. Outline carefully a plan for taking care of the classroom furniture in order that it may be kept in proper condition.
6. What are the chief things to be looked after in regard to the sanitary condition of the building? Outline fully what you would do in order to keep the building, in all parts, in an absolutely sanitary condition.
7. What is the duty of the janitor in charge with respect to safety and prevention of fire, and how would you undertake to keep the fire risk, in your building, at a minimum?
8. What are the duties of the janitor in charge when supplies of various kinds are being delivered to the school by local contractors?

APPENDIX B.

REGULATIONS FOR THE CLEANING AND CARE OF SCHOOL BUILDINGS AND GROUNDS.

The following directions for the cleaning and care of school buildings and grounds are taken from the excellent set of Rules and Regulations for Janitorial Service in the Public Schools of Minneapolis, Minn.:

1. Each head janitor shall be responsible for the cleanly condition of his building, and he must be observant of dirt, dust, and bad odors and see that same are removed without having special attention constantly called thereto.

2. In order that the school building may be properly cleaned; janitors are to be permitted by the principal to begin their schoolroom cleaning not later than 20 minutes after the close of the afternoon session.
3. Under no circumstances is there to be any sweeping done while the schools are in session, with the exception of corridors and stairs, except by permission of the principal of the school.
4. Under no circumstances shall coal oil or kerosene be used for cleaning purposes.
5. When no night school is held, each school building must be carefully and thoroughly swept each school day, the work to be commenced 20 minutes after the close of the last session and to include the entire building, together with outside closets, if any.
6. In buildings where night school is held the janitor shall pick up after the close of the day session all waste paper and rubbish from the floors and furniture of the rooms which are used for night school, and shall in other ways put the school in a neat and clean condition before the opening of the night session, and shall have the building properly lighted and heated one-half hour before the opening of the night session.
7. In buildings where evening school sessions are held all classrooms and other floor space used for night school must be thoroughly swept, commencing 15 minutes after the close of the night session.
8. Assembly halls must be kept in as neat condition as classrooms.
9. The special sweeping compound furnished by the board of education shall be used when sweeping.
10. All woodwork, moldings, window sills, wainscoting, handrails, radiators, pianos, pictures, casts, shelves, chalk troughs, principals' desks, teachers' tables, pupils' seats and desks, chairs, furniture, and apparatus of every description must be thoroughly dusted each school day.
11. Every school building must be thoroughly cleaned three times each year, as follows:
During the summer, Christmas, and Easter vacations, the engineers and janitors shall thoroughly brush all walls, ceilings, and window shades of their respective buildings before proceeding to wash the woodwork, which shall include oil-painted walls, doors, baseboards, wainscoting, doors, frames, sash, and all painted and varnished woodwork. They shall thoroughly wash with water the glass in all windows, transoms, and furniture, and dust all picture molding and the fronts and backs of all pictures. The floors of all entries, halls, passages, stairways, corridors, and all rooms occupied for school purposes and stair landings shall then first be well scrubbed with scrub brushes and then mopped, according to special instructions to be given by the head janitor-engineer to the head janitor of each school.
12. Head janitors shall see that the floors of all principals' offices, teachers' rooms, health promotion rooms, cooking rooms, and toilet rooms are cleaned every week, according to special instructions to be given by the head janitor-engineer for each school.
13. All rooms not in general use shall be kept clean and tidy at all times.
14. Chairs and desks shall be washed three times a year and at same time the general cleaning is done.
15. Chairs and desks which have been occupied by pupils who have contracted a contagious disease shall at once be thoroughly washed with a disinfectant to be furnished by the supply department.
16. Kindergarten rooms must be thoroughly swept and dusted after the morning session as well as after the afternoon session.
17. Kindergarten floors must be scrubbed at least once each week and must be wiped off with a damp mop or rag each morning before school opens.
18. Manual training rooms shall be thoroughly swept and dusted each day after the rooms are used and all shavings, sawdust, and rubbish must be removed.
19. The cooking room, including pantry and dining room, shall be scrubbed once every week, and shall be swept and dusted, and the garbage bucket emptied and cleaned each day that the room is used.
20. Extra precautions shall be taken in cleaning around the radiators, and to see that rags, paper or any other material of an inflammable nature does not come in contact with the radiators, by being on or behind them.
21. In buildings heated by hot-air furnaces, and where floor registers are used, the register boxes must be cleaned at least once a week, and oftener if necessary.
22. Doors and door knobs of schoolrooms and handrails and banisters of stairs shall be washed at least twice each month with a disinfectant to be furnished by the supply department.
23. Janitors shall keep gas and electric fixtures clean, removing dust and dirt from interior of all X-ray reflectors at least once each month.

