R E P O R T R E S U M E S

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A GUIDE FOR PLANNING PHYSICAL EDUCATION AND ATHLETIC FACILITIES.

NEW JERSEY STATE DEPT. OF EDUCATION, TRENTON

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DESCRIPTORS- *ATHLETIC EQUIPMENT, *ATHLETIC FIELDS, *GYMNASIUMS, *PHYSICAL EDUCATION FACILITIES, *RECREATIONAL FACILITIES, ATHLETIC ACTIVITIES, EDUCATIONAL FACILITIES, FIELD HOUSES, LOCKER ROOMS, PHYSICAL FACILITIES, SCHOOL SPACE,

THIS STUDY EXAMINES PHYSICAL EDUCATION FACILITIES, THEIR PHYSICAL NEEDS, AND RELATED DESIGN CONSIDERATIONS. A SYSTEM OF DETERMINING THE TOTAL NUMBER OF TEACHING STATIONS NEEDED IS GIVEN TO AID INITIAL REQUIREMENT ANALYSIS. INDOOR FACILITIES ANALYZED INCLUDE--(1) THE GYMNASIUM, IN TERMS OF LOCATION, SIZE, DESIGN FEATURES, AND RELATED COMPONENTS, (2) AUXILIARY TEACHING ROOMS WHICH PROVIDE TEACHING STATIONS FOR SPECIALIZED FUNCTIONS, (3) LOCKER AND SHOWER ROOMS INCLUDING SUPPORTING FACILITIES AND DETAILS, AND (4) OFFICES FOR SUPERVISORY FUNCTIONS. PLANNING FACTORS FOR OUTDOOR FACILITIES INCLUDE LOCATION, SUPERVISORY CONTROL, SAFETY, UTILITY, SURFACING REQUIREMENTS, AND SPECIALIZED EQUIPMENT. REQUIREMENTS FOR INTER-SCHOLASTIC ATHLETICS AND RECREATIONAL FACILITIES ARE LISTED IN TERMS OF STORAGE AND USAGE REQUIREMENTS, WHILE IMPORTANT GENERAL FACTORS FOR FIELD HOUSE AND ATHLETIC FIELD DESIGN ARE GIVEN. A CHECKLIST FOR FACILITIES PLANNING IS INCLUDED TO HELP ELIMINATE COMMON ERRORS MADE IN DESIGN AND CONSTRUCTION. (MH)

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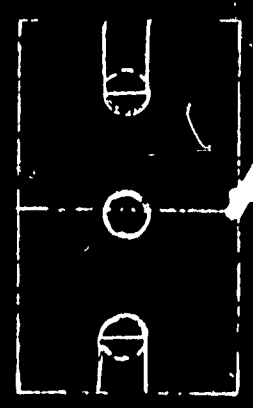

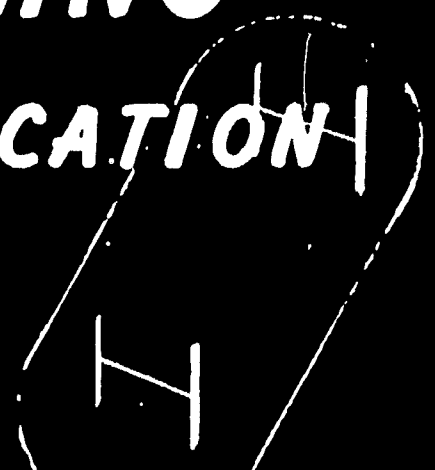

DIVISION OF CURRICULUM AND INSTRUCTION
OFFICE OF HEALTH-SAFETY-PHYSICAL EDUCATION
DIVISION OF BUSINESS SCHOOL BUILDING SERVICES BUREAU

REVISED 1964

INTRODUCTION

This information has been drawn from resource materials listed below, and from conferences with architects, school administrators and staff members who are engaged in teaching physical education and directing athletics. Existing plants have been visited for analysis of facilities in operation.

1. *A Guide for Planning Facilities for Athletics, Recreation, Physical and Health Education.* Athletic Institute, Revised 1956, Chicago, Illinois.

