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**Representative School
Buildings**



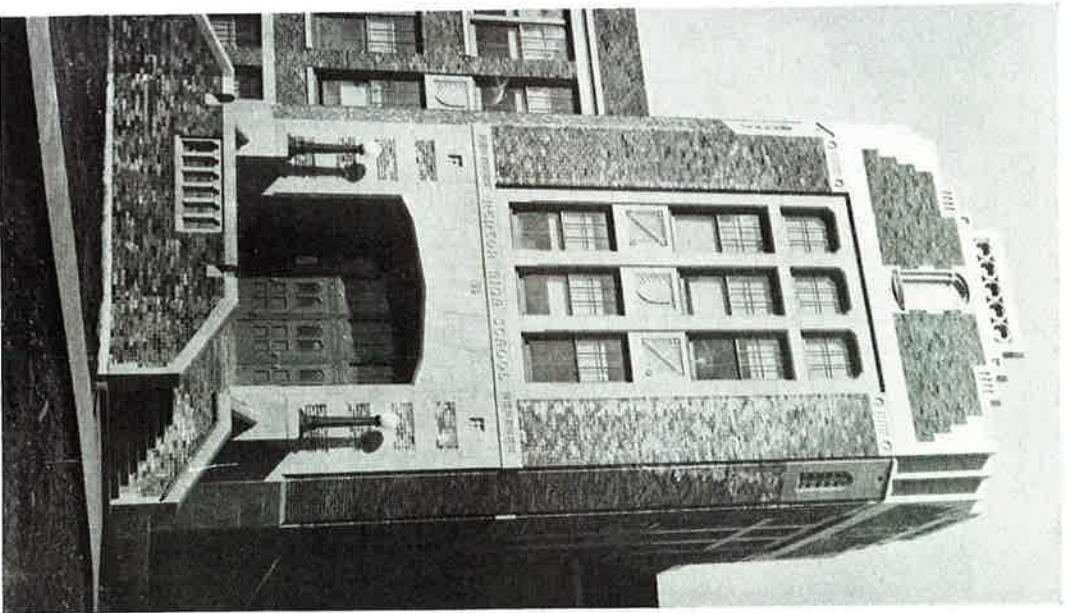
1933

STATE DEPARTMENT OF EDUCATION
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STATE DEPARTMENT OF EDUCATION

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Renton Senior High School: Main Entrance and Tower.
This Building was Designed by Wm. Mallis, Architect.

FOREWORD

Local school boards have felt the need, when faced with a building problem, of knowing what plans other communities have developed. The Department of Education has undertaken to publish this bulletin of "Representative School Buildings" in the hope of partially meeting this demand.

A building project is complicated by the fact that modern school procedures are changing. Some departments of school work have taken on greater significance; new functions have been added to serve new objectives. School buildings therefore need to be adaptable to the best procedures of the day in order not to be obsolete tomorrow. Boards of education in most cases readily recognize their responsibility in adequately adjusting their building provisions to the functions that the modern school must serve.

It is recognized that providing good buildings does not of itself guarantee good schools. Modern buildings do provide, however, the facilities and atmosphere in which a well-selected staff can more effectively stimulate the learning activities of pupils. There can be no doubt about the deterrent effect upon pupils and teachers alike of unwholesome surroundings and inadequately lighted and ventilated classrooms. Since the cost of buildings represents a comparatively small percentage of the total cost of education, an undue postponement of a building program may be questionable economy.

This publication has been made possible through the cooperation of the schools represented, which have provided the cuts and engravings without cost to this department. Many of these schools have enlisted the interest of their architects in order to be of assistance in the preparation of this bulletin. To all who have assisted in this way I wish to express my deep appreciation.

W. D. Stewart
State Superintendent of Public Instruction.

Olympia, Washington, February 15, 1933.

PLANNING A BUILDING PROGRAM

FIRST STEPS IN THE PLAN

Whenever a school district is in need of additional or improved school building accommodations it is the duty of the school board and its administrative officers to carefully initiate a program that takes into consideration all the facts pertinent to the problem. Included in such a program should be the following considerations:

Survey of Present Buildings and Probable Needs

First, a careful survey of the existing buildings by a competent person should be made. This survey should include: (a) Life of present buildings; (b) type of school for which each building is adaptable; (c) location of buildings relative to population served; (d) estimated cost for any remodeling. The use of a standard school building score card is recommended.* These findings should be given in non-technical language which the board and the people at large can understand.

Determination of Educational Program

The determination of the type of organization and the extent of the educational opportunities the district is to provide are basic limiting factors in any school building program.

How many grades of work are to be provided? Shall the schools be organized along the 8-4, 6-3-3, or some other plan? Shall the district operate a junior high school, a senior high school, or can these years be better provided by transporting pupils to some neighboring school? Is a consolidation with other districts desirable or probable?

Shall the course of study be narrow or broad? What technical courses should be offered? What provision shall be made for the under-privileged child? For what community uses will the building be used?

In planning for the future, it is necessary to take into consideration the probable future growth of the community and a corresponding expansion of school activities. Buildings, when once constructed will help or hinder the educational program of the community for years to come. It is of the greatest importance that they house, or be a part of an extended program to satisfactorily house, the needs of the community.

Financial Ability of the District

The ability of the district to finance and maintain an educational program, once started, needs to be carefully considered. A

* Strayer, C. D., and Engelhardt, N. L.: "Score Card for Elementary School Buildings," "Score Card for High School Buildings," "Score Card for Village or Rural School Buildings for Young Teachers or Less-able Pupils," "Score Card for Junior High School Buildings," "Score Card for Senior High School Buildings," "The Butlerworth School Building Score Card."—World Book Co., Yonkers-on-Hudson, New York.

building program beyond the educational needs or the ability of the community to support is an economic waste. Some school districts have found it of great advantage to build up a cash reserve to be used for building purposes and thereby be able to "pay as they go." This is to be desired when possible, since it saves interest costs.

Whenever it becomes necessary to bond, a careful study should be made of the district's tax problems, since the schools are only one of the taxing units of government. A comparison with other like-sized districts with a similar program carried on for a period of years will aid in determining the advisability of bonding. School districts should avoid bonding to the legal limit when there is a possibility of valuations being materially lowered. (For directions for bonding, see Director's Handbook, page 53.)

Selection of School Site

It is very important that the site selected be accessible to the population served. Due consideration should be given to the probable trend of growth. It is more important that the ground be high and dry than to be centrally located. The site should be large enough to provide space for all types of activities recognized as a part of the modern educational program. It should also lend itself to attractive landscaping.

The Committee on Schoolhouse Planning appointed by the National Education Association suggests the following as essentials of a good site:

1. Adequate Size*
 - (a) For the building and its future expansion.
 - (b) For the proper setting of the building and its removal from the noise and dust of the street.
 - (c) For outdoor games and physical education.
 - (d) For school garden if desired.
2. Orientation of Building
 - (a) Most classrooms should have sunlight part of the day.
 - (b) Skyline should permit sufficient light.
3. Freedom from Noise and Odors

Avoid proximity to railroads, gas plants, factories, and other sources of injurious noise and odors.
4. Suitability for Construction

Avoid low, filled, and wet land. Avoid abrupt changes in grade unless the building can be readily adapted to them. Ledge rocks may increase costs of foundation.

*The White House Conference for Washington suggests that a site of sufficient size for an elementary school be four to six acres and for a high school, ten to twelve acres with separate playgrounds and athletic fields for boys and girls.

5. Safety

Schools should not be located on dangerous thoroughfares. Adequate space should be provided for the loading and unloading of busses on the grounds proper.

6. Healthfulness

Abundance of fresh air, sunlight and freedom from noise, dust, and odors are conducive to health.

7. Reasonable Centrality to Contributing Area

Exact centrality is not as important as other factors.

8. Reasonable Accessibility

When many children must come by railroad or trolley the school should not be too far distant from them.

SELECTING AN ARCHITECT

A wise selection of the school architect is important in the initiation of a school building program. He should be chosen early, as his services will greatly aid in determining the needs of the schools and the funds necessary to properly provide school facilities.

The right way to select an architect is very much the same as that used in selecting a doctor or a lawyer—on the basis of past performances and reputation. School building planning and construction is a specialized field and the public can best be served by a specialist in school architecture. Answers to the following questions will aid boards in their selection:

1. Is he a man of high character?
2. To what extent has he functioned as a school architect?
3. How much work has he done of the general type under consideration?
4. Have his buildings been planned with economy of space and materials?
5. Do his buildings show artistic ability?
6. Will he give personal attention and whole-hearted interest to plans and supervision of construction?
7. What kind of an organization has he? Does it include experts in
 - (a) design as applicable to schools?
 - (b) construction appropriate to schools?
 - (c) heating and ventilating of schools?
 - (d) engineering?

The Schoolhouse Planning Committee of the National Education Association presents the following as its estimate of the essential qualities of a school architect:

"The architect personally in charge of a school plan should possess:

- "1. Familiarity with modern educational practice and the activities conducted in a modern school in so far as they affect planning. He must visualize the way in which the school and its classes carry on their work, in order to handle details satisfactorily.
- "2. Open-Mindedness to suggestions and willingness to revise plans so long as they can be improved. He must not cut short the consideration of educational features.
- "3. Originality and Extended Experience in School Architecture. Every building presents new problems and both experience and originality are needed to cope with them.
- "4. Professional Spirit shown by his desire to secure the solutions that are best for the community and its children.
- "5. Executive Ability to keep all working harmoniously so as to secure the best results.

"The architect's organization should include someone who has demonstrated his ability through the planning and construction of a large number of schools that are really efficient when judged by competent persons. No building can be judged fairly without knowing its cost. Expensive buildings must be judged by high standards of construction and all buildings should be judged by high standards of planning, including safety."

Architect's fees have been standardized and a schedule of minimum charges is set by the American Institute of Architects.

KEEPING THE PUBLIC INFORMED

To get, keep and deserve the confidence of the people, it is necessary to keep them informed as to the educational needs and the board's plans to meet these needs. Where a well-developed publicity program has been carried on, it is quite likely that the public will have an understanding of building needs for the most part, and then it is necessary only that the board's program of meeting these needs be made known to insure public support. The following suggestions may be of value in keeping the public informed:

1. Plan on the assumption that when properly informed, the public will make any necessary sacrifice to provide adequate education.
2. Make the interests of the children the paramount issue.
3. Take the position that the school authorities are speaking for the whole people on school matters.
4. In presenting arguments, keep the issues clean cut; avoid over-stating the case; have unity of action; choose arguments that

will appeal to influential bodies of voters; present timely and sound arguments and illustrations, and make it clear that the people must judge for themselves.

5. Have a systematic plan for presenting the problem to civic organizations and clubs.
6. Present the issue in the school paper and other papers of general circulation.
7. Make charts and maps showing population trends and increase in school attendance.
8. Make a survey of present facilities, showing crowded conditions, courses which cannot be given, and the educational possibilities of the new building.
9. Give the cost, plan of payment and additional tax on \$1,000 valuation.
10. Send a statement of these facts and figures to each voter. It might be effective to use a cut of the proposed building in connection with such statement.

BUILDING STANDARDS

The school should be the center of the educational, social, civic and cultural activities of the community. Every school building should be planned with the idea of serving the public needs as well as school needs. The library, auditorium, and gymnasium, together with the home economics equipment, offer excellent opportunity for civic and social organizations to carry on activities that directly affect not only the lives of the adult population of the district, but the school population as well.

A school building should be beautiful without sacrificing fundamentals. It should be placed in pleasing surroundings. It should be constructed with due regard to (1) convenience, (2) comprehensiveness, (3) safety, (4) flexibility, (5) healthfulness, (6) expansiveness, (7) economy and efficiency, (8) aesthetic fitness.*

1. Convenience. Considerable study should be given to the correlation of the classrooms, to the arrangement of the corridors, to the location of the office and various administrative features, to secure convenience. As nearly as possible, the rooms of each department should be connecting and contiguous and always on the same floor. Supply closets, book shelves and bulletin boards should be provided in each room.

2. Comprehensiveness. The building should provide for all the educational activities of the school. Attention should be given to the fact that new activities are rapidly gaining recognition as essentials, and provision should be made for them. An earnest

* Essential qualities of school buildings as set forth by N. E. A. Committee on Schoolhouse Planning, and the Illinois Bulletin—Representative Illinois High School Buildings.

effort should be made to make the building fit the needs of the particular community in which it is situated.

3. **Safety.** Corridors and stairways should permit the building to be vacated in three minutes even if one stairway is blocked by smoke. Each stairway should be continuous and connect directly with an outside exit. All doors should swing outward. Whenever feasible, the heating plant should be outside the main walls of the building.

4. **Flexibility.** Since it is impossible to foresee all the requirements of the future, every school building should be so planned and constructed that changes can be made, if necessary, in the length of the room. Ventilating and heating ducts, plumbing, and electric wiring should be placed in the walls along the corridors.

5. Healthfulness

(a) **Lighting.**—Every room should have abundant natural light. Unilateral lighting is recognized as essential to safeguard the eyesight of both teachers and pupils. Windows should be arranged in batteries and the distance from the window to the farthest desk should not be more than twice the distance from the floor to the top of the window. Glass area should be 20% to 25% of the floor area. In Western Washington, where there is less sunshine, the glass area might well be 25% or more of the floor space.

(b) **Heating and Ventilating.**—There is a close relationship between warm, clean air of the proper humidity and the health of the pupils of the school. The heating plant should be large enough to insure a temperature of seventy degrees Fahrenheit in the coldest weather and provide further for the right kind of heat control so that the pupils will never be subjected to extremes in temperature. Ventilating systems should not only admit clean air into the room, but should provide also for getting rid of foul air.

(c) **Toilets.**—Toilet rooms should be distributed on each floor and so located that they may be easily supervised. These rooms should not be larger than necessary and should be planned to have the windows opening outside. Walls should be of white tile or hard cement finished with a hard, waterproof white paint. Floors should slope very gently to drains so that the floors may be scrubbed frequently.

Fixtures should be of porcelain or white glazed enamel, designed for pupils of the age the school is to accommodate. For girls, there should be one toilet seat for each 20 pupils in the lower grades and one for each 25 pupils in high school. For boys, there should be approximately one seat for every 30 to 35 boys in the lower grades and one for each 30 boys in high school. There should be one urinal for each 20 to 30 boys. These numbers are the minimum and will suffice only when the school is so programmed as to dismiss the various grades at different intervals.

Wash basins, soap and sanitary towels are essentials in every toilet room.

Generally speaking, the distribution of fixtures should have the greatest number on the first floor, since the lunch room, auditorium, gymnasium and any other factors which may cause congestion, occur, usually, on the main floor.

(d) **Drinking Fountains.**—There should be a sufficient number of sanitary bubble fountains so located that they will not block traffic.

(e) **Wash Basins.**—These should be conveniently placed in rest rooms and near lunch rooms.

6. **Expansiveness.** The building should be so planned that it can be enlarged as much as may be needed without unnecessary cost and without cutting off the natural light and ventilation of any of the existing rooms. If the original plan is carefully drawn, the building can be added to from time to time without destroying the architectural symmetry.

7. **Economy and Efficiency.** The continuous use of each room is an end to be aimed at by the architect. This sometimes involves providing a variety of equipment and making the rooms somewhat larger than they would be if used for one purpose and for only part of the time. Small classrooms are limited in their use for the school. Care should be taken, however, that the rooms are not made too large, as there is a waste involved here also.

8. **Aesthetic Fitness.** Every school building should be thoroughly adapted to the purpose for which it is designed, yet maintain a pleasing appearance. Certainly there is no class of buildings deserving of more thoughtful and artistic treatment than school buildings. The interior should be attractive and pleasing. The decorations should be modest and cheerful. The finish should cause the pupils to take pride in keeping the building free from injury and disfiguration.

Approval of Plans. The State Department of Education and the County Superintendent of Schools will gladly render any assistance possible, without cost to the districts, in determining and approving plans for buildings. The law requires that for districts of the third class all plans for building be approved by the County Superintendent of Schools.

PLANNING FOR THE FUNCTIONS OF THE BUILDING

The National Education Association Schoolhouse Planning Committee, as a result of an extensive study, recommends the following basis for division of floor area in building planning:

Walls and partitions not over.....	10%
Floors not over.....	3%
Stairs and corridors not over.....	20%
Accessories not over.....	50%
Instruction not less than.....	16%
Administration not over.....	16%

Classrooms. There are certain hygienic and pedagogical principles which should determine the size and shape of classrooms.

Elementary classrooms should be large enough to properly seat 35 to 40 pupils with a minimum of 16 square feet of floor space and 200 cubic feet of air space per pupil. They should be placed above ground. Basements are likely to be damp and dark and unsatisfactory. The light should be from one side and the width of the room not over twice the distance from the floor to the top of the windows. The windows should be placed as close to the ceilings as possible, since the most effective light comes from the upper portion of the window.

Experiments prove that pupils cannot readily see writing on blackboards at a greater distance than 30 feet; also, hearing becomes difficult at a greater distance than 30 feet. Classrooms 22 or 24 feet wide and 30 feet long with a 11½ to 12-foot ceiling seem best adapted to present-day needs.

Most of the high school classrooms should accommodate 40 students. Special rooms must, of course, vary in size. The height and width should be the same as elementary schoolrooms, but they should vary in length to meet the school's needs as determined by a study of the program. There is a marked tendency to enlarge the rooms in junior high schools and high schools. Class size is being increased and more informal furniture is coming into use.

Cloakrooms and Lockers. Cloakrooms are more practical for elementary schools wherever there are homerooms where the children remain for most or all of the day. They should be located at the back or side of the room. Those with vanishing, rolling or swinging doors are most satisfactory. Provision should be made for ventilation and drying of wraps. A drip trough for umbrellas should be provided.

Lockers are more suited to the junior high school, senior high school, the platoon school, and the elementary rooms where they are departmentalized. When placed in corridors, the lockers should be recessed and the width of the corridors increased to prevent the congestion of traffic. Wherever lockers are confined to locker rooms, there should be separate locker rooms for boys and girls and their location should be determined by accessibility to the

gymnasium and playgrounds as well as to homerooms. They must be well lighted and adapted to supervision.

Corridors, Exits and Entrances. The arrangement of corridors, exits and entrances is important to give balance to the building as well as to provide for utility, convenience and safety. A minimum of 10 feet in width should be allowed in corridors used by all pupils. If lockers are placed in corridors the width should be increased accordingly. There should be direct light from the ends and at least two inside exits from each floor. The walls of the corridors should be finished with some material such as cement and hard wall finish for 5 or 6 feet from the floor where they receive the hardest usage. The rest of the walls and ceiling may have the same finish as the rest of the building. Corridor doors should be made of materials that are reasonably permanent, easily cleaned, and noiseless. Cement should not be used for corridor floors.

Classroom doors should be 3' x 7' with glass panel not less than 24" x 30". They should swing outward and be so arranged as not to restrict the width of the corridor when open. All doors should be equipped with high-grade locks which can be locked from the outside only, permitting free exit from within at all times. All outside exits should provide free, unrestricted movement of pupils from corridors. They should be equipped with panic bolts the full width of the door, so adjusted that the pressure of the body will permit the door to open outward.

Stairways. Stairways should be at or near the ends of the corridors. They should be of fireproof or slow-burning material. The minimum width of the stairways should be 4 or 4½ feet in elementary schools and 5 or 5½ feet for high schools. In larger schools they need to be wider. Hand rails should be placed on both sides of all stairs, with a dividing rail on wider stairs. Stair risers should not exceed 6 inches and the treads should be 11 to 12 inches wide. Non-slip nosing should be installed on all stair treads. Corners next to the risers on cement steps should be left rounded instead of square, in order to make cleaning easier. The same results may be had on wood stairs by using a metal strip made to fit the corners. Long flights of stairs should be broken by a landing halfway between floors which should be at least the same width as that of the stairway.