24. Janitors are required to see that all blackboard erasers are properly cleaned in the basement of their respective buildings every day.
25. Janitors shall wash and fill the ink wells whenever so requested by the principal.
26. Janitors shall wash all blackboards and clean all chalk troughs every Saturday.
27. Janitors shall see that no grass is permitted to grow in the crevices of paved yards and walks and that no weeds are allowed to grow on yards or boulevards.
28. All planted ground shall be weeded regularly during the entire season and the earth around shrubbery, plants, garden plats, etc., spaded up as often as necessary and at least once each season.
29. The grass on all school lawns and boulevards shall be watered, cut, trimmed, and raked in season at least every two weeks, and all trees, shrubs, and plants sprinkled.
30. All sidewalks, pavements, and yards shall be swept as often as is required to keep them in good condition and at least twice each week.
31. All outhouses, areas, light courts, sidewalks, gutters, playgrounds, grass plats, lawns, storerooms, boiler rooms, cellars, attics, roofs, etc., shall be kept in a neat and tidy condition free from all rubbish, stones, litter, pieces of paper, and other waste matter of every description, and clean and in order at all times, and the janitor is to allow no accumulation of paper, wood, ashes, or refuse of any kind therein or thereon, and a tour of inspection for the observance of these conditions shall be made at least once every day.
32. The urinal troughs and the floors around them shall be flushed with a hose after every recess period.
33. All closet seats shall be kept dry and bowls flushed during school sessions.
34. The urinal troughs, seats of the closets, fixtures, and floors shall be washed and disinfected every day after school sessions, and tanks in connection with water-closets must be kept free from mud and other sediment.
35. The water-closet bowls and urinals and all partitions to urinals and backs of same shall be cleaned at least once each week with a disinfectant to be furnished by the supply department.
36. At all times a sufficient supply of toilet paper shall be kept in each toilet room and towels wherever there is a lavatory.
37. All toilet paper and towel racks out of order must be reported at once.
38. The water and gas shall be turned off at the supply mains at the close of each school day and on again just before the opening of school in the morning. Every precaution shall be taken in cold weather to prevent all pipes and other apparatus from freezing and to see that all plumbing fixtures are drained during freezing weather. All damage resulting from freezing of plumbing, pipes, apparatus, or other fixtures will be charged to the janitor.
39. In extremely cold weather, after the water has been shut off from the building, drain the toilet and urinal tanks, open all faucets, and then fill toilet bowls and traps on fixtures with a solution of salt water.
40. All slop sinks, washbowls, and other fixtures throughout the building shall be cleaned every school day.
41. Janitors shall not clean nor allow any assistants to clean the windows of their school buildings on the outside while standing on the outside window sills or ledges of the school buildings without the use of a window platform or harness furnished for that purpose.
42. After snowstorms a path is to be cleared on all walks and steps in and about the school premises before 8 a. m., so as to provide access to the several entrances to the buildings and to outhouses.
43. All snow and ice must be removed from steps, fire escapes, entrances, and inside and outside walks of the school premises before 12 o'clock noon of the same day that the storm occurs.
44. Janitors shall sprinkle sand or ashes or salt upon sidewalks when they are in a slippery condition; a supply of sand, ashes, or salt for this purpose to be kept on hand.
45. Janitors shall keep fire escapes clear and clean at all times.
46. Floors paved with marble, slate, cement, terrazzo, or other material shall be washed as frequently as may be necessary to keep them clean.
47. During the winter months the boiler room, engine room, and inside of all fresh-air shafts are to be whitewashed.
48. Special attention is to be given to the flow of water in urinals, drinking fountains, etc., and all leaks promptly stopped, and the water for urinals, drinking fountains, etc., turned off as soon as school is dismissed.
49. The electric current for lighting, power, and stereopticon shall be shut off from the building at the switch each night before leaving the building.