2. *Equipment and Supplies for Athletics, Physical Education and Recreation.* Athletic Institute, Chicago, 1960.

3. Gabrielson and Miles, *Sports and Recreation Facilities: for School and Community,* Englewood Cliffs, N. J. Prentice-Hall, 1958.

4. Hughes and French, *The Administration of Physical Education,* New York, A. S. Barnes Company, 1954.

5. Nash, Moench, and Saurborn, *"Physical Education": Organization and Administration,* New York, A.S. Barnes Company, 1951.

6. National Industrial Recreation Association, *Standard Sports Areas,* Chicago, 1956.

7. New Jersey Department of Education, *Guide for Schoolhouse Planning and Construction, Revision 1961.*

8. *Tri-State Institute on Planning and Design of School Swimming Pools.* Yale University 1958.

9. Williams and Brownell, *The Administration of Health Education and Physical Education,* Philadelphia. W. B. Saunders Company, 1951.

10. U.S. Department of Health, Education and Welfare, Office of Education, *Planning Schools for New Media.* Washington, 1961.

PURPOSE

This bulletin is intended to provide SUGGESTIONS for those who are interested in planning particular facilities to be included in a school building. It is not intended to supersede in any way the requirements and recommendations of the school building code which are to be found in the Guide for Schoolhouse Planning and Construction, adopted by the State Board of Education, 1961.

Although this bulletin discusses the facilities for one phase of the educational program, it is not intended to press the use of space or expenditure of funds for this part of the educational program at the expense of others. Provision for the many diversified educational activities to be conducted in a school is best done by balancing the facilities for the particular purposes within the funds available for construction.

Prepared by:

Office of Health, Safety, Physical Education
Office of Elementary Education
Office of Secondary Education
School Building Services Bureau

Revised 1964

Approved by:

Frederick M. Raubinger
Commissioner of Education

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RECOMMENDATIONS

Obviously, the physical education facilities needed for any school will depend upon the program which is to be offered. Basically, the gymnasium, locker rooms, equipment storage space, offices for the physical education instructors and out-of-door play space constitute the bare essentials. In this brochure are found minimum recommendations for these elements as well as suggestions for ways in which these facilities may be established on a more liberal basis and also suggestions for additional facilities which will provide still more enrichment.

If the stringency of finances prevents the development of a full program, the provision of the additional facilities may be postponed. The primary effort of those who plan the school should be directed toward securing adequate space and effective design in the gymnasium, locker rooms, storage space and instructors' offices particularly as these are affected by daily class use.

It is important to provide ample out-of-door space for out-of-door activities. The development of specific areas of this space for certain physical activities may be postponed under circumstances of financial stringency but may be secured later if a Master Plan had been adopted.

DEFINITION OF TERMS

Certain terms used in determining facility needs require definition in order that confusion will not arise. While some of the items listed may be directed apparently only to the school program, their application in defining requirements for community recreation should be recognized.

Teaching station: A separate teaching or meeting space of sufficient size to accommodate a group for the conduct of needed and appropriate activities. The size of the group will be determined by the program activity and the size of the given teacher station. For example, the remedial teaching room must provide space for a specific type of activity for

a smaller group than can be handled in a regular gymnasium class while the gymnasium may be utilized by larger groups for activities needing large areas. In a large gymnasium, two or more teachers may be teaching separate groups of pupils thus utilizing two or more teaching stations.

Group size: For basic planning in physical education, class size means 30 pupils per group in the elementary school and 40 pupils per group in the secondary school. If more than 40 pupils are assigned to a class group, adequate personnel should be provided for instruction.

Frequency of group meetings: For basic planning a daily instructional period for all children in physical education and health.

Time Block: For basic planning, the number and the length of periods in the school day.

School day: The length of time each day that the school is making use of some or all of the physical education and health facilities for school pupils.

Designed peak period-load: The total number of pupils who are to use a given facility at one time according to locally accepted standards.

Classroom unit: A regular classroom that is usually provided in a given section or locality.