Stairs should not be placed over boiler rooms, furnace rooms, storage closets, or any other place where fire may originate. Where there is a run of more than one flight of stairs, the outside balustrades should be of sufficiently closed construction to prevent embarrassment because of the view of persons on the lower levels. Two or three simply designed ornaments can profitably be placed on banisters to prevent pupils from sliding down them.

If ramps are contemplated, they should have no more rise than one in ten.

Auditorium. The auditorium is an essential feature of the modern school. The curriculum requirements will call for its use almost daily. Also, much of the community life will center here. It should be constructed with a stage amply large for choruses, mass drills, orchestras, school plays, literary work, debate and other forms of community and student activities. It should be well lighted, heated and ventilated. It should be located on the first floor, if possible, and so planned that it might be shut off from the rest of the building when used for community activities. In the larger schools the floor should be sloped or bowled so every seat offers an unobstructed view of the stage. Careful provision should be made for exits.

The motion picture room should be lined with fireproof materials and wired for modern equipment. Windows should be equipped so that the room may be darkened if pictures are to be shown in daytime.

Auditorium acoustics is a difficult problem and should receive careful attention.

Study hall accommodations in the auditorium can be arranged by proper placement of skylights. It should be borne in mind that adequate natural lighting is an essential feature of a study hall, as well as heating and ventilation.

In smaller schools the auditorium and gymnasium may be combined. When this is done, provision should be made to store folding chairs on rubber-tired trucks under the stage.

Gymnasium. Provision for physical or health education should be made in every school since the first of the seven cardinal principles of education is health and safety.

Ordinarily, the gymnasium should be 50 to 60 feet wide by 70 to 90 feet long, with at least 22 feet in the clear in height. It is recommended that the minimum playing floor for elementary schools be 40 by 60 feet, and for high schools, 48 by 75 feet. It should be located on the ground floor if possible and so arranged that it could be shut off when open to the public. It should not be in the center of the building, but isolated so that the noise does not disturb classroom instruction. An abundance of light should be provided with windows arranged to admit plenty of fresh air. Heating and ventilating apparatus should be recessed in the walls. Nothing should protrude in such a way as to be a hazard to the players.

Separate showers, toilet and locker rooms should be provided in the gymnasium for boys and girls. It is well to plan these so they are accessible from the playfields without going through the halls of the school building.

Study Halls. Elementary schools do not need to be provided with study halls. Neither do junior high schools necessarily need such a room. The study halls in high schools should accommodate about one-fifth to one-fourth of the school enrollment. Generally speaking, each study hall should seat a maximum of 100 to 125 pupils. Study halls should be adjacent to the library so that pupils may have easy access to books needed.

Library. The library should be considered as the heart of the school. In small schools it may be a part of the study hall if it can be so set apart as to provide a library atmosphere. The library room should be provided with reading tables and chairs to accommodate 10 to 20% of the student body. Especial attention must be paid to adequate lighting. Windows should extend from the top of the shelving to the ceiling. Artificial lighting should be semi-indirect. A librarian's workroom, with ample space for storage, should be connected with the library, separated by a glass partition. One or more conference rooms similarly located are desirable.

All shelving should be adjustable. Except for the reference sections, the shelves should be 8" deep. The top shelf should not be over 5'6" from the floor.

Battlehip linoleum is the best floor covering for libraries, since the elimination of noise is essential here.

Science. The arrangement of the laboratory will depend on the size of the school. The best arrangement for small schools is a single room equipped with tables suitable for all the sciences. The room should be about one and one-half times the length of a standard classroom, with the teacher's demonstration tables and the tablet armchairs at the front. A storage room should be conveniently placed for apparatus and supplies. This room may also be equipped for a teachers' cloakroom. There should be plenty of cupboard room in the classroom for the materials which are constantly in use. At least one good-sized hood, vented outside the building, is needed.

In larger schools the science rooms should be grouped so that one lecture room, centrally located, can serve for two laboratories. All science rooms should be well lighted. Windows in the lecture room should be arranged so that they may be darkened for lantern work. Rooms for biological science should have plenty of sunlight for plant and animal life.

All plans for science rooms should include provision for such requirements as electricity, gas and running water. The plumbing and table tops should be of the best acid-resisting materials.

Home Economics. The home economics department in a small school may be provided for in a room about one and one-half times the size of a standard classroom and a good-sized storage

room. A cooler should be planned if other refrigeration is not contemplated. In larger schools, this department may include a sewing room, fitting room, cooking laboratory, dining room, bath-room, laundry and storeroom. The plans for this department might correlate the need of a girls' rest room with facilities for instruction in bed-making and the care of equipment usually found in the home bedroom.

The architect must know such facts as whether the unit type kitchen is contemplated, whether gas or electricity is to be used, etc., before he can anticipate plumbing and wiring needs.

Suggestions for arrangement and equipment may be obtained from the Home Economics Supervisor, State Department of Education.

Lunchroom. A special place should be provided for serving hot lunches, especially in schools where many of the pupils are transported on school buses. The lunchroom or cafeteria should be near the cooking laboratory unless there is a special kitchen and serving room. The cafeteria or lunchroom should be a light, airy, attractive room equipped with tables and stools that are well finished and easily kept. This space should be planned with unusual economy of space if it functions for cafeteria purposes only.

Rest Rooms. Every school containing several rooms should have a small rest room for men teachers and one for women teachers where they may meet pupils for conferences if their own rooms are in use, and where they may retire when not actively engaged in some school work. These rooms should be located near the office so that their use may be supervised. Such facilities will prove to be worth while to any district.

Rest rooms for pupils are essential when many of the pupils are transported on school buses. The girls' room should be adjacent to the women teachers' room, with a doorway between for supervision. The boys' room, if it can be afforded, should be similarly situated to the men's room. These rooms should have a lavatory and toilet and should be provided with a first aid outfit. They should be equipped with table, chairs, hospital bed and such other equipment as may be necessary to carry out their purpose.

Shops. This department will vary according to the size of the school and the courses of instruction that are to be offered. The general shop is recommended for junior high schools and small schools. All shops should have ample storeroom for stock materials and individual lockers for projects under construction. Shop rooms should be located in a part of the building so that the noise will not interfere with the regular class work.

Commercial. The commercial department in the larger schools should have a bookkeeping room, a shorthand room, and a typing room. The shorthand and typing rooms should be divided by a

glass partition so that both rooms may be under the supervision of one teacher. The shorthand room may also be used for book-keeping in the smaller schools.

Administration Rooms. The modern school transacts business which is considerable in both extent and detail and should be provided with ample space to properly function. The administration department may include superintendent's office, reception room, principal's office, vault for records, and adequate space for the detail work that must be done.

The superintendent's office, if located in the prospective building, should be large, well lighted, heated and ventilated, with private toilet and cloakroom. In most instances, it will also be used for the school board room. It should be located near the front entrance where the public can easily find it and where it might easily be reached from every part of the building. A reception room should be adjacent to the office so that those wishing to see the superintendent may wait if he is busy.

The principal's office should be off the reception room and arranged so that he can privately confer with teachers, pupils or patrons. It should be provided with private toilet and cloakroom and it should have a secondary entrance. There should be a small storeroom for materials in connection with the office.

Ample space should be provided for clerical help. The vault should be located where it cannot be reached except within view of someone in the office.

Some suggested plans may be found on pages 40 and 53.

Janitor's Room and Closets. There should be closets on each floor for mop, sink and cleaning supplies. The janitor's storeroom should be conveniently located and all inflammable materials kept in a fireproof room. Under no condition should this room be under stairways. The custodian should have a comfortable place of his own in the building, if possible.

MISCELLANEOUS FEATURES TO BE CONSIDERED

Floors should be of hardwood, preferably maple or some other close-grained wood, since the floors receive greater wear and tear than any other part of a school building. It should be borne in mind that floor oil is not a well-adapted treatment for floors and is being abandoned by most school boards in the interest of cleanliness.

Wiring for master clock, secondary clocks, bell signals, fire alarm, intercommunicating telephones, radio, and Public Address System, can all be done without excessive cost at the time the building is being constructed, whether or not these will all be installed in the immediate future.

Generally speaking, there should be six light outlets in each classroom, controlled by two switches so arranged that the lights located on the far side from the windows may be used independently of the others on dark days.

Tinting of ceilings should in all cases be in ivory white or light cream with a light-reflecting factor of not less than sixty per cent. Walls should be of a color with a light-reflecting factor of not less than thirty per cent nor more than fifty per cent.

Glossy finish should be avoided.

Tinting, however, should await such time as is required for the building to settle so that there may be no subsequent cracks in the plaster.

Shades should be translucent and in a color to harmonize with the classroom walls.

Blackboards should not exceed 42" in width. No more blackboard should be provided than the needs of the respective classrooms may require—from 22 to 39 feet. It is economy to install blackboards of high quality. Nothing has yet excelled good slate. The height of the chalk trough above the floor should be for:

First and Second Grades.....	24 to 28 inches
Third and Fourth Grades.....	26 to 30 inches
Fifth and Sixth Grades.....	28 to 32 inches
Seventh and Eighth Grades.....	30 to 36 inches
Junior High Schools.....	30 to 36 inches
High Schools	34 to 38 inches

Bulletin Boards should be provided in all classrooms to the extent of 20 square feet as a minimum. Many rooms will require more. A large bulletin board near the main office or near the main entrance is essential and should receive careful treatment. Cork is standard material.

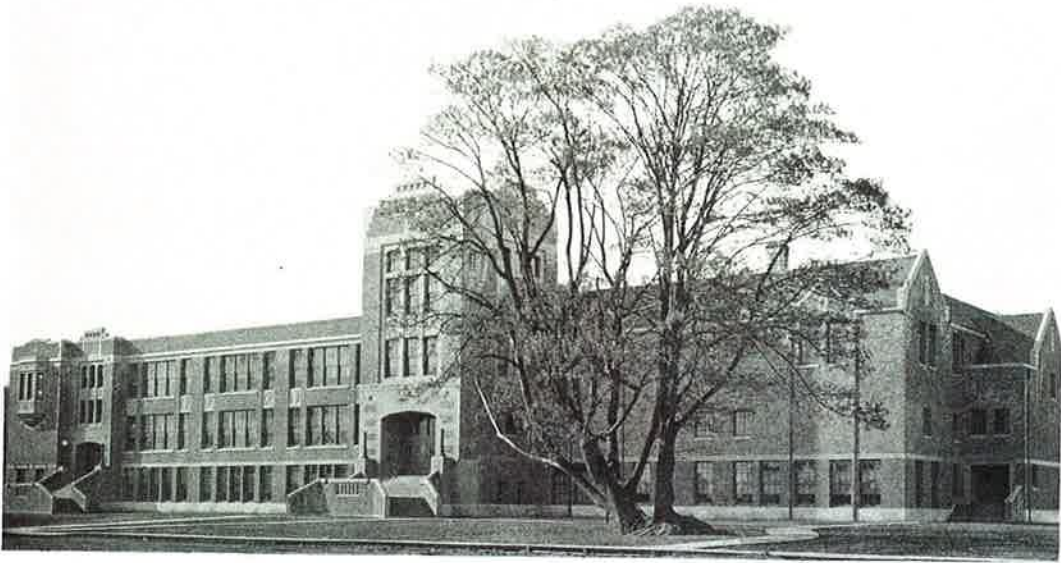
Equipment and Fixtures—especially in hardware, plumbing and lighting—should be of standard high quality. Door locks and window latches must be especially sturdy in any school building.

Sound Proof Insulation materials have an important place in the construction of the music rooms, the auditorium, typing room, and in connection with ventilation fans if such a system is used.

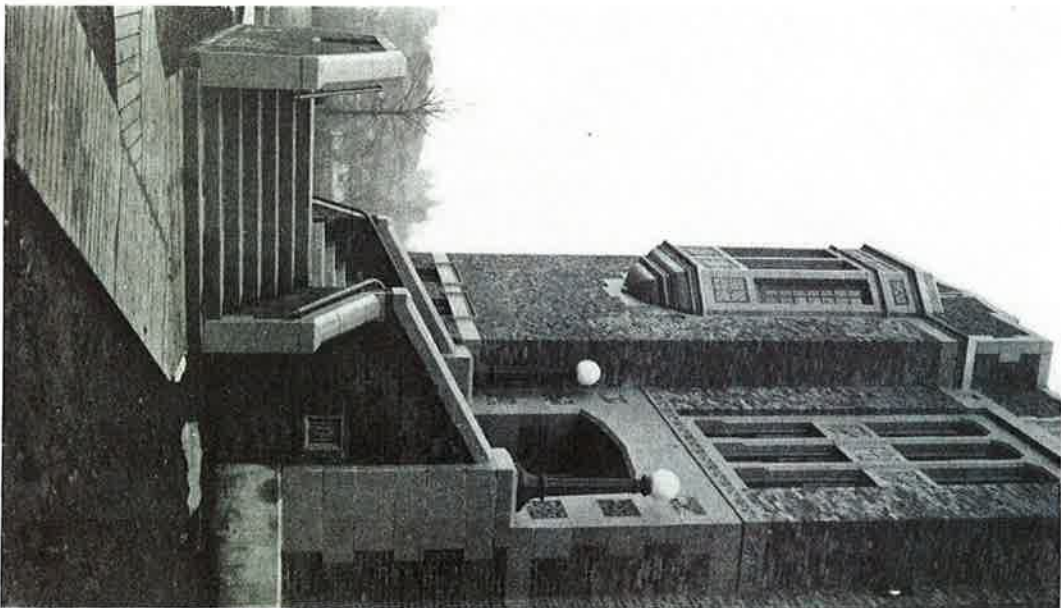
Lighting standards shall be those contained in "Standards of School Lighting" approved September 15, 1932, by the American Standards Association. All school architects should have a copy of this bulletin. It may be had from the Illuminating Engineering Society, 29 West 39th Street, New York, or The American Institute of Architects, 1741 New York Avenue, N. W., Washington, D. C.

Building Plans and Specifications should be carefully filed for future reference.

Representative High School Buildings and Plans



Senior High School, Renton; Built 1931; Cost \$223,000; 32 Classrooms, Gymnasium and Auditorium.
This Building was Designed by Wm. Mallis, Architect.



Renton Senior High School; Secondary Entrance.

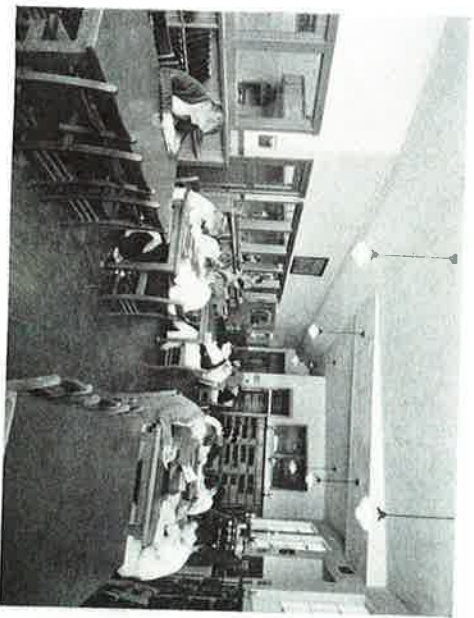


Renton Senior High School; Auditorium.



Renton Senior High School; Auditorium, Study Hall, Library (under balcony).

Representative School Buildings



Renton Senior High School: Library.



Renton Senior High School: English Room.

in the State of Washington



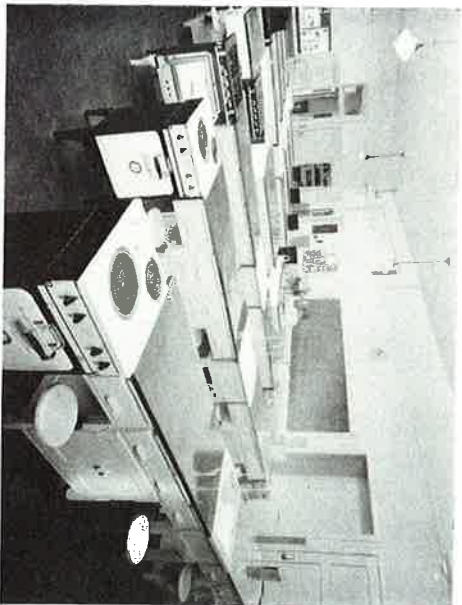
Renton Senior High School: Chemistry and Physics Laboratory.



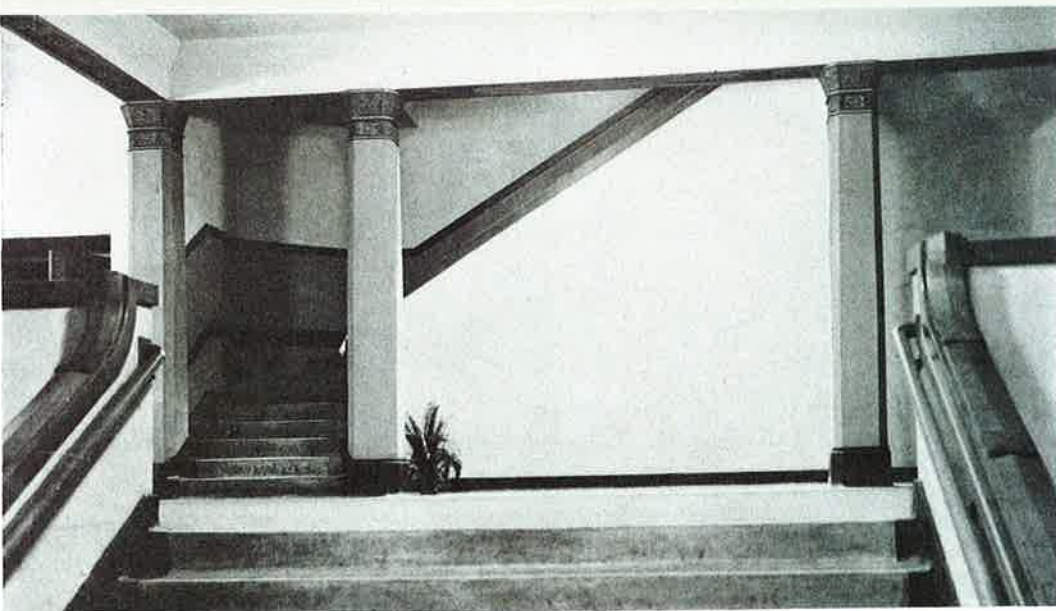
Renton Senior High School: Biology Laboratory.



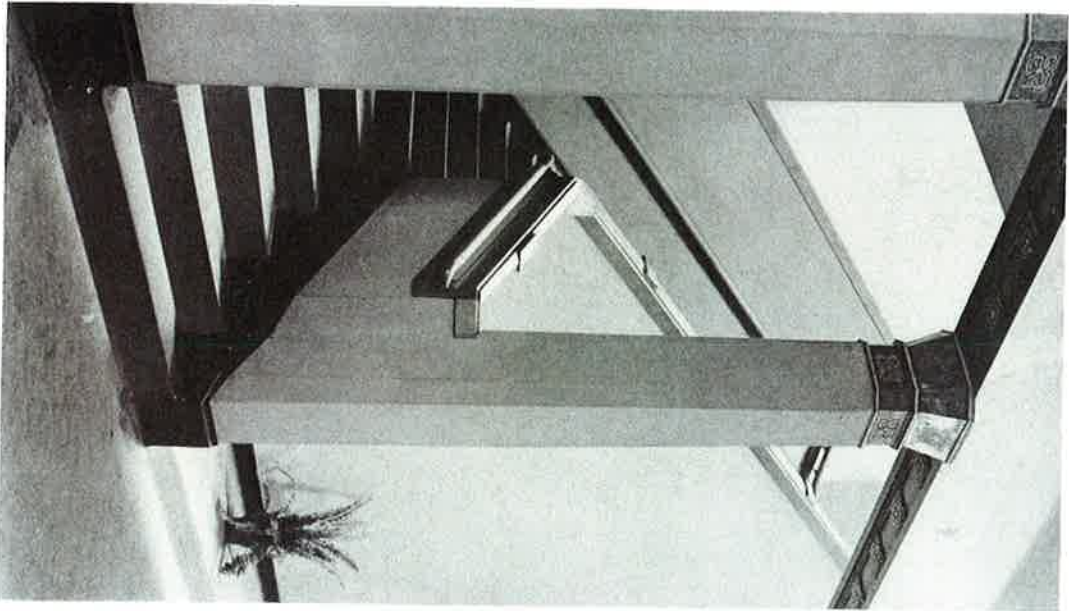
Renton Senior High School: Typing Room.