50. All refuse matter, excelsior, waste paper, oil waste, oily and dirty rags, sweepings, rubbish, vegetable matter, animal matter, and all inflammable or combustible materials shall be collected and placed in receptacles provided for that purpose, and then burned or removed from the buildings each day.

51. No smoking or chewing of tobacco in or about the building or premises will be allowed.

52. The use of intoxicants while in or about the school or premises is strictly prohibited.

53. No matches shall be allowed in the school buildings, except safety matches, which shall be under the immediate charge of the head janitor.

54. The use of alcohol, gasoline, or coal-oil stoves is not to be allowed for any purpose whatever, except when used by teachers for the instruction of pupils.

55. The janitor is to use extraordinary precautions against fire, and is to become familiar with the use and care of fire extinguishers.

APPENDIX C.

SCHEDULE OF COMPENSATION FOR JANITOR SERVICE IN THE PUBLIC SCHOOLS OF BOSTON, MASS.

(SCHOOL DOCUMENT NO. 10-1918, BOSTON PUBLIC SCHOOLS.)

SECTION 1.—FACTORS USED.

The total compensation for janitor service is based on the following five factors:

1. Cleaning.
2. Heating, ventilation, and superintendence.
3. Washing windows.
4. Care of yards and sidewalks.
5. Care of lawns.

SECTION 2.—OTHER FACTORS.

Because many other factors do not appear in this schedule, it does not mean that they are not paid for but that in order to get a simple, workable formula the payment has been reduced to the basis of these five and is established at a rate sufficiently high to cover the compensation for all others.

SECTION 3.—CUBIC CONTENTS.

Wherever the term "cubic contents" is used in this schedule it is intended to mean the total cubic contents of the building computed in accordance with the rule of the National Association of School Accounting and Business Officials and indorsed by the American Institute of Architects, which establishes a standard method of computing such cubic contents for the purpose of making comparisons of the costs of school buildings, and which is as follows:

The area of the outside of the building at the first floor shall be multiplied by the height of the building from the under side of the general basement floor to the mean height of the roof. Where portions of the building are built to different heights, each portion is to be taken as an individual unit and the foregoing rule applied.

In applying this rule, however, the following modifications shall be made:

In the case of pitch-roof buildings with unused attics, deduction will be made of a volume such as would reduce the cubic contents of the building to that which it would have if fitted with a flat roof.

For the purpose of applying this schedule, the cubic contents of the buildings shall be such as shall have been certified by the schoolhouse commission.

SECTION 4.—RATES.

It should be thoroughly understood that no matter how large the building the compensation for cleaning for the first 10,000 cubic feet shall be at the rate of \$0.004, for the second 10,000 cubic feet at the rate of \$0.0038, for the third 10,000 cubic feet at the rate of \$0.0036, and so on as per schedule up to the total cubic contents of the building.

In the same way for the *heating, ventilation, and superintendence* of a building of Class A, no matter how large, the compensation for the first 10,000 cubic feet shall be at the rate of \$0.006, for the next 10,000 cubic feet at the rate of \$0.0044, and so on as per schedule up to the total cubic contents of the building.

For the *heating, ventilation, and superintendence* of a building of Class B, no matter how large, the compensation for the first 10,000 cubic feet shall be at the rate of \$0.006, for the next 10,000 at the rate of \$0.0047, for the next 10,000 at the rate of \$0.0044, and so on as per schedule up to the total cubic contents of the building.

SECTION 5.—CLEANING.