DETERMINING TEACHING STATIONS REQUIRED

The number of teaching stations required to house the program of physical education and recreation for school pupils is determined by the enrollment of the school, the size of class, the frequency of class meetings, the number of periods in the school day, and the program to be provided. With the exception of the program requirements, these variables are expressed in a formula designed to indicate the minimum number of teaching stations needed in a given school.

a. $\frac{\textit{Total school enrollment}}{\text{Class size}}$ = The number of physical education and health classes to be scheduled daily.

b. *Number of physical education and health classes daily* x 1.25 (schedule weighting) =

Number of periods per day.

The number of teaching stations needed.

c. For the elementary school, additional space is needed by younger children for recreational activity in the school day.

A schedule weighting is introduced in the formula to meet the administrative problems arising from the variations in grade size, the need for separate class scheduling of boys and girls in the upper elementary and secondary grades, and the problem of combining two grades in the smaller school.

Following are illustrations of the use of the formula in determining the number of teaching stations in schools of varying size and of different grade levels:

Elementary school: A six-grade elementary school with (1) a total enrollment of 360 pupils, (2) an average grade size of 30 with two sections of each grade, (3) daily periods of physical education or health instruction, (4) eight physical education instruction or health periods per day.

a. $\frac{360}{30}$ = 12 physical education or health classes to be scheduled daily.

b. $\frac{12}{8}$ X 1.25 = 1.88 teaching stations needed.

This figure indicates the obvious need for two teaching stations. These may be provided by a divisible gymnasium or single gymnasium and one auxiliary recreation room. An ideal instruction-recreation provision to meet all ordinary community needs for physical activity recreation and for social gatherings as well as school use would be an auxiliary recreation room and a gymnasium with a folding partition making two teaching stations.

Secondary School: A four-year secondary school with a total enrollment of 750 pupils, an average class size of 40, a daily period of physical activity or health and a seven-period instructional day.

a. $\frac{750}{40}$ = 18.75 or 19 physical education and health classes to be scheduled daily.

$\frac{19}{7}$ X 1.25 = 3.40 teaching stations needed.

In this case, three and one-half teaching stations are needed. These may be provided by a divisible gymnasium with folding partitions making two teaching stations, an auxiliary gymnasium for corrective or remedial needs, and a health instruction room. Another possibility would be to provide a divisible gymnasium to provide two teaching stations and two health instruction rooms divided by folding partitions which may be opened up into one large auxiliary recreation area. Such facility provisions would help to meet the physical activity and social gathering needs of the community.

II. INDOOR PHYSICAL EDUCATION FACILITIES

The physical education program, the recreational activities, and the enrollment of the school will determine the gymnasium floor space required. It will be necessary to provide within the floor space as many separate class areas as will be needed for simultaneous activities of physical education classes. In addition to these areas, there should be a reasonable amount of seating space for spectators when the physical education areas are converted for the use of interscholastic sports.

Plans for indoor space for physical education facilities should be applied first to the daily educational program; second, to the after-school program of intramural and interschool games; and finally to activities necessary for community participation.

A. Gymnasiums

A single gymnasium is adequate only in a small school, elementary or secondary, with enrollment of less than 400 and 500 pupils respectively.

Two gymnasiums are desirable since they make possible two complete programs without interference as to time, equipment, convenience, or administration. Very large schools may have need for two gymnasiums, one or both of which are divisible.

A divisible gymnasium is the popular type in current construction. It is not preferable to two separate gymnasiums of adequate dimensions. It is advised when the cost of two gymnasiums is prohibitive.

The triple gymnasium is another popular type for large schools. It is a single large gymnasium with two folding partitions to provide three teaching stations. Such a gymnasium serves its greatest need when the official basketball court is run the width of the gymnasium. This then provides one varsity basketball court and two smaller courts on each end, all usable at the same time. Spectator seating is provided by high-tier folding bleachers on both ends of the gymnasium.

A popular type of gymnasium combinations today in New Jersey is the one large divided gym plus a divided auxiliary gymnasium (smaller in length, width and height). This combination provides four (4) teaching stations and compels variety of activity in the program. It is less costly than the three-section gymnasium because of lower ceiling height in the auxiliary gym.