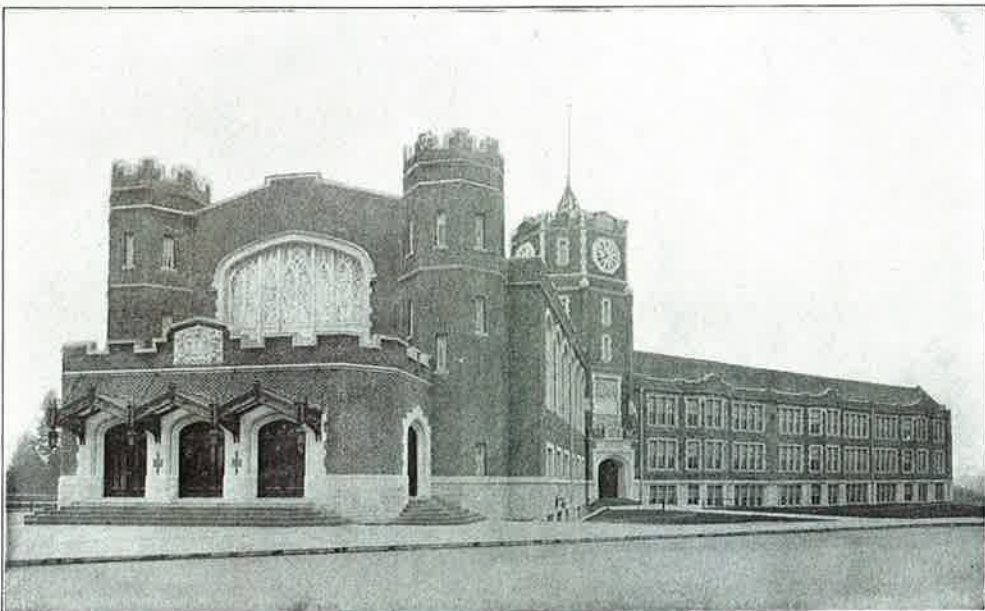
Renton Senior High School: Cooking Laboratory.



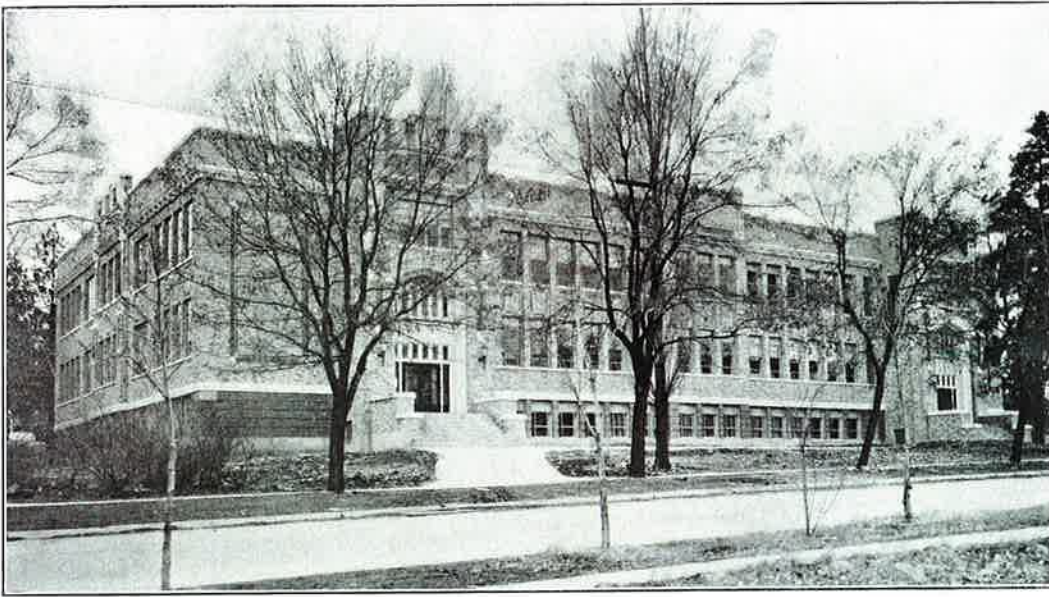
Renton Senior High School; Main Entrance Foyer.



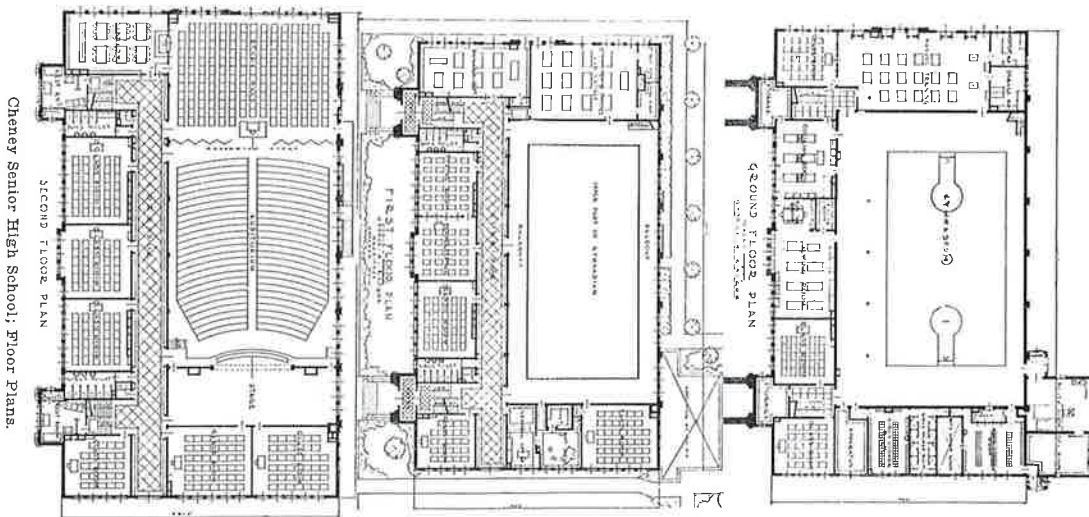
Renton Senior High School; Foyer Stairway.

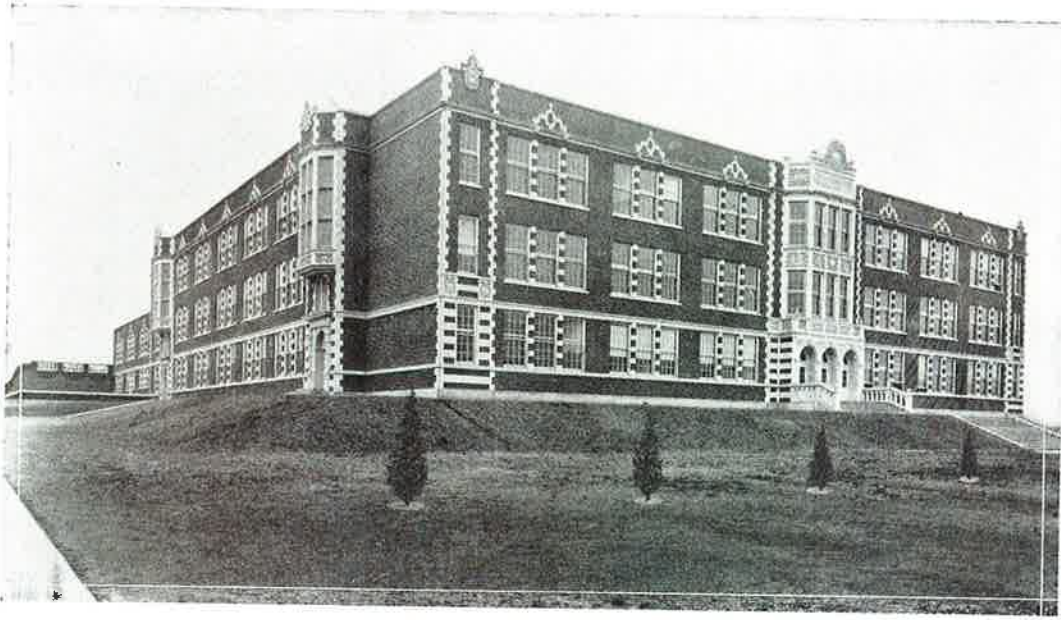


Lincoln High School, Tacoma; Built 1914-15; Cost \$439,150; 81 Classrooms and 12 Shops, Auditorium, 2 Gymnasiums. This Building was Designed by Heath and Gove, Architects.

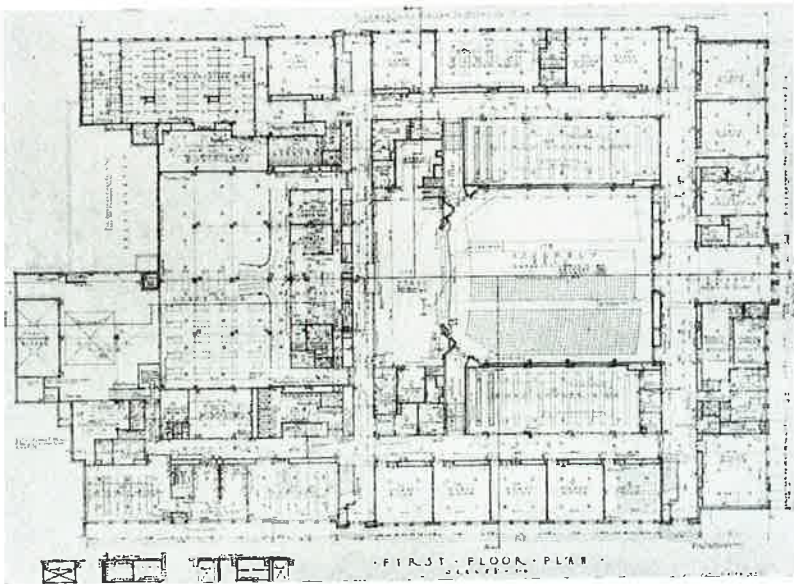


Senior High School, Cheney; Built 1929; Cost \$141,000; 24 Classrooms, Gymnasium and Auditorium.
This Building was Designed by George M. Rasque, Architect.



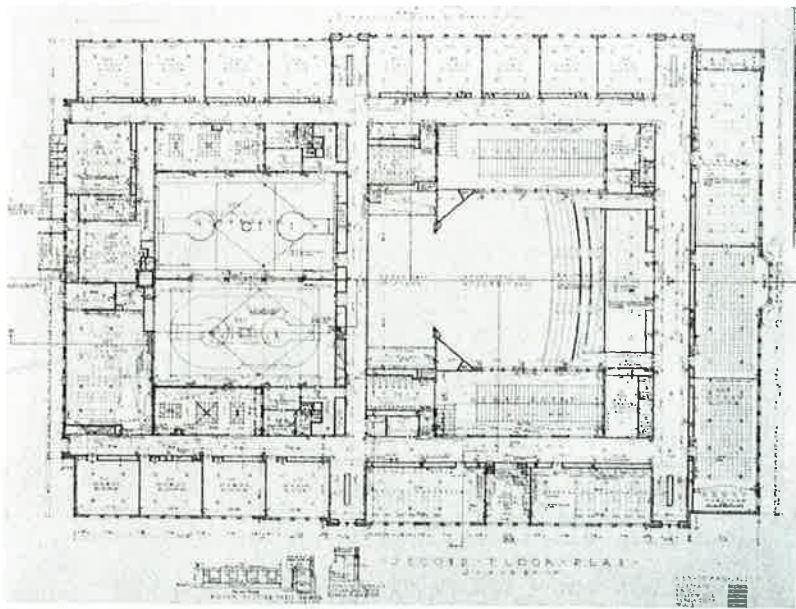


Garfield High School, Seattle.
This Building was Designed by F. A. Naramore, Architect.

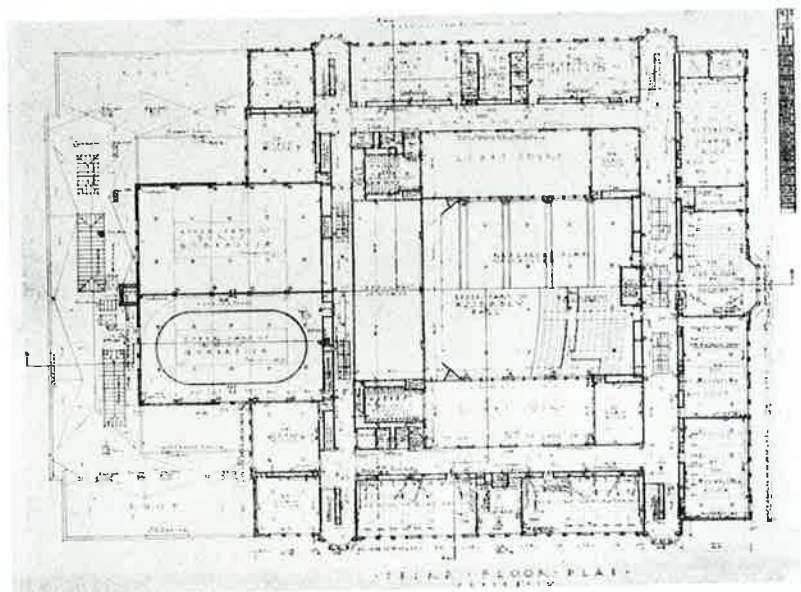


Garfield High School, Seattle; First Floor Plan.

[Cut by Courtesy of The American School Board Journal]



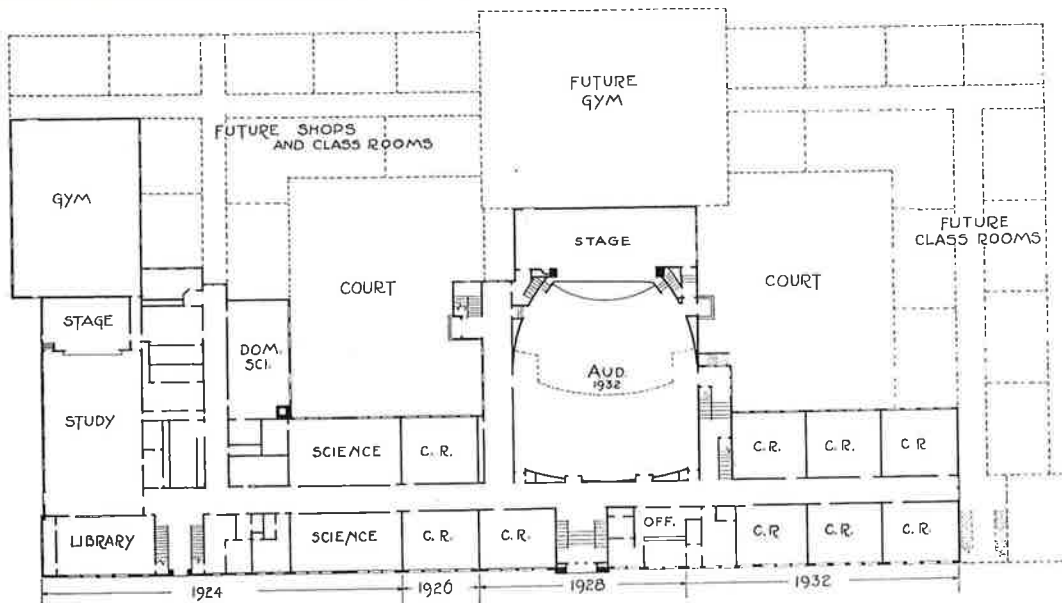
Garfield High School, Seattle; Second Floor Plan.
 [Cut by Courtesy of The American School Board Journal]



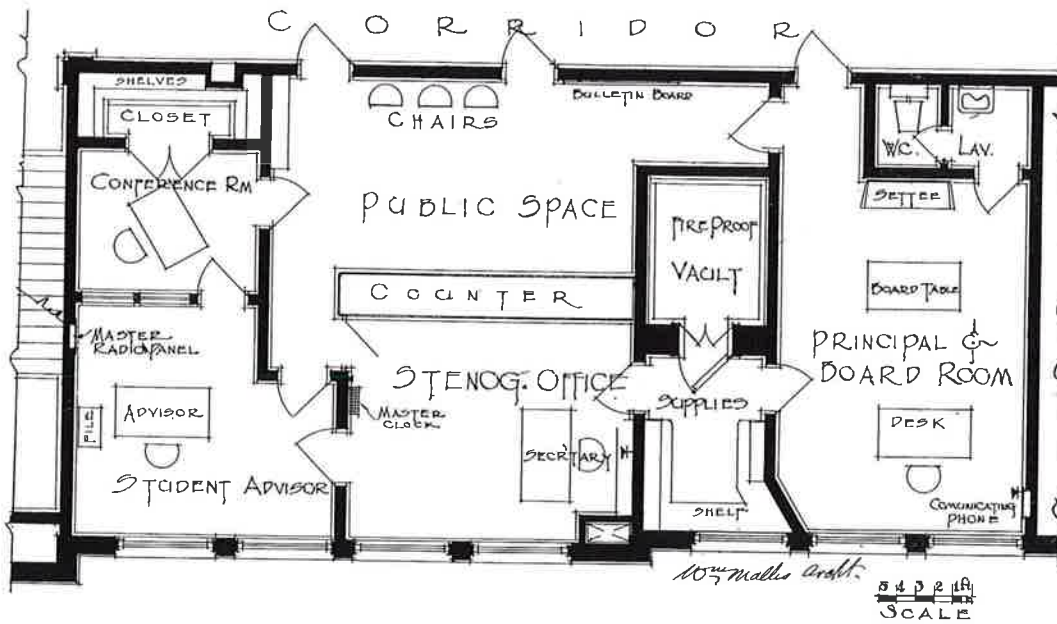
Garfield High School, Seattle; Third Floor Plan.
 [Cut by Courtesy of The American School Board Journal]



Highline High School, R. 7, Seattle; Built 1924-26-28-31; Cost \$270,000; 35 Classrooms, Gymnasium, Auditorium.
This Building was Designed by Wm. Mallis, Architect.



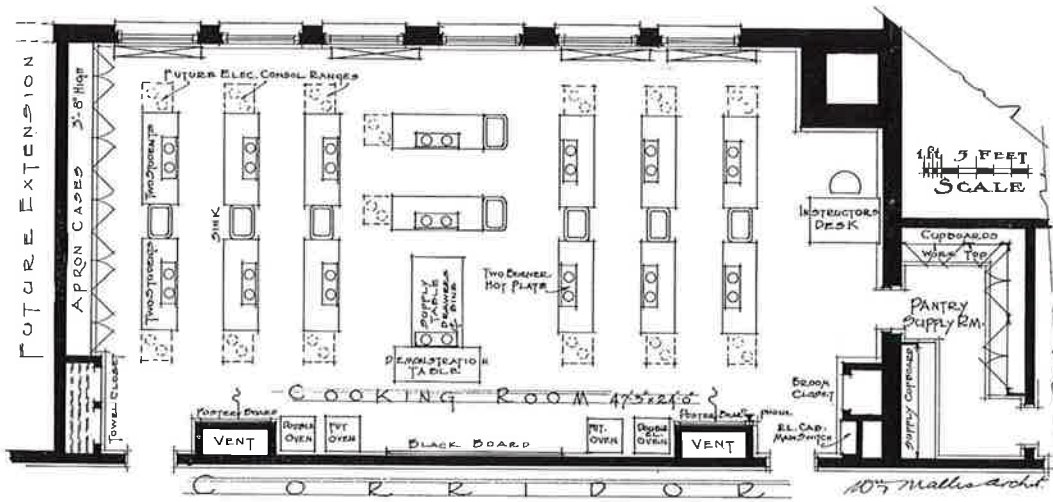
Highline High School; First Floor Plan.
Showing Units as Built in 1924, 1926, 1928, 1932, and Future Plans.