Compensation for *cleaning* shall be on the basis of the total cubic contents of the building and at the following rates:

Contents.	Rate (per cubic foot).
To and including 10,000 cubic feet.....	\$0.004
Over 10,000 to and including 20,000 cubic feet.....	.0038
Over 20,000 to and including 30,000 cubic feet.....	.0036
Over 30,000 to and including 40,000 cubic feet.....	.0034
Over 40,000 to and including 50,000 cubic feet.....	.0032
Over 50,000 to and including 60,000 cubic feet.....	.003
Over 60,000 to and including 70,000 cubic feet.....	.0027
Over 70,000 to and including 80,000 cubic feet.....	.0024
Over 80,000 to and including 90,000 cubic feet.....	.0022
Over 90,000 to and including 100,000 cubic feet.....	.002
Over 100,000 to and including 200,000 cubic feet.....	.0015
Over 200,000 to and including 3,000,000 cubic feet.....	.001
Over 3,000,000 to and including 4,000,000 cubic feet.....	.0008

SECTION 6.—HEATING, VENTILATION AND SUPERINTENDENCE.

Compensation shall be on the basis of the total cubic contents of the building. As it is a recognized fact that it requires a higher degree of intelligence and skill to operate and care for the heating and ventilating plants of certain buildings than it does for others, they have been divided into two classes—class A and class B—in the order of such requirements for intelligence and skill, and the compensation has been fixed in such a manner as to recognize this difference.

While it is also recognized that buildings heated by furnaces or stoves and without fans for the main ventilation do not require as much intelligence and skill for their operation as do the steam-heated buildings, they have been put in class B on account of the large amount of labor required in their operation.

SECTION 7.—CLASSIFICATION OF BUILDINGS.

School buildings shall be divided into two classes as follows:

Class A: (1) Buildings in which are installed fans and engines or motors for the main ventilation by the plenum system; (2) buildings in which are installed fans and engines for the main ventilation by the exhaust system.

These buildings are usually fitted with both the direct and indirect system of steam heating, but in some cases are heated in part by furnaces.

Class B: (1) Buildings heated by steam or hot water, but without fans, engines or motors for the main ventilation; (2) buildings heated by steam, but with fans and motors for the main ventilation by the exhaust system; (3) buildings heated wholly by furnaces, but with fans and motors for the main ventilation by the plenum system; (4) buildings heated by furnaces or stoves and without fans for the main ventilation.

Buildings in which there are installed two types of heating and ventilating apparatus of substantially equal importance shall be classified according to the superior type of such apparatus.

The classification of buildings shall not be raised above that determined by the main heating and ventilating plant in consequence of the type of such apparatus installed in sanitariums or in additions to the main building containing not more than three rooms.

SECTION 8. CLASS A.—HEATING, VENTILATION, AND SUPERINTENDENCE.
 Compensation for buildings of this class shall be at the following rates:

Contents.	Rate (per cubic foot).
To and including 10,000 cubic feet.....	\$0.005
Over 10,000 to and including 20,000 cubic feet.....	.0047
Over 20,000 to and including 30,000 cubic feet.....	.0044
Over 30,000 to and including 40,000 cubic feet.....	.004
Over 40,000 to and including 50,000 cubic feet.....	.0036
Over 50,000 to and including 60,000 cubic feet.....	.0032
Over 60,000 to and including 70,000 cubic feet.....	.0029
Over 70,000 to and including 80,000 cubic feet.....	.0025
Over 80,000 to and including 90,000 cubic feet.....	.0022
Over 90,000 to and including 100,000 cubic feet.....	.0018
Over 100,000 to and including 200,000 cubic feet.....	.0015
Over 200,000 to and including 500,000 cubic feet.....	.00125
Over 500,000 to and including 2,000,000 cubic feet.....	.001
Over 2,000,000 to and including 4,000,000 cubic feet and over.....	.0009

SECTION 9. CLASS B.—HEATING, VENTILATION, AND SUPERINTENDENCE.