A combination auditorium-gymnasium is occasionally satisfactory in an elementary school although it presents administrative problems. These problems are so severe in secondary schools that this type of combination is not recommended in any case for high schools.

A multiple type of gymnasium (gymnasium-auditorium-cafeteria) is sometimes used for elementary schools. When such design is necessary because of financial reasons the kitchen area for services should be located across a corridor and not open up into the multiple area.

Location

Most desirable is isolated type represented by adjoining building or wing that is devoted solely to physical education.

Accessibility to out-of-door areas; there should be direct entrance from the street or parking area and access to play fields adjacent to the school building.

Size

Safety and utility should be planned in relation to use, first as a classroom, then in relation to use for programs when spectators may be present. Suggested area size for physical education class use is as follows:

All Purpose Rooms (Primary Elem.)	– Minimum - 45-50 square foot per pupil (Minimum size of room 30' x 50')
Elementary level	– 70-80 sq. ft. per pupil in largest class size for each.
Junior High School	– 80-90 sq. ft. per pupil in largest class size for each teaching station.

Senior High School – 90-100 sq. ft. per pupil in largest class size for each teaching station.

The size of the regulation basketball court must be considered in determining the size of the gymnasium. [1]

Basketball rules only provide for maximum court sizes 50' x 94'. It is recommended that court sizes for New Jersey schools be 45-50' x 80-84' for high schools, 42-44' x 74-76' for junior high schools and 40-42' x 72-74' for elementary schools.

The sizes listed here are shown only as a minimum listing. *New Jersey schools have planned in the past and are continuing to plan large sized gymnasiums to meet needs for future expansion.*

1. Unit for a small elementary school with divisible gymnasium should have minimum floor area 52' x 72'. This could provide:

   a. Two small teaching stations, each 36' x 50'.
   b. One 40' x 66' intramural basketball court.
   c. One 30' x 60' court area for volley ball, etc.
   d. Three 20' x 44' court areas for badminton, paddle tennis, etc.
   e. Two 30' circle areas for dodge ball, circle games, etc.
   f. Three rows of folding bleachers on one side of gymnasium.

2. Unit for medium elementary school with divisible gymnasium should have a minimum floor area 58' 8" x 84'. This unit could provide:

   a. Two teaching stations, each 42' x 56'.
   b. One 42' x 74' official basketball court.
   c. One 30' x 60' official court area for volley ball, etc.
   d. Two 30' x 50' junior court areas for volley ball.
   e. Three 20' x 44' court areas for badminton, paddle tennis, etc.
   f. Two 30' circle areas for instruction, dodge ball, and circle games.

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[1] *A Guide for Planning Facilities for Athletics, Recreation, Physical Education and Health Education,* Athletic Institute, Chicago. Revised 1956.

g. Folding bleachers (6 rows seating approximately 350) on one side of gymnasium for intramurals, recreational activities, and demonstrations.

3. Unit for large elementary school minimum floor area 80' x 92'. This unit could provide:

   a. Two teaching stations, each 46' x 74'4".
   b. Two 30' x 60' official court areas for volley ball.
   c. Three 20' x 44' official courts for badminton, paddle tennis, etc.
   d. Two 30' circle areas for dodge ball and circle games.
   e. One 42' x 74' basketball court.
   f. Two 40' x 68' court areas for instruction and intramural basketball.
   g. Seven rows of bleachers each side of gymnasium for approximately 675. Bottom row opened will seat 120 for intramurals and recreational activities.

4. Unit for junior high school with divisible gymnasium and minimum floor area 82' x 94'. This unit could provide:

   a. Two teaching stations, each 46' x 74'4".
   b. Two 30' x 60' official court areas for volley ball.
   c. Three 20' x 44' official courts for badminton, paddle tennis, etc.
   d. Two 30' circle areas for dodge ball and circle games.
   e. One 42' x 76' basketball court.
   f. Two 40' x 68' court areas for instruction and intramural basketball.
   g. Seven rows of bleachers each side of gymnasium for approximately 725. Bottom row opened will seat 135 for intramurals and recreational activities.