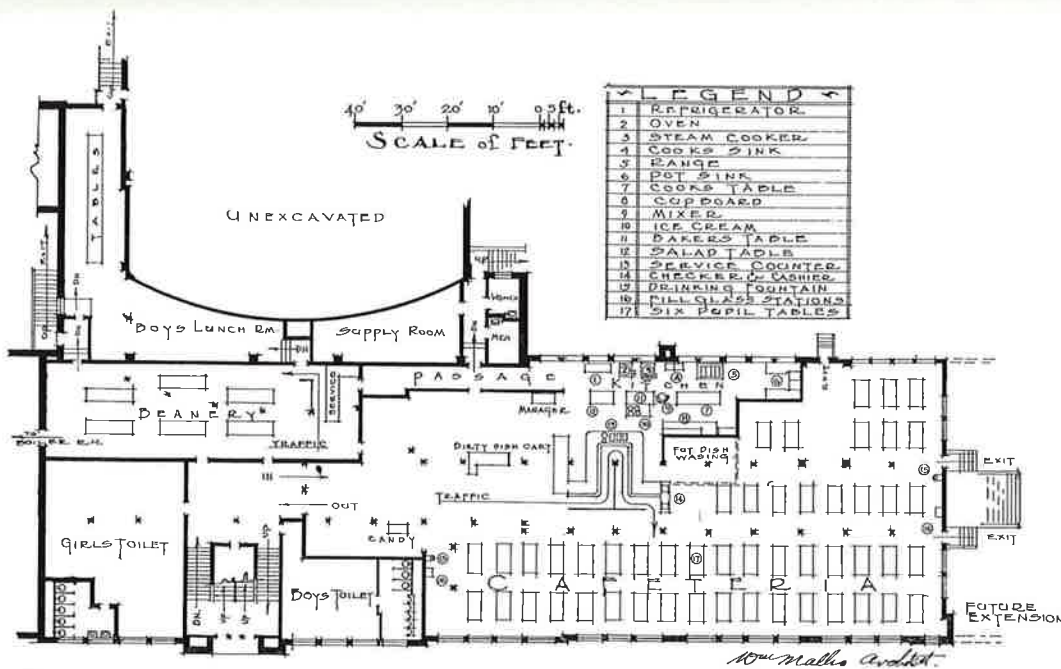
Highline High School; Office Floor Plan.



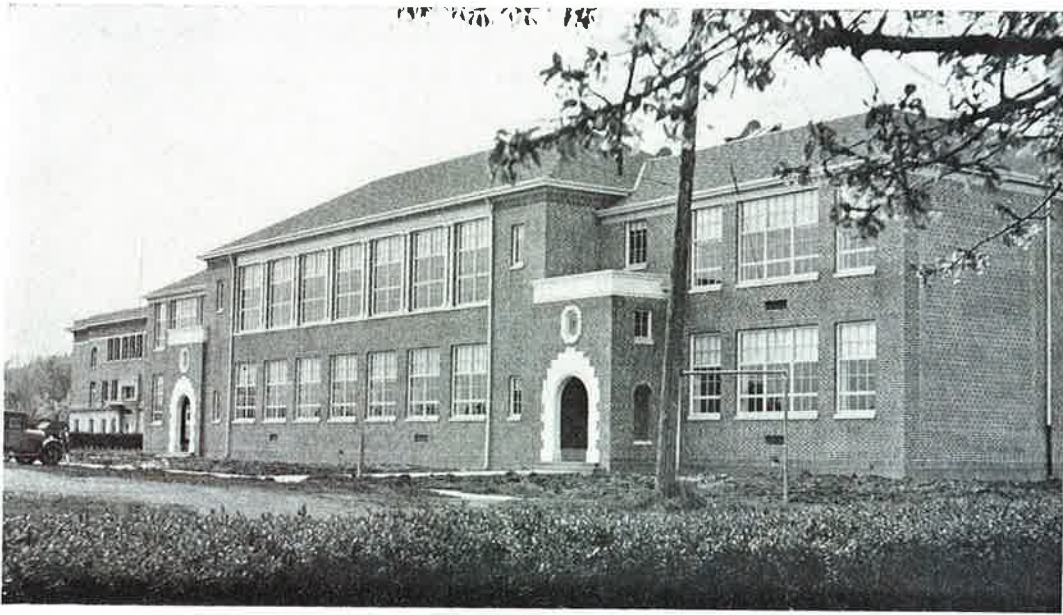
Highline High School; Library and Study Hall Arrangement.



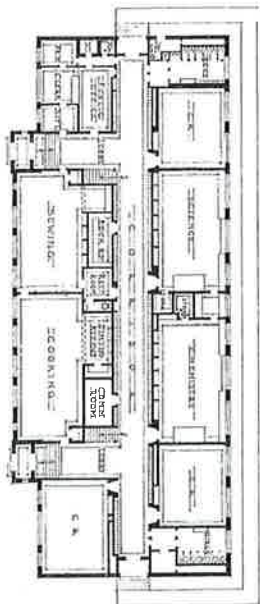
Highline High School; Cooking Laboratory.



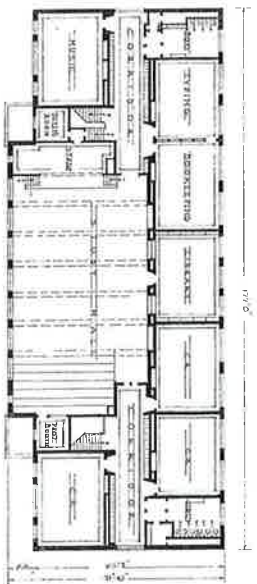
Highline High School; Cafeteria Floor Plan.



Senior High School, Sumner; Built 1931; Cost \$72,201; 23 Rooms (15 Classrooms), Auditorium.
This Building was Designed by Mock & Morrison, Architects.



Summer Senior High School; First Floor Plan.



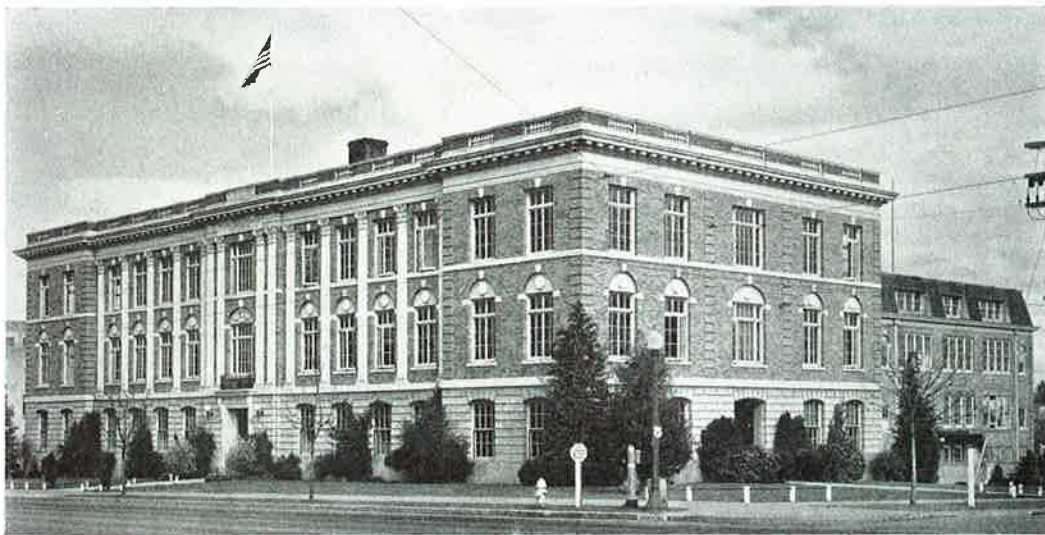
Summer Senior High School; Second Floor Plan.



Sumner Senior High School; Study Hall and Auditorium.

46

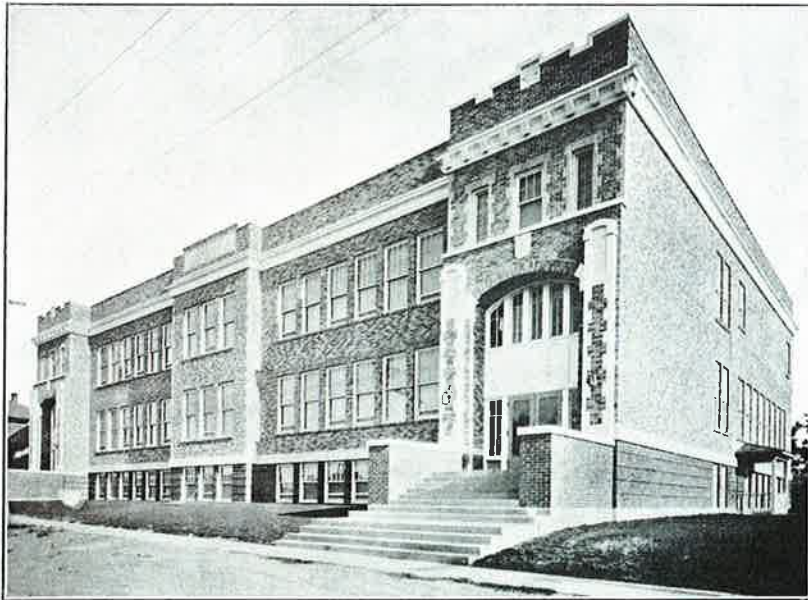
Representative School Buildings



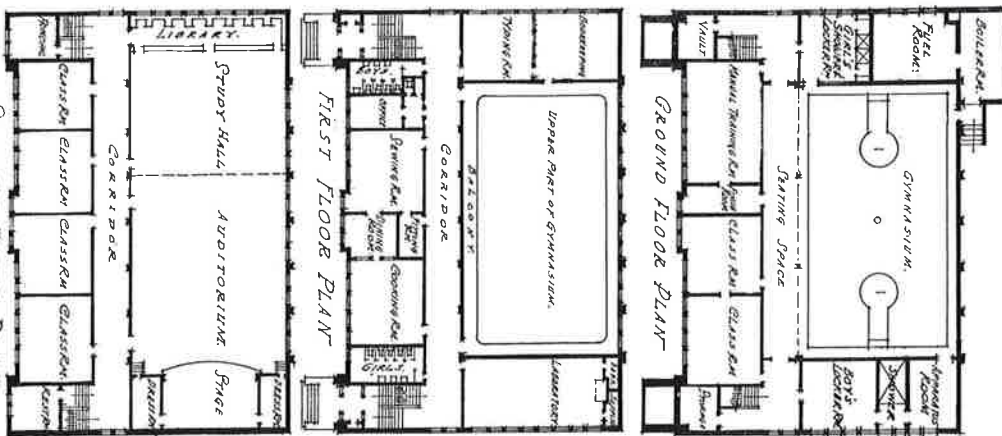
High School, Olympia; Built 1917-26; Cost \$350,000; 50 Classrooms, Auditorium.
This Building was Designed by Joseph H. Wohleb, Architect.

in the State of Washington

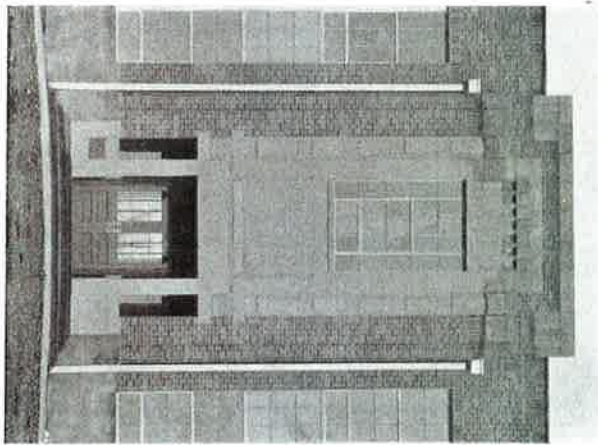
47



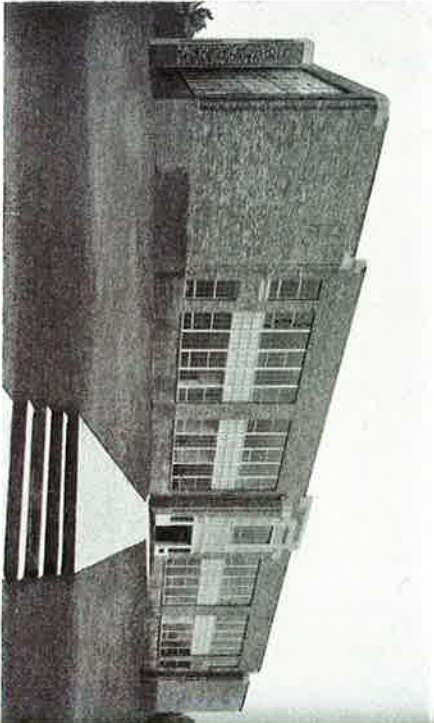
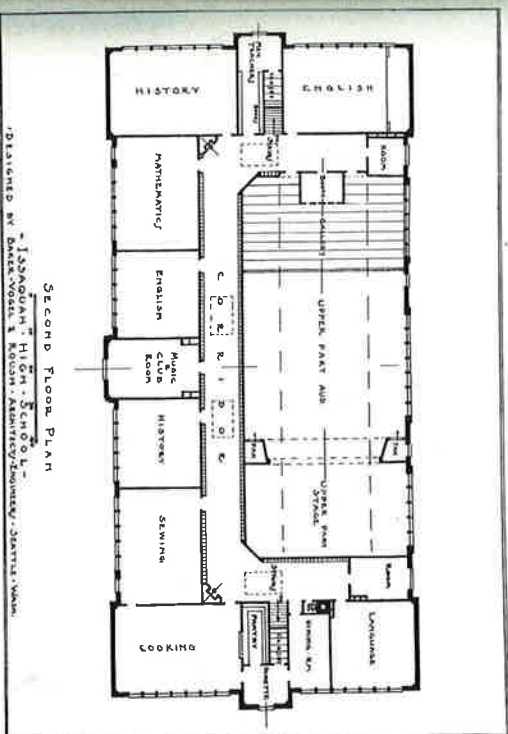
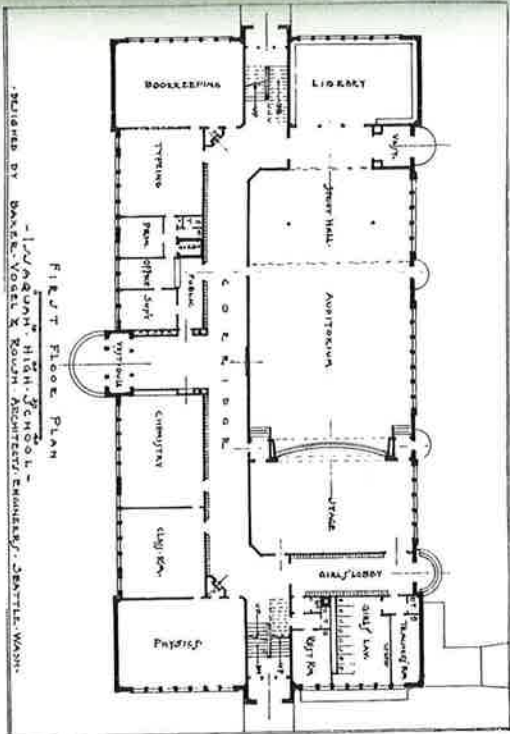
High School, Odessa; Built 1927; Cost \$70,000; 18 Classrooms, Auditorium and Gymnasium.
This Building was Designed by George M. Rasque, Architect.



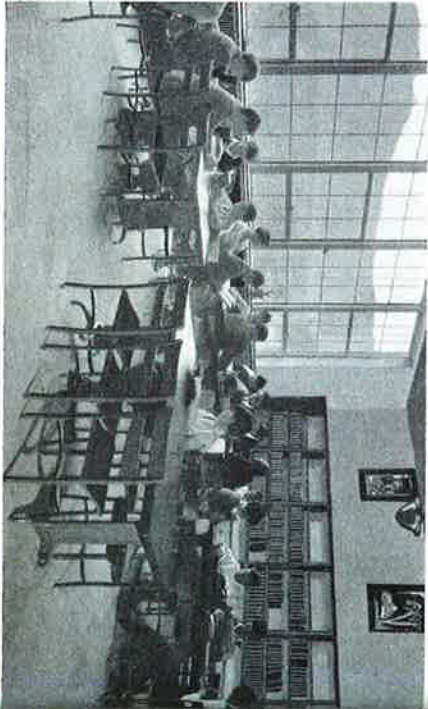
SECOND FLOOR PLAN
ODESSA
SCHOOL.
GEORGE M. RASQUE ARCHT.
SPOKANE, WASHINGTON
Odessa High School; Floor Plans.



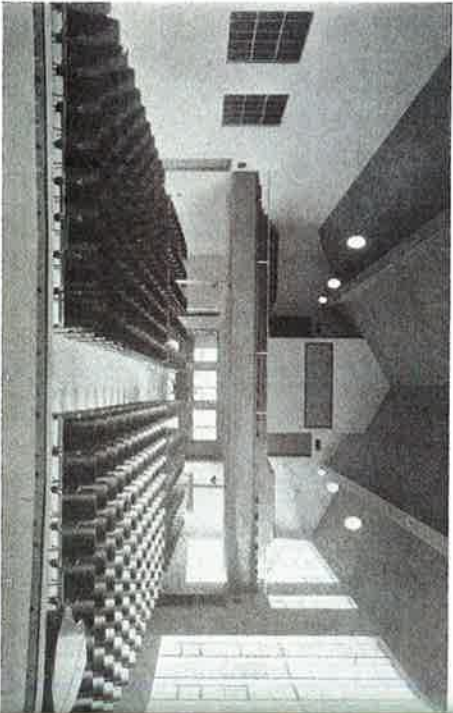
Issaquah High School: Entrance.



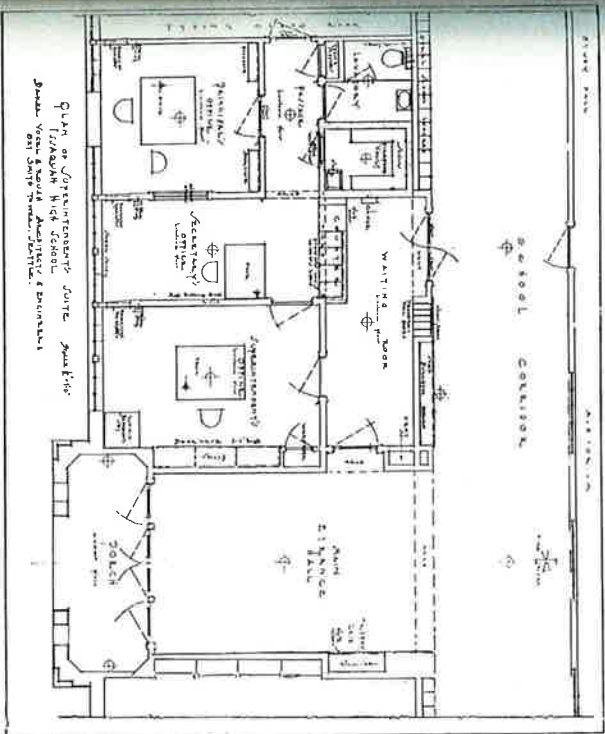
High School, Issaquah: Built 1931; Cost \$58,500; 15 Classrooms, Auditorium. This Building was Designed by Baker, Vogel & Roush, Architects.