Compensation for buildings of this class shall be at the following rates:

Contents.	Rate (per cubic foot).
To and including 10,000 cubic feet.....	\$0.005
Over 10,000 to and including 20,000 cubic feet.....	.0047
Over 20,000 to and including 30,000 cubic feet.....	.0044
Over 30,000 to and including 40,000 cubic feet.....	.004
Over 40,000 to and including 50,000 cubic feet.....	.0036
Over 50,000 to and including 60,000 cubic feet.....	.0032
Over 60,000 to and including 70,000 cubic feet.....	.0029
Over 70,000 to and including 80,000 cubic feet.....	.0025
Over 80,000 to and including 90,000 cubic feet.....	.0022
Over 90,000 to and including 100,000 cubic feet.....	.0018
Over 100,000 to and including 200,000 cubic feet.....	.0015
Over 200,000 to and including 500,000 cubic feet.....	.00125
Over 500,000 to and including 1,000,000 cubic feet and over.....	.0009

SECTION 10.—WASHING WINDOWS.

Compensation for *washing windows* shall be on the basis of the total area of the sashes and at the rate of 5½ mills (\$.0055) per square foot for one washing on both sides of the glass.

Additional washings per year, as called for by the existing rules or when ordered by the school committee, shall be at the above rate for washing both sides of the glass, and at one-half the above rate for washing one side of the glass.

The above rate applies to all windows, transoms, doors, and doors in permanent bookcases in the building.

SECTION 11.—CARE OF YARDS AND SIDEWALKS.

Compensation for *care of yards and sidewalks* shall be on the basis of their total area and at the rate of 3 mills (\$.003) per square foot.

SECTION 12.—CARE OF LAWNS.

Compensation for *care of lawns* shall be on the basis of their total area and at the rate of 3½ mills (\$.0035) per square foot.

SECTION 13.—CARE AND SUPERVISION OF CHILDREN IN BATHS.

Compensation of janitors for care and supervision of children in baths is not included in this schedule.

SECTION 14.—EXTENDED USE OF SCHOOL BUILDING.

This schedule does not include compensation for evening schools, social centers, vacation schools, playgrounds, lectures, or concerts.

SECTION 15.—WASHING FLOORS.

No extra compensation shall be allowed for the washing of floors required by the existing rules.

1. *Ordered*, That the compensation for the janitor service of the several buildings occupied by the city for school purposes and equipped with complete and independent systems of heating apparatus, unless otherwise ordered, shall be established in accordance with the foregoing schedule, to take effect September 6, 1918, and to continue until otherwise ordered; and that the areas used in the determination of such salaries shall be such as shall have been respectively certified by the schoolhouse custodian and approved by the school committee; and that the cubic contents of such buildings used in the determination of such salaries shall be such as have been respectively certified by the schoolhouse commission and approved by the school committee.

2. *Ordered*, That the compensation for the janitor service of a single building shall be arrived at in the following manner: The several amounts determined by applying the rates of compensation for *cleaning, heating, ventilation, and superintendence* to the cubic contents of the buildings, and by applying the rates of compensation for *washing of windows* and the *care of yards, sidewalks, and lawns* to the areas of such items shall be added together, and such sum shall be the annual compensation for janitor service.

3. *Ordered*, That the compensation for the janitor service of buildings containing not more than one classroom and not in charge of the janitor of a larger school building and not occupied by classes in manual training or cookery shall be at the rate of \$3 per week.

4. *Ordered*, That the compensation for the janitor service of buildings containing not more than one classroom and not in charge of the janitor of a larger school building and occupied by classes in manual training or cookery shall be at the rate of \$4.35 per week.

5. *Ordered*, That the compensation for the janitor service of building containing not more than one classroom, when in charge of the janitor of a larger school building, and not occupied by classes in manual training or cookery, shall be at the rate of \$1.95 per week.

6. *Ordered*, That the compensation for the janitor service of buildings containing not more than one classroom, when in charge of the janitor of a larger school building, and when occupied by classes in manual training or cookery, shall be at the rate of \$2.60 per week.

7. *Ordered*, That the compensation for cleaning, heating, ventilation, and superintendence service of a building containing not less than two classrooms and not in charge of the janitor of another building shall in no case be less than \$450 per year.