5. Unit for small high school with divisible gymnasium should have a minimum floor area 80' x 92'. This unit could provide:

   a. Two teaching stations, each 46' x 74'4".
   b. Two 30' x 60' official court areas for volley ball.
   c. Three 20' x 44' official courts for badminton, paddle tennis, etc.
   d. Two 30' circle areas for dodge ball, etc.
   e. One 46' x 80' basketball court.
   f. Two 40' x 68' court areas for instruction and intramurals basketball.

g. Seven rows of bleachers each side of gymnasium for approximately 675. Bottom row opened will seat 120 for intramurals and recreational activities.

6. Unit for medium size high school with divisible gymnasium, minimum floor area 84' x 98'. This unit could provide:

   a. Two teaching stations, each 49' x 78' 4".
   b. One 50' x 84' basketball court.
   c. Two 43' x 70' court areas for instruction and intramural basketball.
   d. Two 30' x 60' court areas for volley ball.
   e. Four 20' x 44' court areas for badminton, paddle tennis, etc.
   f. Two 30' circle areas.
   g. Seven rows of bleachers each side of gymnasium for approximately 800. Bottom row opened will seat 150 for intramurals and recreational activities.

7. Unit for large high school with divisible gymnasium, minimum floor area 90' x 106'. This unit could provide:

   a. Two teaching stations, each 53' x 83'.
   b. One 50' x 86' basketball court.
   c. Two 46' x 70' court areas for instruction and intramural basketball.
   d. Three 30' x 60' court areas for volley ball.
   e. Six 20' x 44' court areas for badminton, paddle tennis, etc.
   f. Four 30' circle areas.
   g. Nine rows of seats each side of gymnasium for approximately 1,300. Bottom row opened will seat 150 for intramural and recreational activities.

In estimating floor area for basketball, allow at least five to six feet on each side for out-of-bounds territory.

Recommended distance under baskets for interschool athletics from end of court to end walls should be seven to ten feet.

Floor

Material: To insure dryness and preservation of the wood, the floor should be above the ground level.

A floor below the ground level should be water-proofed. Maple flooring is most commonly used.

Finish

To properly finish a wood floor, sand it to a smooth surface, clean thoroughly (without water), apply a penetrating floor seal, dry and buff. Apply floor markings after first coat of seal, then apply finishing coat of seal. Playing surfaces demanding hard use often receive two coats of seal after floor markings are applied. Boric acid powder provides a splendid wax substitute for dancing because it dissolves readily when cleaned with a damp mop.

Walls and Ceiling

Hard and smooth walls up to a height of 10–12 feet from floor help to prevent injuries.

The lower wall should be of smooth, glazed impervious brick or tile. Ordinary plaster does not function well in a gymnasium and hollow tile is unsatisfactory, since it is too fragile to permit attachment of wall apparatus.

Electric outlets should be provided for cleaning machines, electric score boards, record players, public address system.

Apparatus mountings for suspended apparatus should be planned for ceiling. If wall apparatus is desired and wall space is available (clear wall space of 23 feet) a strip of metal or hardwood firmly bolted or set into wall five feet from floor is recommended.

Ceiling heights vary with desired use. Elementary schools usually need 18 feet, junior high schools 18–20 feet and high schools 20–22 feet, to provide sufficient height for most activities.

If mats are to be hung in the gymnasium, appropriate hangers should be provided. Rubber-tired mat trucks wheeled into a storage room are preferable and recommended.

Movable partitions should be motor driven, sound proof, and so installed as to permit compensation for building settlement. Such partitions must extend from floor to ceiling

and should be recessed when closed, if possible. Access to each section of gymnasium should be possible by door in partition with recessed locking device.

Pass doors through the folding partition should be located near the walls and out of the area of game or other activity. These doors should be provided with a key lock and used by instructors. This is a vital safety precaution to be observed.

The switch for the motor driving the partition should be located far enough away from the partition to avoid possible injury to the operator.

Where the lead door meets the wall it is recommended that the edge of the door have affixed to it a soft rubber cushion at least one inch thick and extending from the floor to a height of seven feet. If a "U" shaped flange is used to receive the lead edge of the door, such flange should not extend below a point seven feet from the floor.