Issaquah High School: Library.



Issaquah High School: Auditorium.

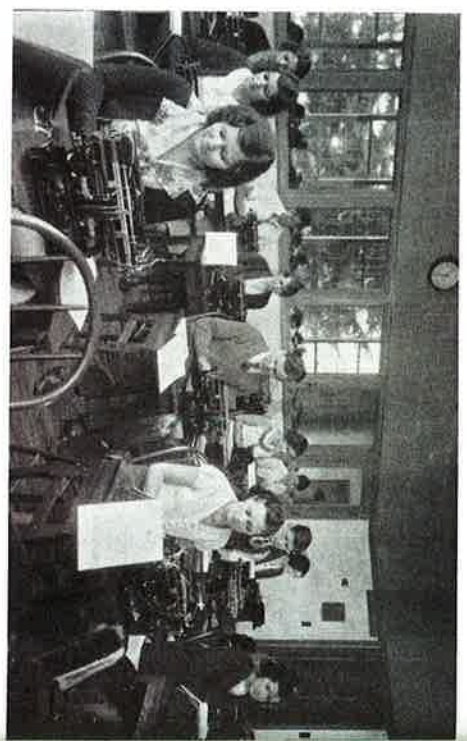


Issaquah High School: Superintendent's Suite.

Representative School Building

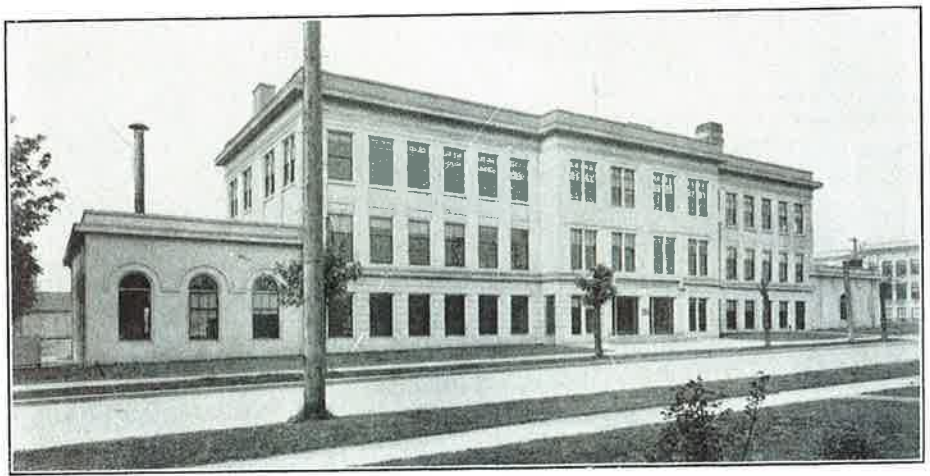


Issaquah High School; Science Laboratory.

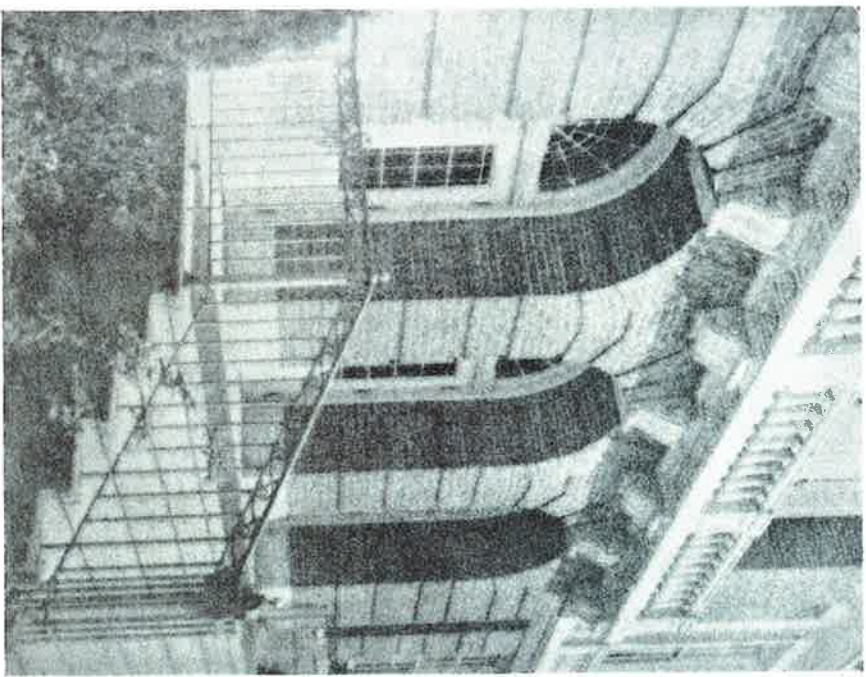


Issaquah High School; Commercial Room.

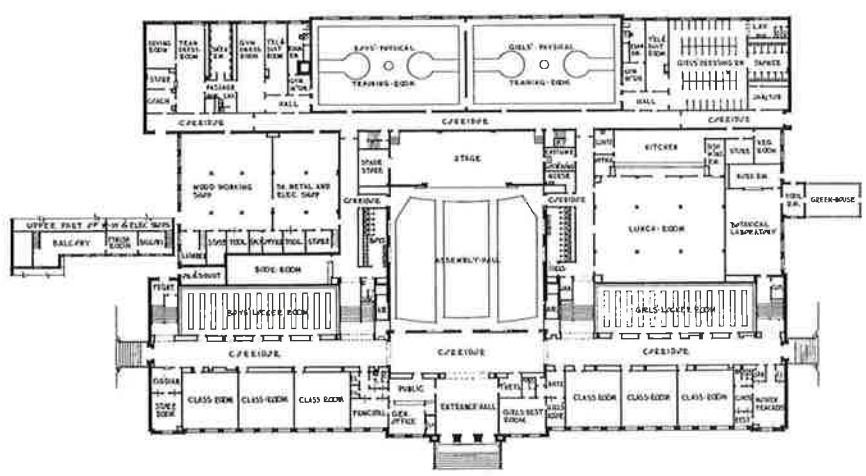
in the State of Washington



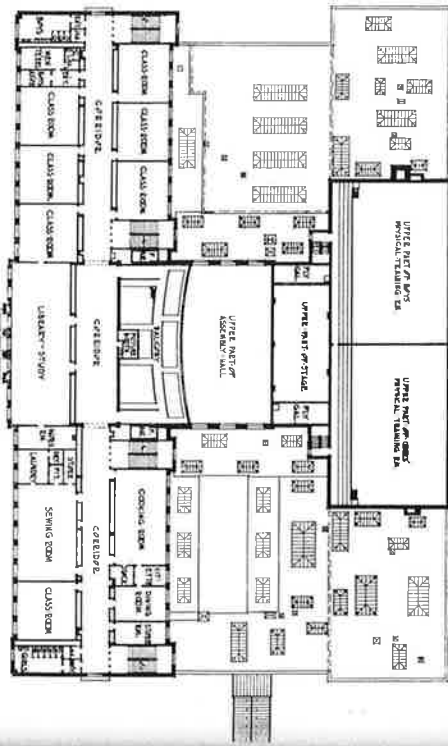
Everett Vocational School.
This Building was Designed by B. R. Turnbull, Architect.



Grover Cleveland High School, Seattle, Main Entrance.

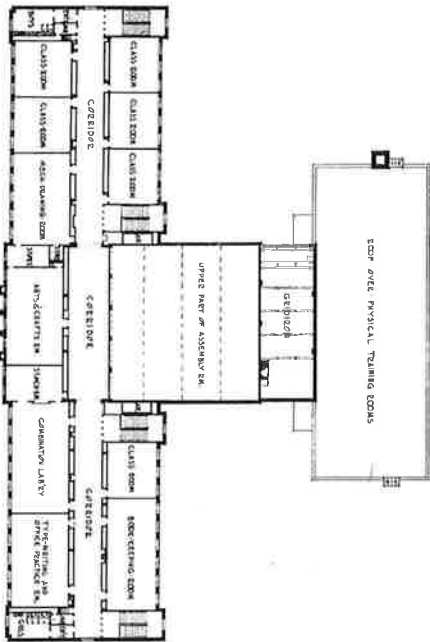


Grover Cleveland High School, Seattle; First Floor Plan.
[Cut by Courtesy of The American School Board Journal]



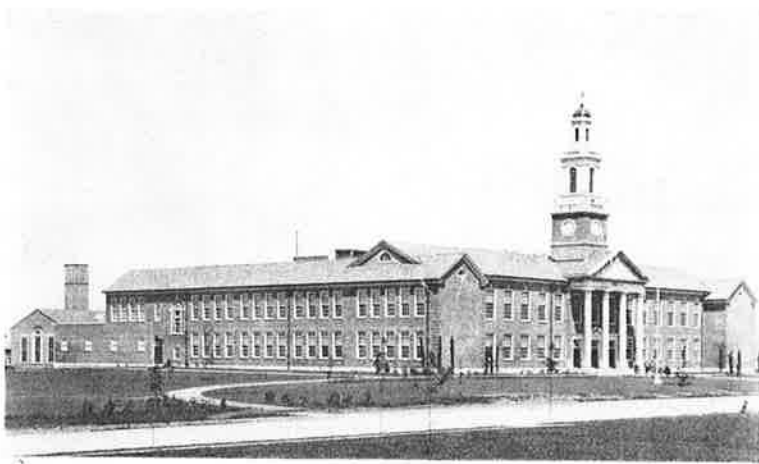
Grover Cleveland High School, Seattle; Second Floor Plan.

[Cut by Courtesy of The American School Board Journal]



Grover Cleveland High School, Seattle; Third Floor Plan.

[Cut by Courtesy of The American School Board Journal]

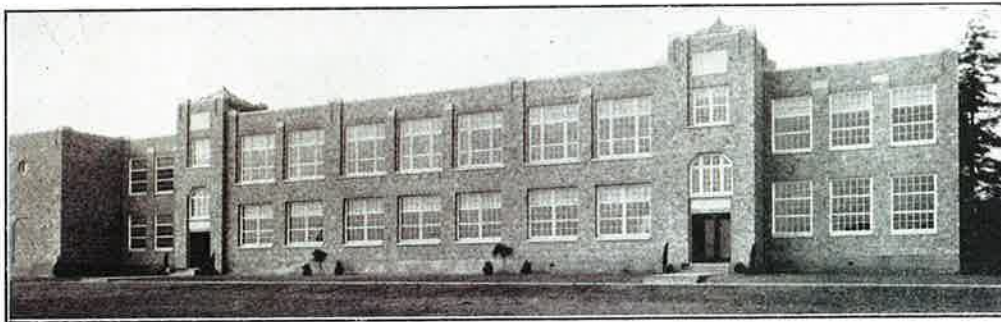


R. A. Long High School, Longview; Built 1927-30; Cost \$819,331; 57 Classrooms, Auditorium, Gymnasium.

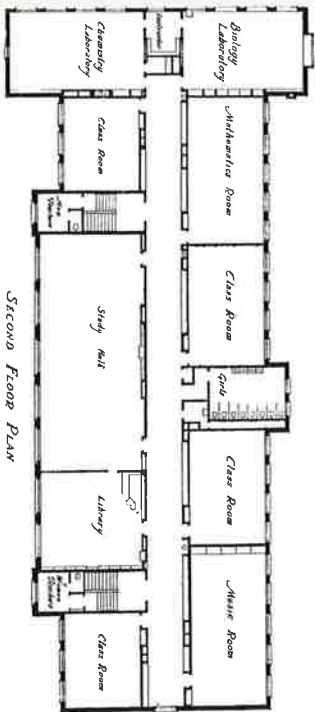
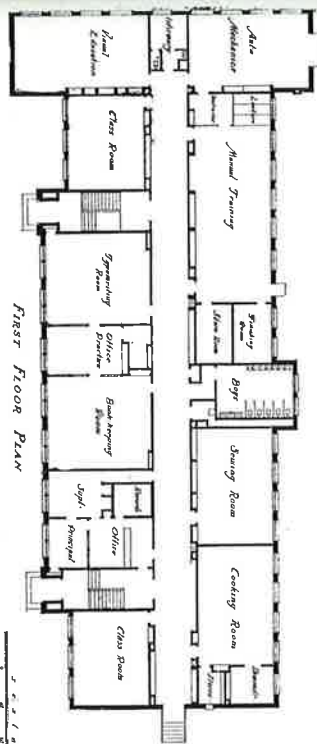
This Building was Designed by William B. Ittner, Architect.

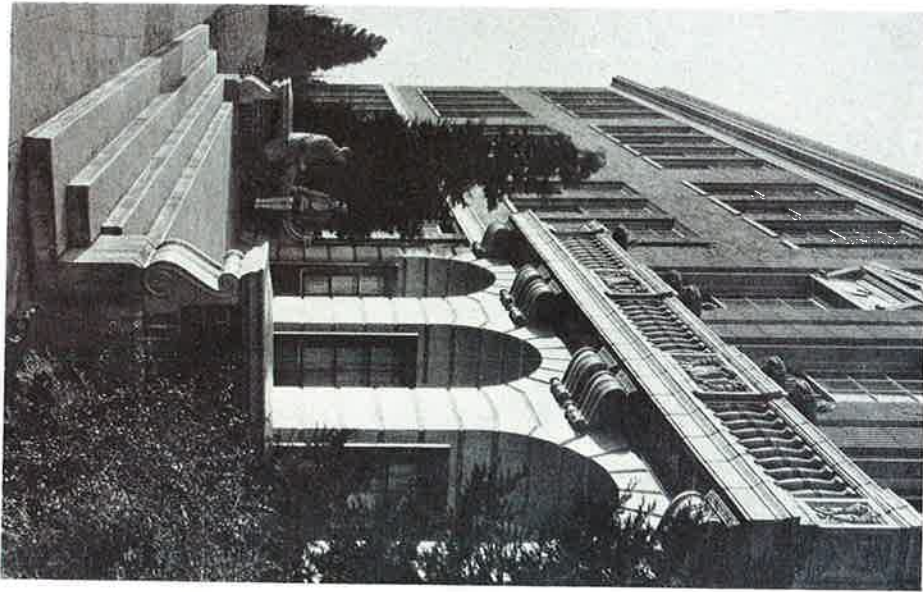


High School, Mossyrock; Built 1931; Cost \$37,547; 9 Classrooms, Auditorium, Gymnasium.
This Building was Designed by E. J. Bresemann, Architect.

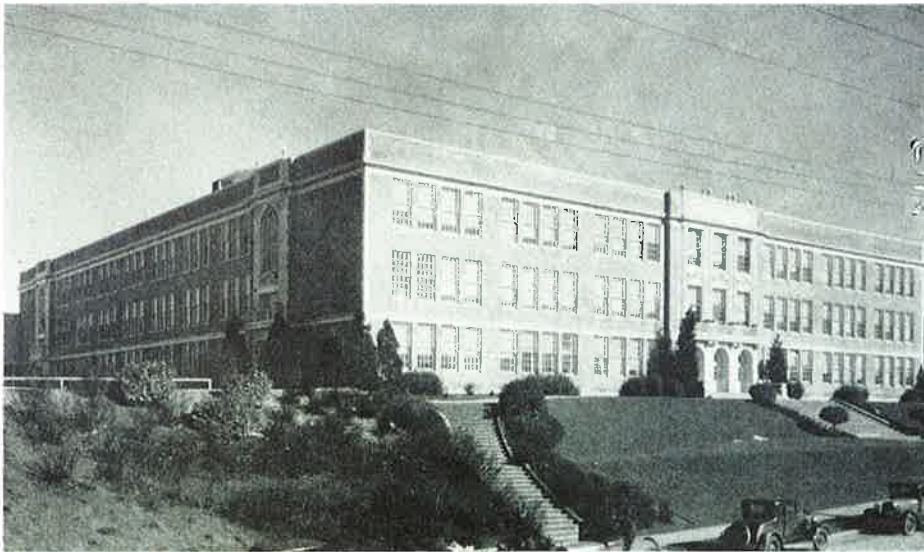


Senior High School, Anacortes; Built 1931; Cost \$78,296; 20 Classrooms.
This Building was Designed by Arch N. Torbett, Architect
[Cut by Courtesy of The Pacific Builder and Engineer]





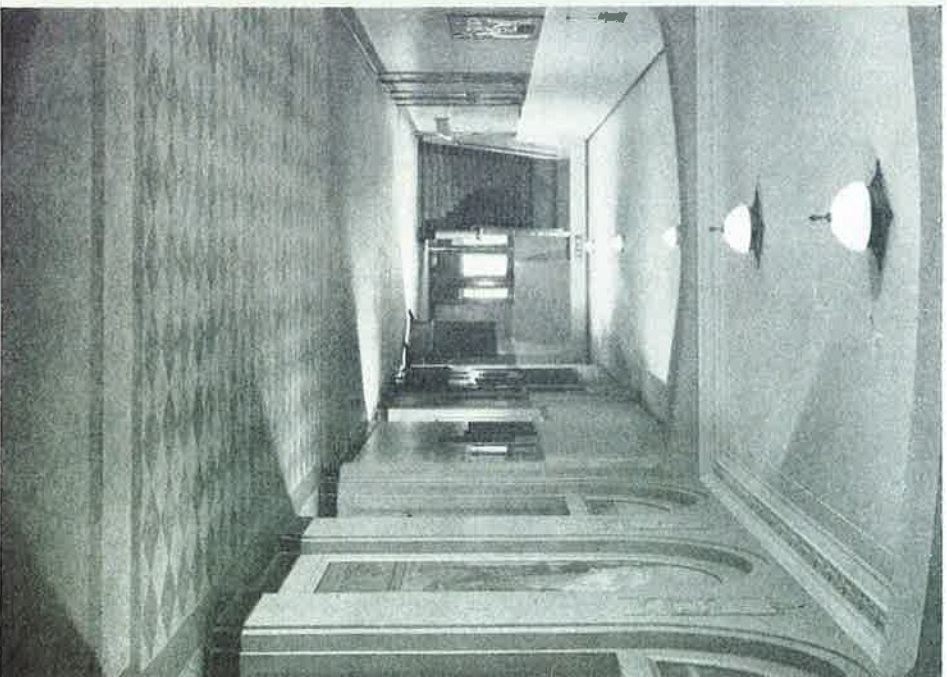
Roosevelt High School, Seattle; Entrance.



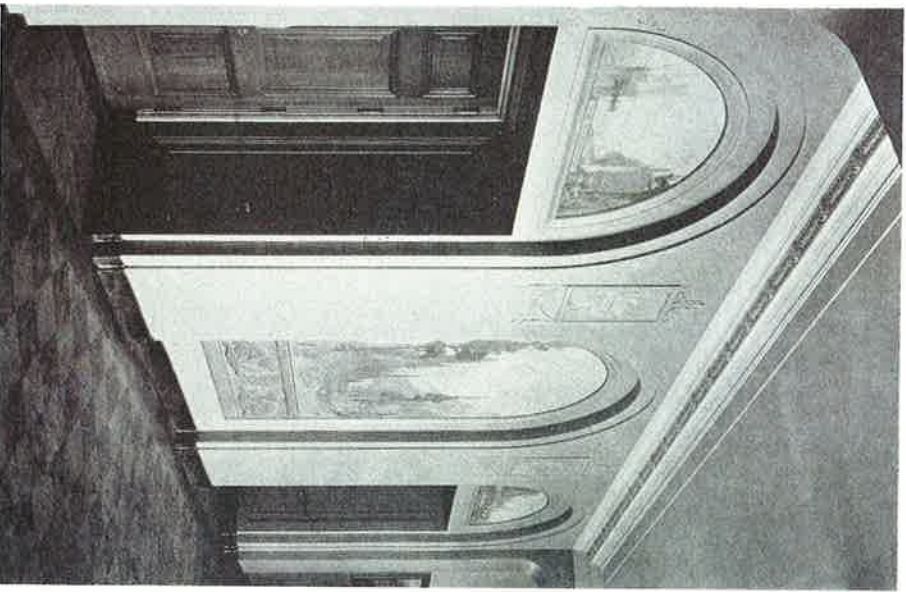
Roosevelt High School, Seattle.
This Building was Designed by F. A. Naramore, Architect.