8. *Ordered*, That the compensation for the janitor service of buildings containing not containing two or more classrooms, and in charge of the same janitor, shall be as per schedule for the first and largest building. For each additional building full schedule rates shall be allowed for washing of windows, care of yards and sidewalks, and care of lawns. For cleaning, heating, ventilation, and superintendence of such additional buildings the compensation shall be 80 per centum of schedule rates.

9. *Ordered*, That during the occupancy of the Trade School for Girls as an industrial school, the janitor be paid at the rate of \$14.45 per week in addition to the regular rate for that building. Such compensation does not include payment for services which may be rendered because of evening occupancy of the building.

10. *Ordered*, That during the occupancy of the Brimmer School Building as an industrial school, the janitor of that building be paid at the rate of \$12.02 per week in addition to the regular schedule rate for that building. Such compensation does not include payment for services which may be rendered because of evening occupancy of the building.

11. *Ordered*, That in addition to the compensation provided by the salary schedule, the janitor of the Mechanic Arts High School shall be paid at the rate of \$28.20 per week for the additional cleaning of shops and lavatories required.

12. *Ordered*, That additional compensation at the rate of \$36.64 per week be allowed the janitor of the Boston Trade School for the services of an engineer to operate the electric generating plant and for the daily sweeping of approximately 27,000 square feet of floor space used for shop work, this sweeping being estimated in accordance with the salary schedule, said compensation to take effect September 6, 1918.

13. *Ordered*, That in addition to the compensation provided in the schedule of compensation for janitors of school buildings, the janitor of the English High and Public Latin Schoolhouse shall be at the rate of \$9.75 per week for janitor service in connection with the occupancy of part of the building for school committee supply rooms.

14. *Ordered*, That the schoolhouse commission is hereby requested to certify to the cubic contents of all the school buildings in the city, computed in accordance with section 3 of the Schedule of Compensation for Janitor Service of School Buildings, adopted September 4, 1918.

15. *Ordered*, That the compensation for the janitor service of buildings occupied for school purposes, but in which the heating apparatus is not complete, but is supplied by heat from a plant not under the control of the janitor and not in charge of another janitor under the control of the school committee, shall be established in the following manner: Full schedule rate shall be allowed for cleaning, washing, windows, care of yards and sidewalks, and care of lawns; for heating, ventilation, and superintendence, the compensation shall be at the rate of 50 per centum (50 per cent) of the schedule rate.

16. *Ordered*, That the annual compensation for the janitor service of each building or group of buildings shall be paid to the person appointed to the position of "janitor" of each building or group of buildings in weekly instalments, and each such weekly instalment shall be 7/365 of the annual compensation as set forth in orders No. 2 and No. 7.

Ordered, That the salary of school matrons is hereby established at the rate of six hundred and forty-four dollars (\$644) per annum, to take effect September 6, 1918, and to continue until otherwise ordered.

Application of schedule of rates to particular buildings.

Name of school.	Cubical contents minus unused attic space.	Cleaning.	Heating, ventilating, and superintendence.	Cleaning windows.	Care of sidewalks and yards.	Care of lawns.	Total.
Bennett.....	363,751	\$616.75	\$615.38	\$42.87	\$52.03	\$14.38	\$1,341.41
Damon.....	227,004	480.00	492.30	31.42	136.91		1,140.63
Emerson.....	543,583	798.58	759.79	71.91	71.15	42.87	1,742.30
Gaston.....	659,400	909.40	816.20	89.66	69.80	19.05	1,904.13
Hancock.....	847,261	1,100.26	911.63	102.04	113.27		3,063.33
Lowell.....	630,208	883.21	803.10	105.81	72.48	11.77	1,876.37
Mather.....	1,267,043	1,520.04	1,635.04	169.83	89.43	53.78	3,468.12
Parkman.....	292,190	435.18	468.96	25.99	22.26		973.39
Quincy.....	463,718	716.72	706.35	62.83	23.06		1,507.96
Rice.....	591,522	844.52	783.76	56.89	46.18	12.47	1,743.82
Tappan.....	294,078	457.08	471.67	44.02	22.71		995.48
Wells.....	446,553	667.55	801.19	56.30	27.61		1,584.65