Roosevelt High School, Seattle; Library.

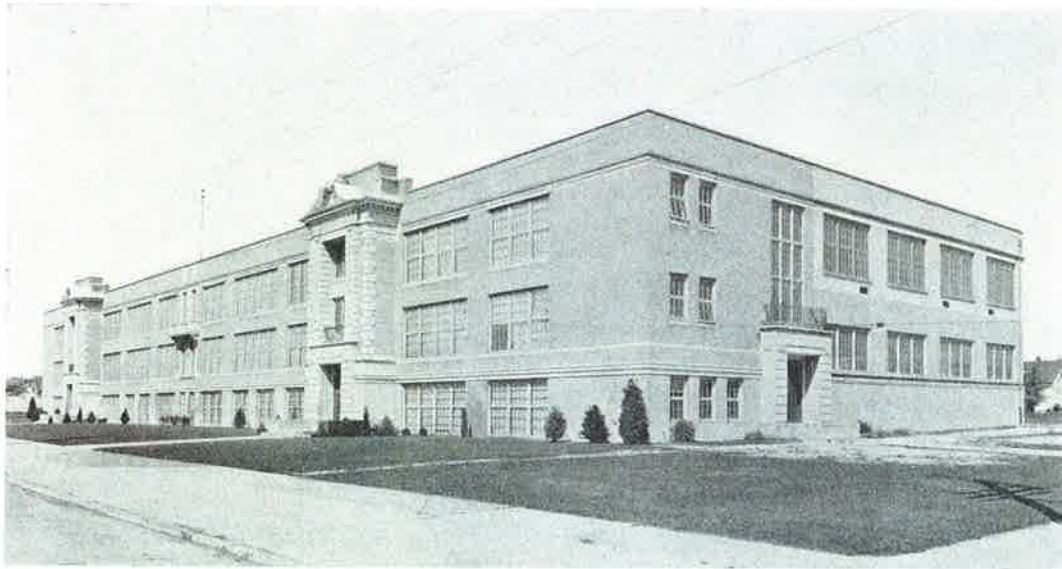


Roosevelt High School, Seattle; Corridor.

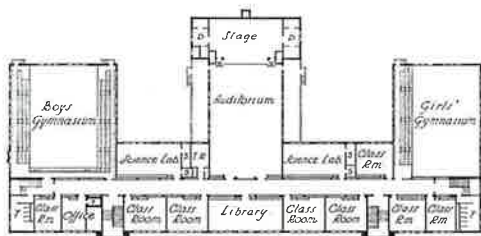


Roosevelt High School, Seattle; Corridor at Auditorium Entrance.

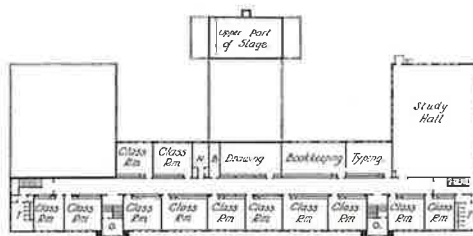
**Representative Junior High School Buildings
and Plans**



North Junior High School, Everett; Built 1924; Cost \$253,000; 34 Classrooms, Auditorium, 2 Gymnasiums. This Building was Designed by Earl W. Morrison, Architect.



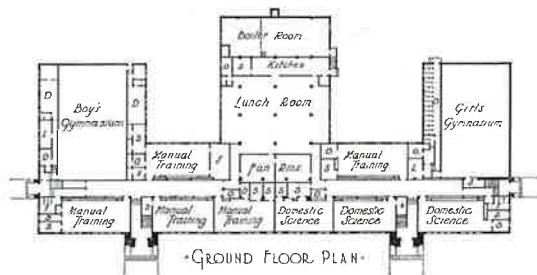
•FIRST FLOOR PLAN•



•SECOND FLOOR PLAN•

SCALE 1" = 10'

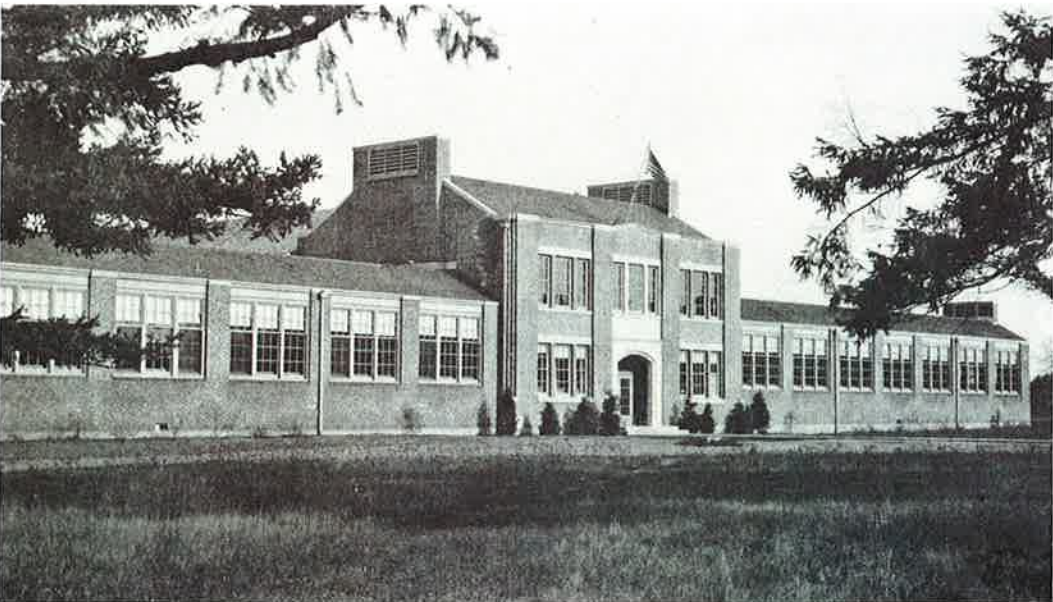
D-DRESSING RM. L-LOCKER RM. N-NURSES RM.
O-OFFICE S-STORAGE ROOM T-TOILETS
TR-TEACHERS ROOM V-VULT B-BOOK RM.



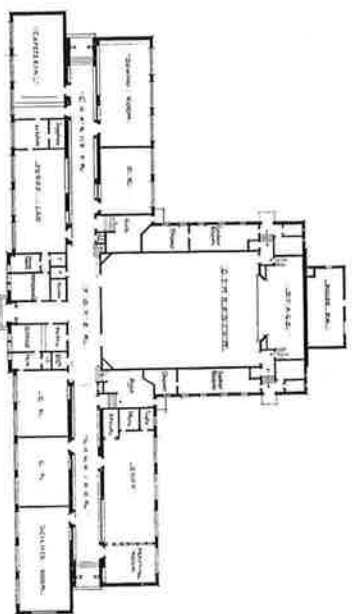
•GROUND FLOOR PLAN•

NORTH JUNIOR HIGH SCHOOL
EVERETT WASHINGTON

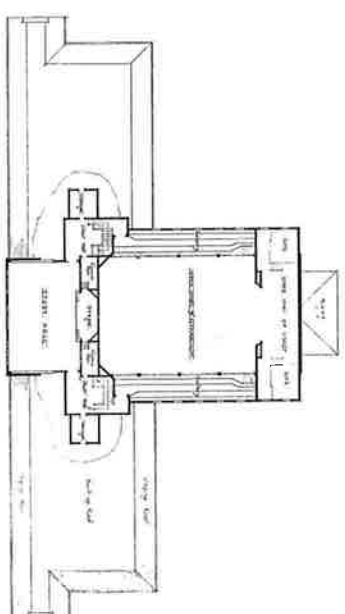
EARL W. MORRISON - ARCHITECT
VAS J. STIMSON - ASSOCIATE
SEATTLE - WASHINGTON



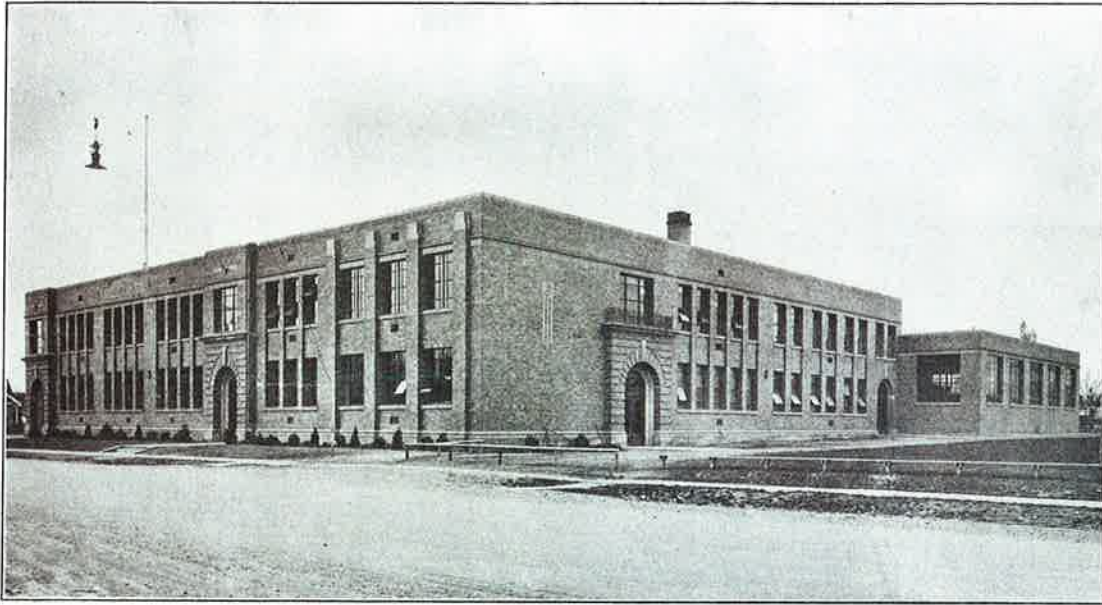
Clover Park Junior High School; Route 1, Tacoma; Built 1928; Cost \$61,762; 15 Classrooms, Auditorium-Gymnasium. This Building was Designed by Ernest Mock, Architect.



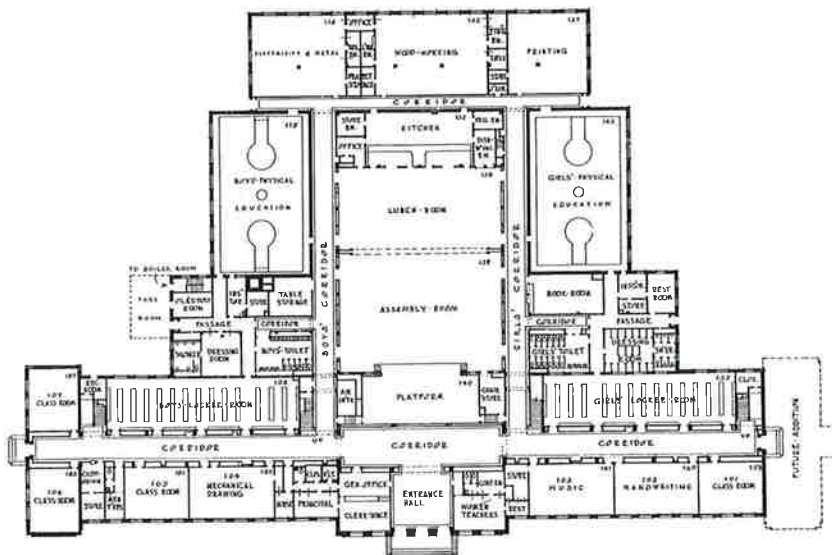
First Floor Plan
Clover Park Junior High School; First Floor Plan.



Second Floor Plan
Clover Park Junior High School; Second Floor Plan.

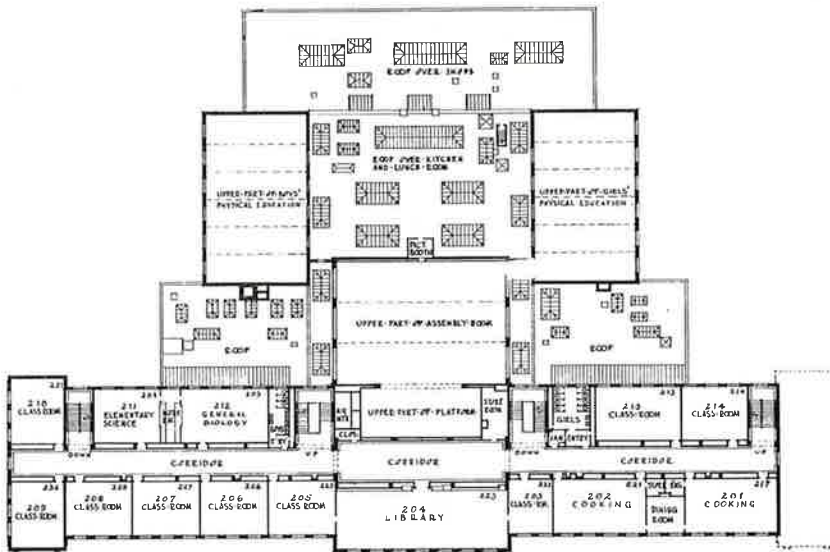


Havermale Junior High School, Spokane; Built 1923; Cost \$261,769; 24 Classrooms, Gymnasium.
This Building was Designed by Julius A. Zittel, Architect.



John Marshall Junior High School, Seattle; First Floor Plan; F. A. Naramore, Architect.

[Cut by Courtesy of The American School Board Journal]



John Marshall Junior High School; Second Floor Plan.

[Cut by Courtesy of The American School Board Journal]

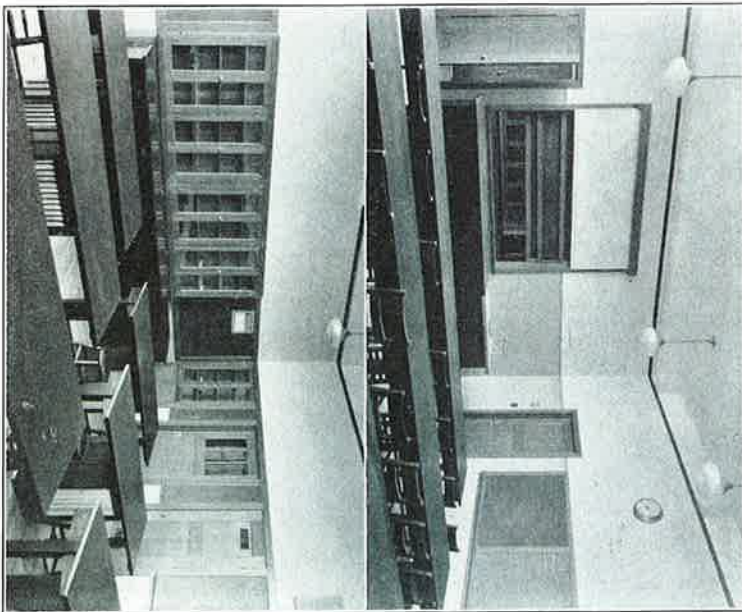


John Marshall Junior High School; Third Floor Plan.

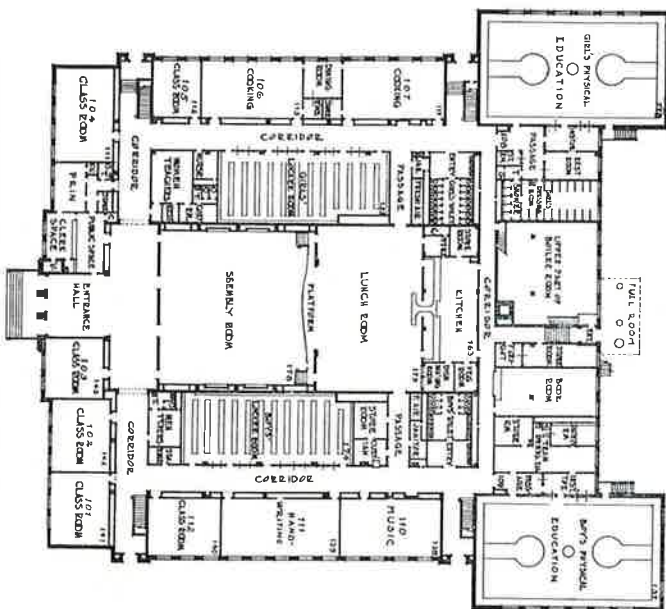
[Cut by Courtesy of The American School Board Journal]



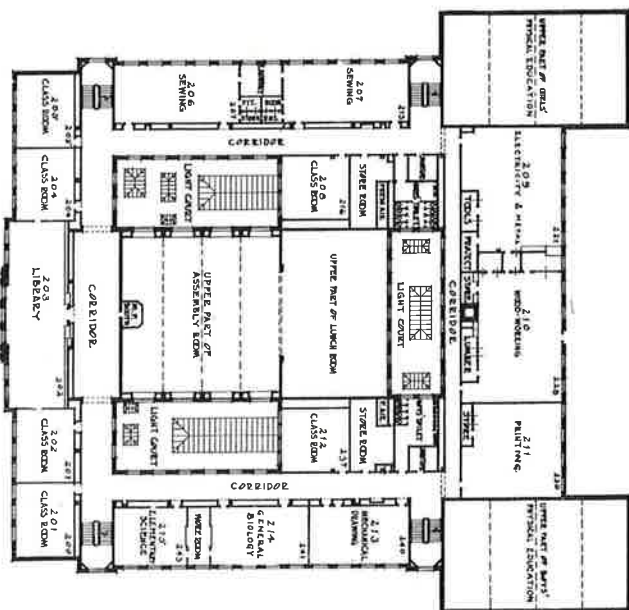
Alexander Hamilton Junior High School, Seattle.
 This Building was Designed by P. A. Naramore, Architect.



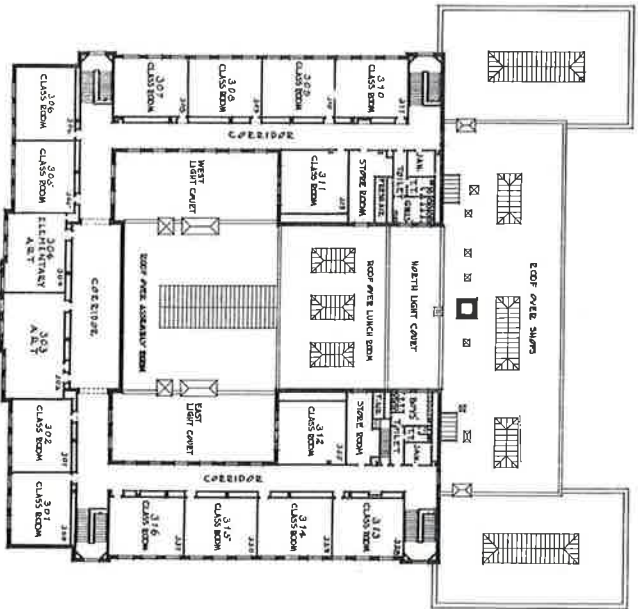
Alexander Hamilton Junior High School; Elementary Science Room,
 (Upper); Mechanical Drawing Room, (Lower).
 [Cuts by Courtesy of The American School Board Journal]



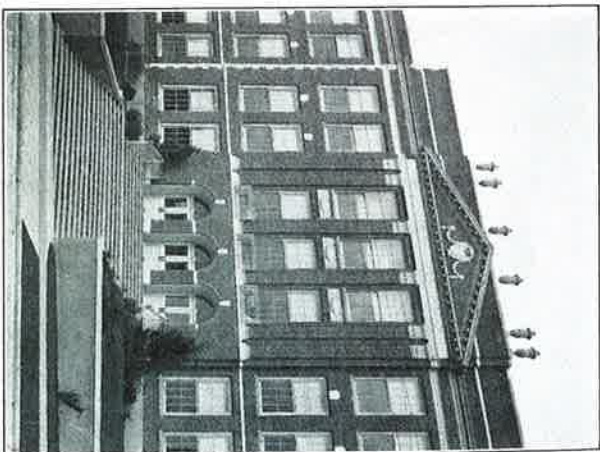
Alexander Hamilton Junior High School; First Floor Plan
 [Cut by Courtesy of The American School Board Journal]



Alexander Hamilton Junior High School; Second Floor Plan
 [Cut by Courtesy of The American School Board Journal]



Alexander Hamilton Junior High School; Third Floor Plan.
 [Cut by Courtesy of The American School Board Journal]

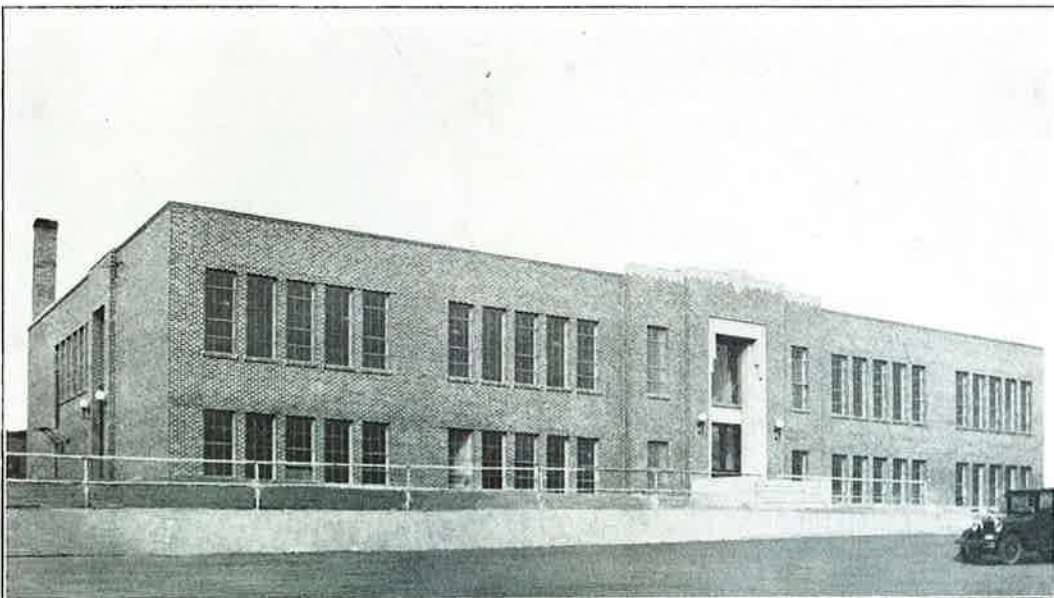


Alexander Hamilton Junior High School; Main Entrance

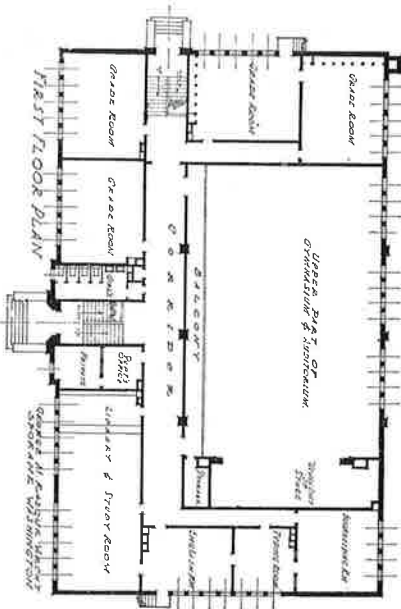


James Madison Junior High School, Seattle.
 This Building was Designed by F. A. Narnmore, Architect.

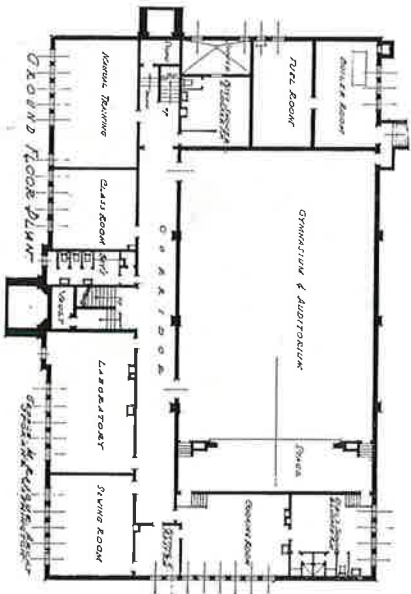
*Representative Elementary and High School
Buildings and Plans*



Elementary and High School, Wilson Creek; Built 1932; Cost \$28,000; 17 Classrooms, Auditorium-Gymnasium.
This Building was Designed by Geo. M. Rasque, Architect.



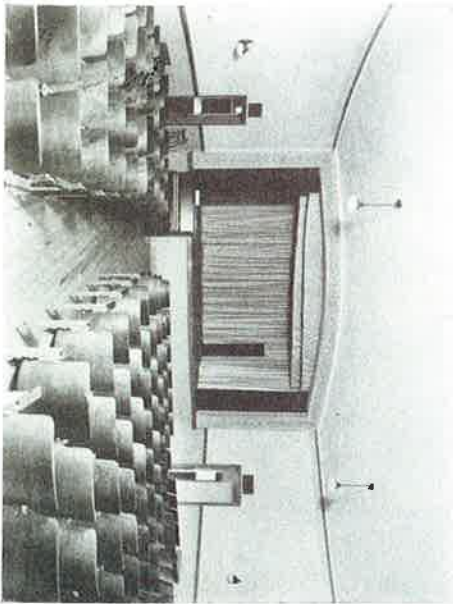
Wilson Creek Elementary and High School; First Floor Plan.



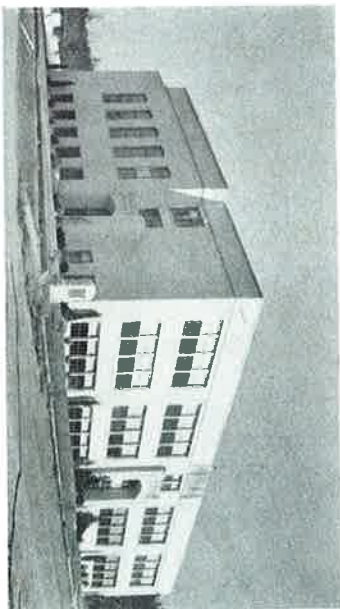
Wilson Creek Elementary and High School; Ground Floor Plan.



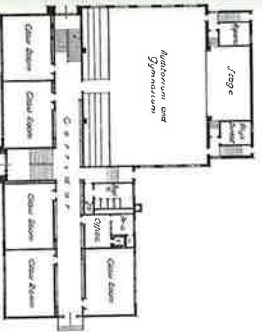
High School and Elementary School, Clallam Bay; Built 1917-27-31; Cost \$50,000; 15 Classrooms, Auditorium, Gymnasium. This Building was Designed by Wm. Mallis, Architect.



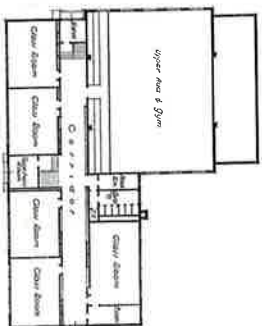
Chatham Bay High School and Elementary School: Auditorium.



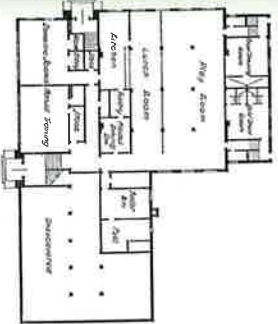
Elementary and Junior High School, Mukilteo; Built 1928; Cost \$63,000; 12 Classrooms, Auditorium-Gymnasium. This Building was Designed by Earl W. Morrison, Architect.



FIRST FLOOR PLAN



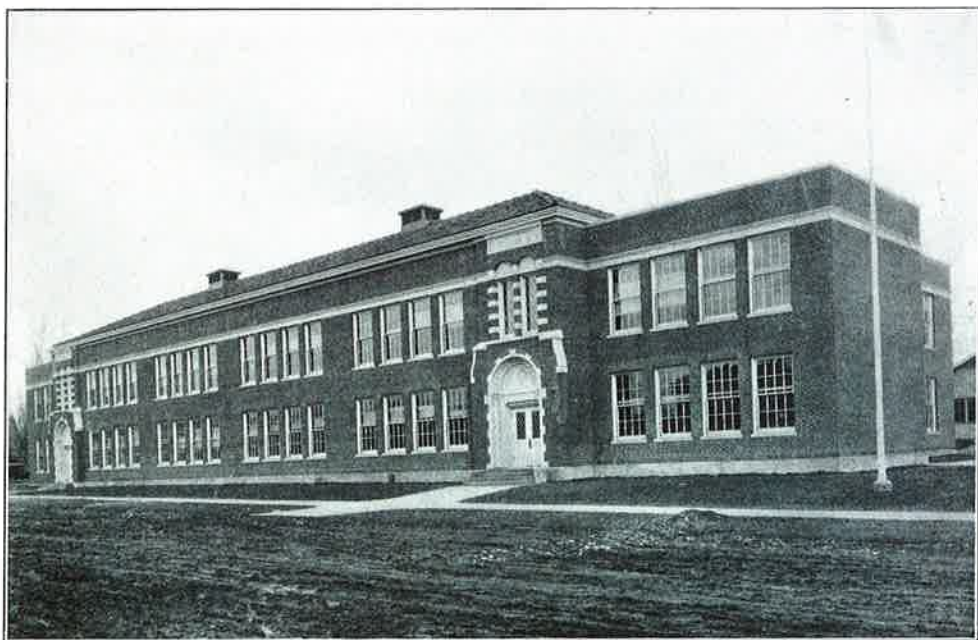
SECOND FLOOR PLAN



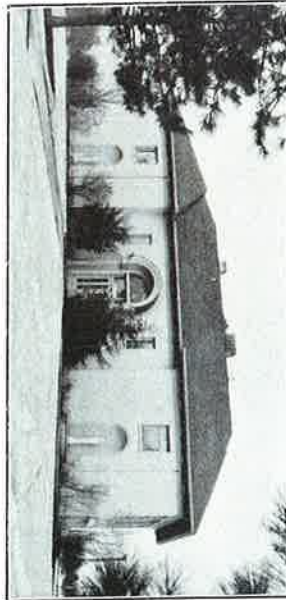
GROUND FLOOR PLAN

MUKILTEO SCHOOL
 EARL W. MORRISON, ARCHITECT
 SEATTLE, WASHINGTON
 SCALE 1/8" = 1'-0"

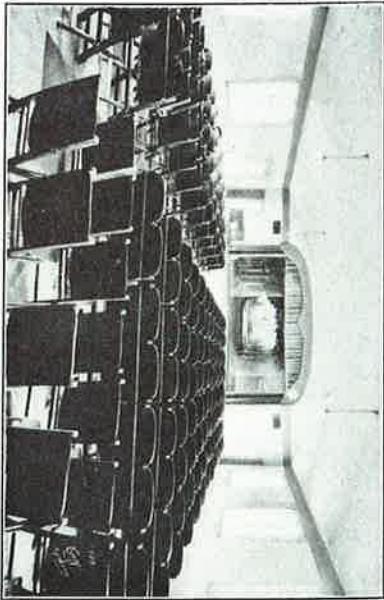
*Representative Elementary School Buildings
and Plans*



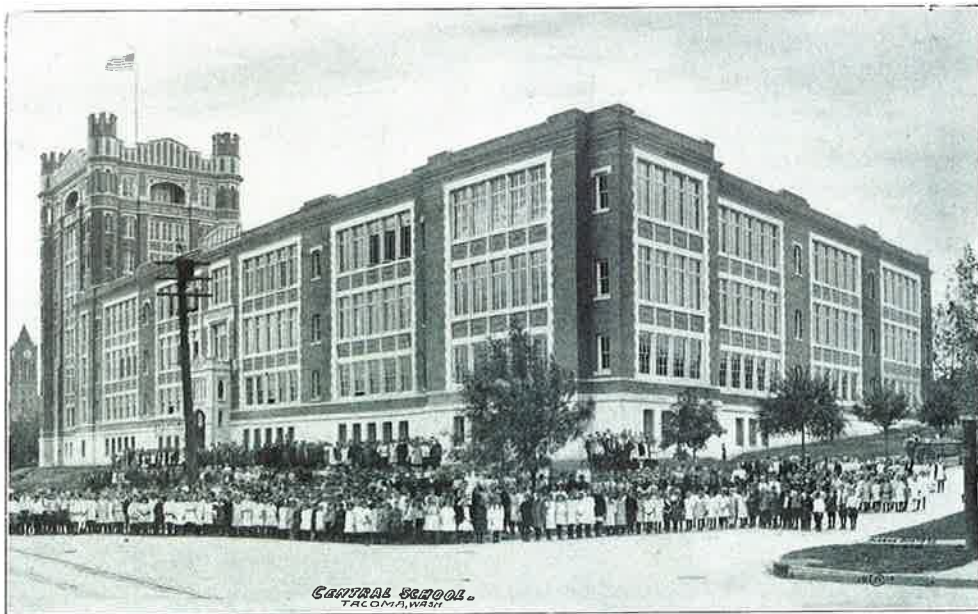
Washington Elementary School, Ellensburg.
This Building was Designed by F. A. Naramore, Architect.



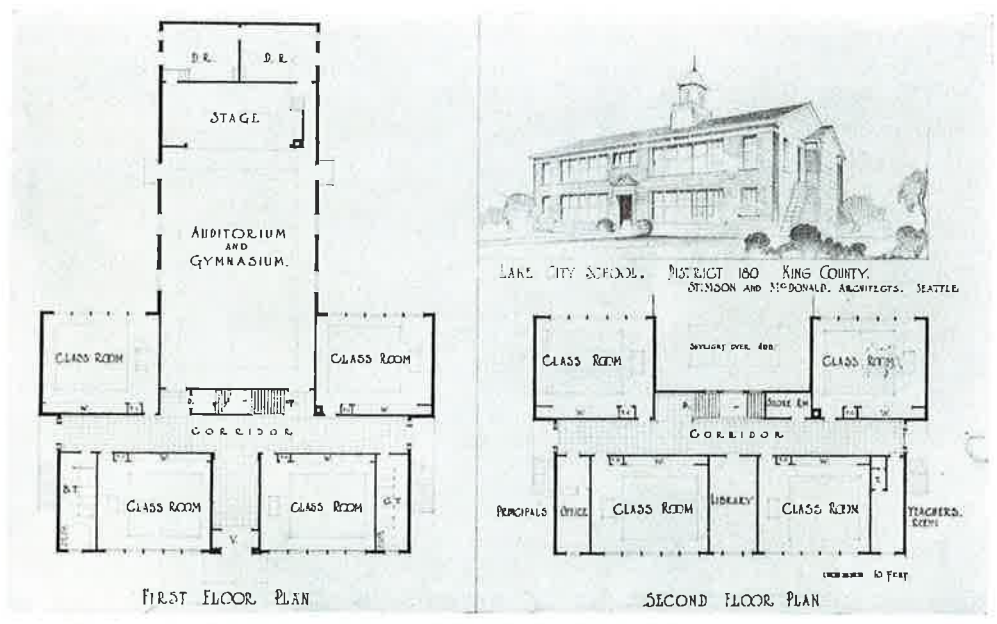
Whitworth Elementary School, Spokane, Built 1916; Cost \$20,000; 4 Class-Rooms, and 2 Play Basements. This Building was Designed by Whitehouse & Price, Architects.



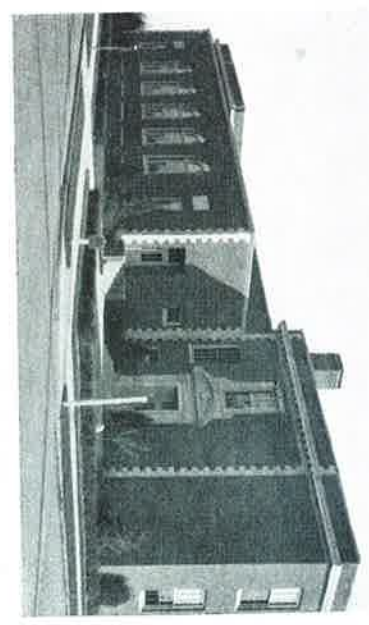
Whitworth Elementary School Auditorium.



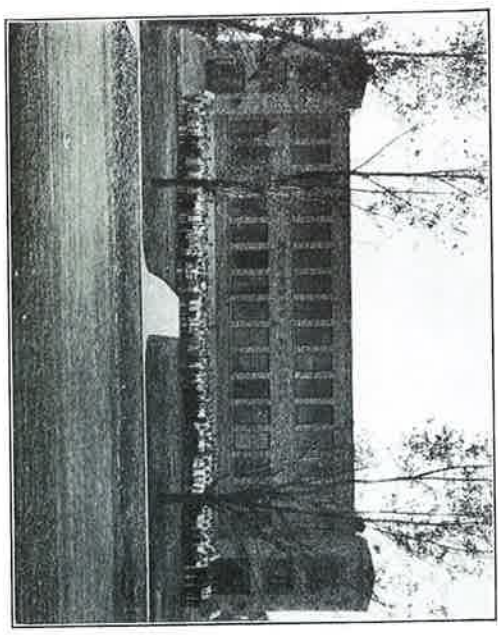
Central Administration Building, Elementary School, and Shops, Tacoma; Cost \$207,230; 23 Classrooms and 20 Administrative Rooms; Shops, Auditorium and 2 Play Basements. This Building was Designed by Heath & Gove, Architects.



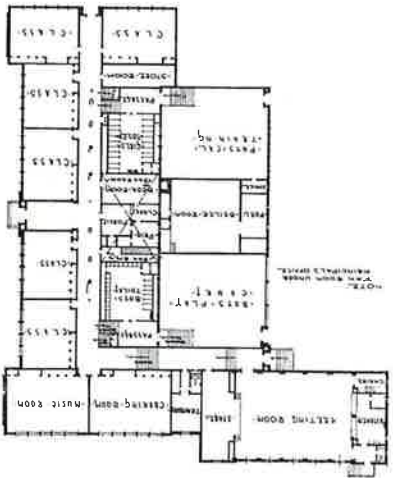
Lake City Elementary School, Route 13, Seattle; Built 1931; Cost \$30,000; 8 Classrooms, Auditorium, Gymnasium. This Building was Designed by Stimson & McDonald, Architects.



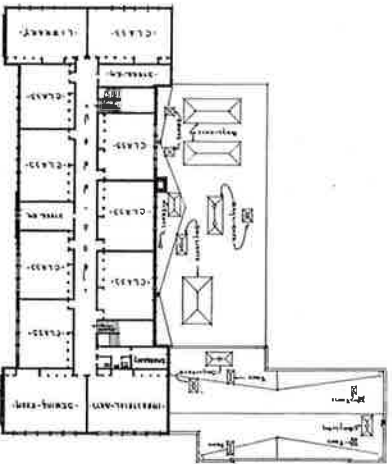
Loyal Heights Elementary School, Seattle. This Building was Designed by F. A. Saranove, Architect.



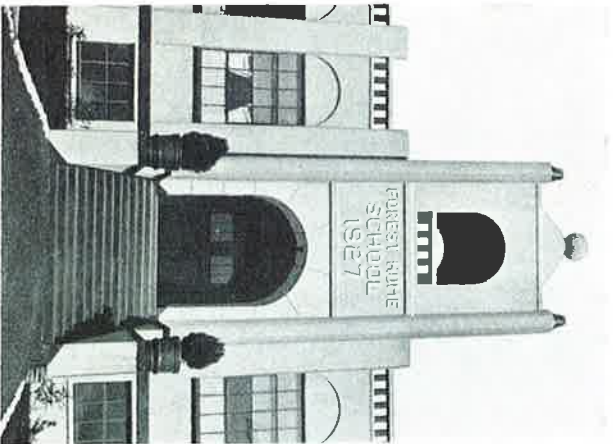
Elementary School, Reardan; Built 1930; Cost \$65,000; 8 Classrooms, Auditorium, Gymnasium. This Building was Designed by G. A. Peterson, Architect.



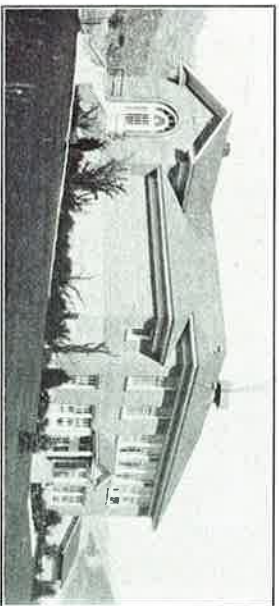
Bryant Elementary School, Seattle.
[Cut by Courtesy of The American School Board Journal]



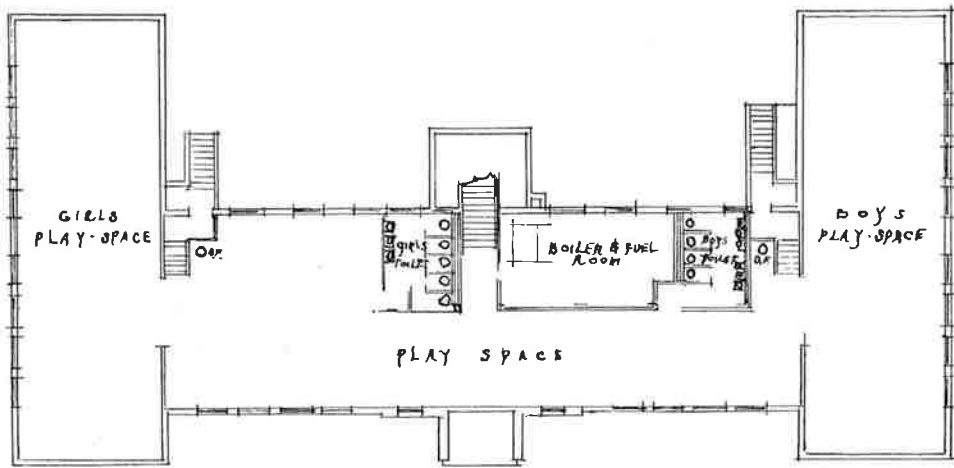
Bryant Elementary School, Seattle.
[Cut by Courtesy of The American School Board Journal]



Forest Home Elementary School, Cimat; Built 1927;
Cost \$8,590, 8 Classrooms.
This Building was Designed by Fred M. Lash.

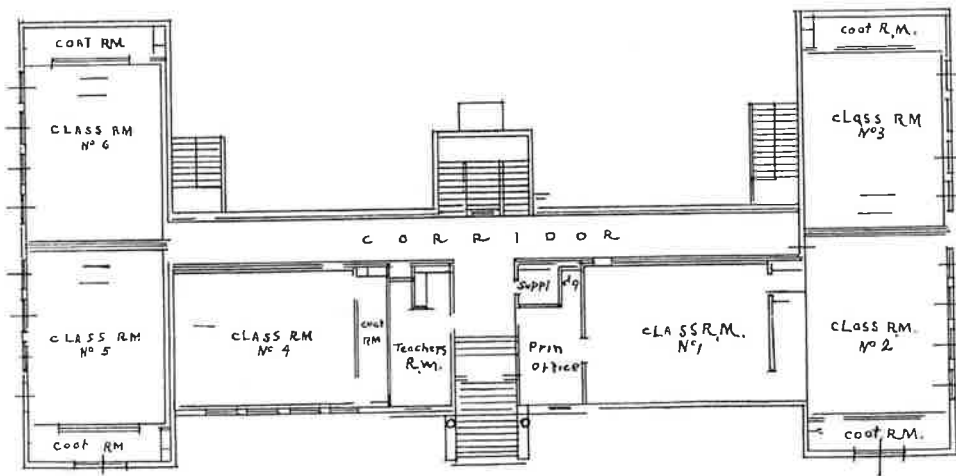


Elmentary School, Cheilan Falls; Built 1929; Cost \$11,000; 2 Classrooms
and Playroom.
This Building was Designed by L. Solberg, Architect.



BASEMENT FLOOR PLAN
Scale: 1/8" = 1'

PROPOSED FOREST HOME SCHOOL
CAMAS WASH
THE ANSTON CO. BUILDING ENGINEERS
CAMAS, OREGON



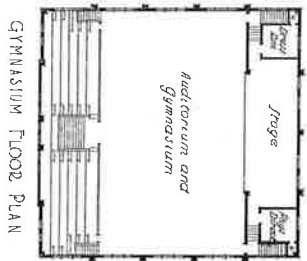
FIRST FLOOR PLAN
Scale: 1/8" = 1'

FOREST HOME SCHOOL
CAMAS WASH
711

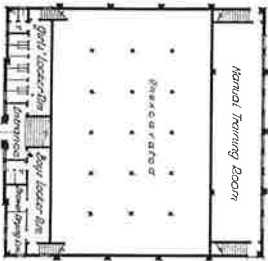


Kessler Boulevard Elementary School, Longview; Built 1924-26; Cost \$255,995; 50 Classrooms, Auditorium, Gymnasium.
This Building was Designed by Arch N. Torbitt, Architect.

*Representative Gymnasium Buildings
and Plans*



GYMNASIUM FLOOR PLAN

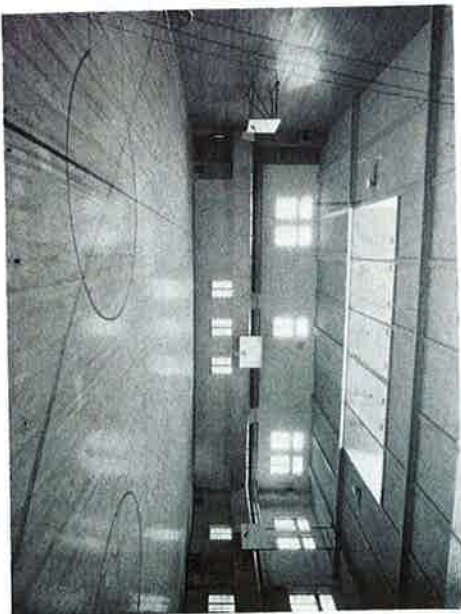
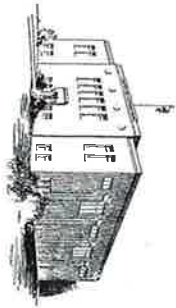


GROUND FLOOR PLAN

Gymnasium, Hamilton: Built 1929; Cost \$20,000; Gymnasium and Assembly Hall Building: Manual Training Room.

GYMNASIUM BUILDING
 HAMILTON WASHINGTON
 EARL W. MODISON ARCHITECT
 SEATTLE WASHINGTON

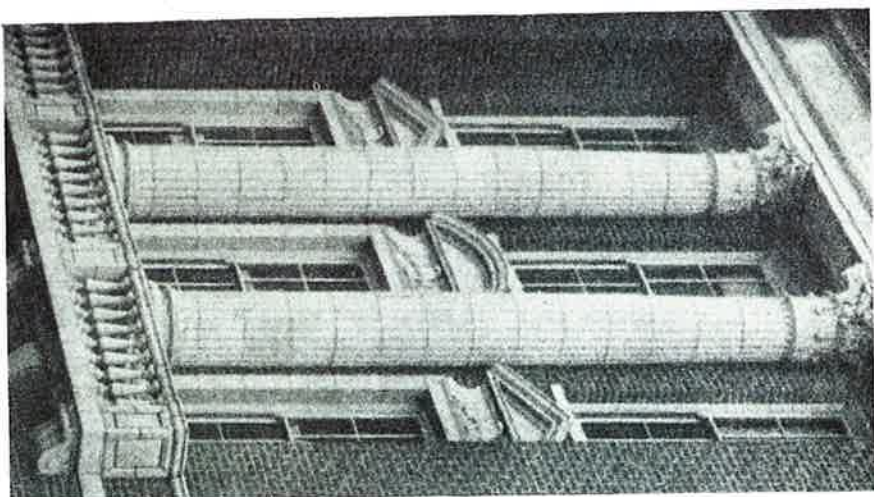
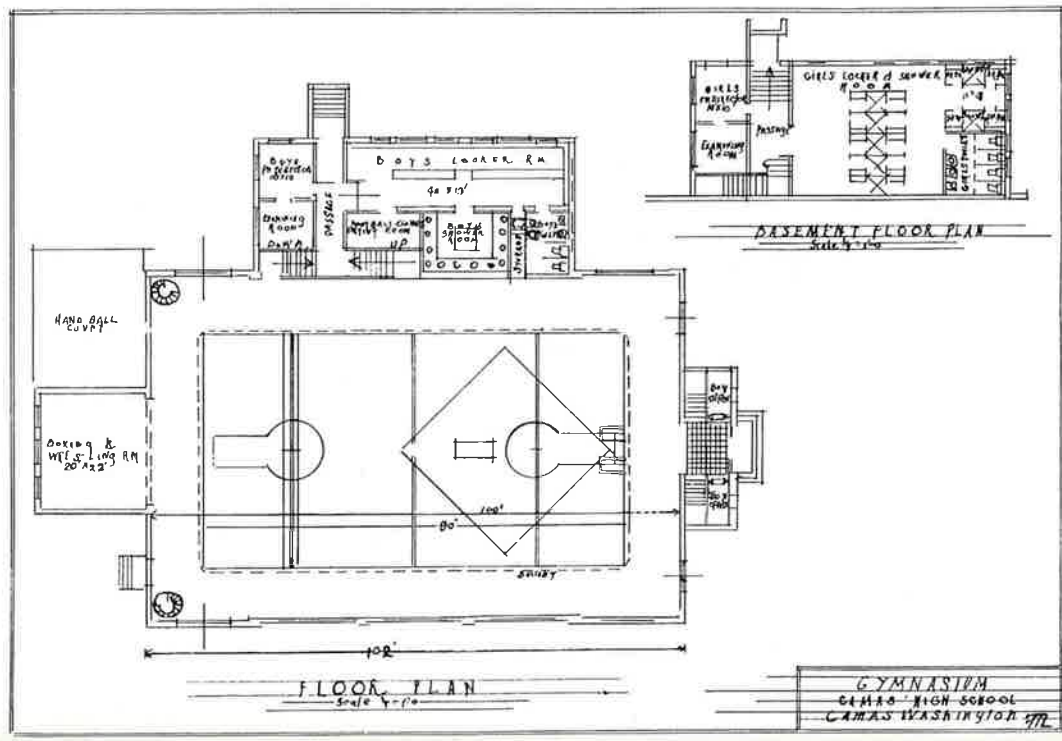
SCALE 0 10 20 30



Renton Senior High School Gymnasium.



High School Gymnasium, Camas: Built 1927; Cost \$43,000; Seating Capacity 1200.
 This Building was Designed by the Austin Company, Architects.



Grover Cleveland High School, Seattle, Columns.

STATISTICAL TABLE.

Name of School	Type	Cost*	Year Built	Construction	No. Pupils to Accommodate	Size of Study Hall	Number of Rooms	Average Size of Rooms	Size of Auditorium	Seating Capacity of Aud.	Size of Gym.	Type of Heating	Type of Ventilation
Anacortes	Sr. H. S.	\$78,296	1931	Brick, Concrete Tile	500	29 x 67	20		Separate Bldg.			Steam	Gravity
Camas	Gym	43,900	1927	Brick, Concrete Tile							85 x 102	Steam	Mechanical
Forest Home (Camas)	Elem	8,996	1927	Concrete, Tile	240	None	6	23 x 30	None			Steam	Gravity
Chehalis Falls	Elem	11,000	1929	Brick, Tile	80	None	2	21 x 31	21 x 45	150	Playr'm	Hot Air	Mechanical
Cheney	Sr. H. S.	141,000	1929	Brick	450	45 x 60	24	23 x 26	60 x 121	1,200	60 x 113	Steam	Gravity
Clallam Bay	H. S., Elem.	50,000	1931	Frame	200	None	15	23 x 31	42 x 65	275	60 x 66	Steam	Gravity
Clover Park (R. 1, Tacoma)	Jr. H. S.	61,762	1928	Brick, Tile	240	30 x 50	15	24 x 30	72 x 60	1,100	Same as Aud.	Steam	Gravity
Washington School (Ellensburg)	Elem	120,000	1925	Brick, Tile	600	None	15		35 x 80	600	Same as Aud.	Steam	Mechanical
North Jr. H. S. (Everett)	Jr. H. S.	253,000	1924	Brick, Concrete	1,200	58 x 75	34	21 x 28	46 x 80	600	(45 x 75)	Indirect	Gravity
Hamilton	Gym	20,000	1929	Concrete					Gym.	710	76 x 79	Steam	Gravity
Highline (R. 7, Seattle)	H. S.	270,000	1924-6-8-31	Brick Veneer	900	40 x 92	35	24 x 32	75 x 120	1,100	50 x 80	Steam	Gravity
Issaquah	H. S.	58,500	1931	Brick, Tile	500	35 x 45	15	24 x 32	45 x 80	700	None	Steam	Univent
Lake City (R. 13, Seattle)	Elem	30,000	1931	Brick	320	None	8	23 x 30	40 x 70	420	Same as Aud.	Steam	Gravity & Mechanical
Keesler Boulevard (Longview)	Elem	255,995	1924-25	Tile, Stucco	1,200	None	50	22 x 32	26 x 33	200	50 x 80	Dual Steam and Hot Air	Mechanical
R. A. Long (Longview)	H. S.	819,331	1927-30	Brick	850	24 x 141	57	24 x 36	80 x 83	1,010	60 x 80	Dual Steam and Hot Air	Mechanical
Mossyrock	H. S.	37,547	1931	Brick	180	24 x 60	9	24 x 32	70 x 80	900	Same as Aud.	Steam	Gravity
Mukilteo	Elem. Jr. H. S.	63,000	1928	Concrete, Stucco	400	None	12	22 x 30	56 x 73	600	Same as Aud.	Steam	Mechanical

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Representative School Buildings

STATISTICAL TABLE—Continued.

Name of School	Type	Cost*	Year Built	Construction	No. Pupils to Accommodate	Size of Study Hall	Number of Rooms	Average Size of Rooms	Size of Auditorium	Seating Capacity of Aud.	Size of Gym.	Type of Heating	Type of Ventilation
Neah Bay	Elem	18,000	1932	Frame	175	None	5	22 x 30	27 x 60	150	None	Steam	Gravity
Odessa	H. S.	70,000	1927	Brick	300	36 x 48	18	23 x 25	48 x 103	750	48 x 86	Steam	Gravity
Olympia	H. S.	350,000	1917-26	Brick	1,200	22 x 60	50	22 x 29	70 x 110	1,300	70 x 110	Plenum-steam	Mechanical
Reardan	Elem	65,000	1930	Brick	300	None	8	21 x 35	50 x 60	441	50 x 80	Steam	Gravity
Renton	H. S.	223,000	1931	Brick	850	Same as Aud.	32	22 x 30	73 x 90	550	77 x 94	Vacuum-steam	Gravity
Havermale (Spokane)	Jr. H. S.	261,769	1928	Brick, Concrete	500	23 x 80	24	22 x 26	None	(Gym.) 300	50 x 80	Vacuum-steam	Univent
Sumner	H. S.	72,201	1931	Brick, Tile	547	44 x 78	23	22 x 30	44 x 78	464	None	Steam	Univent
Central Building (Tacoma)	Elem-Shops Admin.	\$207,230	1912	Brick	900	None	23 Cl. Rms. 29 Ad. Rms. 81 Cl. Rms. 12 Shops 4	25 x 32	33 x 66		33 x 90 39 x 61	Steam	Mechanical
Lincoln (Tacoma)	H. S.	439,150	1914-15	Concrete, Brick	1,500	Part of Aud.		22 x 26	74 x 83	1,500	72 x 111	Steam	Mechanical
Whitworth (R. F. D. Spokane)	Elem	20,000	1916	Concrete, Tile	105	None		22 x 28			47 x 69	Hot Air	Mechanical
Wilson Creek	Elem. H. S.	28,000	1932	Brick	200	21 x 51	17	21 x 25	48 x 73	500	Same as Aud.	Steam	Gravity

*Comparison of buildings by cost of construction is not always an accurate criterion. Type of construction, location, and cost of materials at time of erection must always be taken into consideration. Maintenance costs on buildings of cheap construction frequently make them very expensive.

in the State of Washington

The details of a building program are important as a permanent record in the school's archives, and should be filed in the Clerk's Record Book. Copies of the following blank form are available for this purpose from the State Department of Education, Olympia, Washington.

SCHOOL BUILDING RECORD

School..... Location..... Date.....
 Kind of School (a) Elementary, (b) Intermediate, (c) High, (d) Special.
Construction Classification
 Type "A"—Fireproof—Concrete walls, floors and attic slab, with mill roof. Brick facing. Masonry partitions.
 Type "B"—Concrete floors and walls with wood attic, joists and roof. Masonry partitions.
 Type "C"—Masonry walls with wood roof and fire restrictive stairway and corridors.
 Type "D"—Frame construction above foundation.
 Total cu. content.....cu. ft. Total floor area.....sq. ft. Pupil capacity.....
 Dimensions of Auditorium..... Dimensions of Gymnasium.....
 Contractor..... Date of Contract..... Date Accepted..... Amount of Contract.....
 H. & V.
 Plumbing.....
 Electrical.....

RECORD OF COSTS

ITEMS	Contract Price	Extras	Deductions	Total
1. LAND AND GRADING				
Site.....				
Grading.....				
Total.....				
2. SITE IMPROVEMENTS				
Walks and Drives.....				
Yard, Parking, Lawn.....				
Fencing.....				
Sprinkling System.....				
Total.....				
3. BUILDING CONSTRUCTION				
a. General Work				
.....				
Total.....				
b. Mechanical and Electrical				
Heating and Ventilation.....				
Plumbing.....				
Electrical.....				
Clock System.....				
Public Address.....				
Total.....				

RECORD OF COSTS—Continued.

ITEMS	Contract Price	Extras	Deductions	Total
4. FURNITURE AND EQUIPMENT				
San Work.....				
Tables.....				
Teachers desks.....				
Library equipment.....				
Home Economics equipment.....				
Gymnasium equipment.....				
Refrigeration.....				
Lockers.....				
Window shades.....				
Drapes.....				
Stair handrails.....				
Miscellaneous.....				
Total.....				
5. OTHER EXPENSES				
Architect's fees.....				
Inspector's fees.....				
Temporary heat.....				
Total.....				
GRAND TOTALS				

Bonds: Date.....; Term..... years; Rate.....% ; Amount \$.....

Architect..... Board of Directors.....