Cups and eyes installed in all walls at 15 foot height and ten foot intervals are desirable for decorating convenience and for securing nets and other equipment.

Non-glare type of artificial lighting to eliminate shadows should be provided. Lighting fixtures which can be serviced from the floor with replacement bulbs are desirable.

Special attention should be given to acoustical treatment of upper walls and ceilings.

Exits

Accessibility should determine the location of doors; that is, a pupil should be able to reach the gymnasium directly from a corridor or from the locker room. Doors should swing away from the gymnasium, thus removing a possible cause of injury to running players. It should be possible for spectators attending events in the gymnasium to enter and leave without passing through other parts of the school. Compliance with state and local fire laws is important.

Windows

All sources of natural light should be kept as high off the floor as possible. Care should be taken to eliminate glare problems caused by large window areas.

Windows should be banked and grouped together and placed on one side or on both of the long sides of the gymnasium, depending upon window areas, size of gymnasium, exposure and nearby outside construction. Window sills should be placed high enough to clear the top of telescopic bleachers. Windows should be operable from the floor or top of bleachers. There should be no protruding mechanical parts which make the use of shades or draperies impossible. Windows should be protected by wire mesh screens.

Drinking Fountains and Cuspidors

Drinking fountains should be located adjacent to the entrance of the gymnasium, in the locker rooms and in the foyer. Drinking fountains, even when recessed, tend to be safety hazards if located in the gymnasium proper.

Basketball Backboards

They should be folding in type, placed as rules demand for official basketball court and on sides in proper relation to cross court locations. For a divisible gymnasium, a minimum of six backboards is recommended, or three for each teaching station. To eliminate any future problems in the interscholastic athletic program as it relates to basketball it is recommended that *all* types of basketball backboards be installed. Suggested installation would be glass backboards for official court, rectangular wood for boys gymnasium and fan shaped backboards for girls' gymnasium. Practice sessions could then be used with each type of backboard for the varsity basketball team. Adjustable backboards should be considered for elementary schools to provide varying basket heights.

Apparatus Storage Room

Average size would be 20' x 20' depending on amount of apparatus and mats. It should be accessible to both por-

tions of a divisible gymnasium. Rooms should be on floor level with double doors and no sills.

Equipment Closet

This area to be available for every day use of equipment. Accessible to ready use in gymnasium area. Used for basketballs, volley balls, nets, and so forth, which are in constant use each day.

Provisions for Spectators

It should always be borne in mind that the primary purpose of a gymnasium in a school is to provide for the education of the pupils. When money for school building is limited and curtailments must be made, space which is provided solely for spectators can well be curtailed or abandoned without injury to the educational program. This applies to space and facilities within a gymnasium and to outdoor space and facilities solely or primarily for spectator use.

All traffic arrangements for spectators should provide direct movement to and from bleachers with a minimum of walking on gymnasium floors. Accessibility to drinking fountains; refreshments and toilets should be provided without crossing gymnasium floor.

A public address wiring system for instruction as well as athletics may be installed while building is being constructed.

The spectator seating is usually determined by the size of the gymnasium or vice versa. The amount of space will vary according to desired seating. It is highly desirable to have recessed folding bleachers. It is not recommended that built-in permanent seating be used for schools in New Jersey.

The following dimensions are about average for all types of folding bleachers. Each company differs a few inches either way.

SEATING CAPACITY

(16 ft. Section)

Rows	Capacity *(16" per seat)*	DEPTH Extended	DEPTH Closed *
3	36	5' 0"	2' 8"
4	48	6' 10"	2' 8"
5	60	8' 8"	2' 8"
6	72	10' 6"	2' 8"
7	84	12' 4"	2' 10"
8	96	14' 2"	2' 10"
9	108	16' 0"	2' 10"
10	120	17' 10"	3' 2"
11	132	19' 8"	3' 4"
12	144	21' 6"	3' 4"
13	156	23' 4"	3' 6"
14	168	25' 2"	3' 6"
15	180	27' 0"	3' 6"

* The closed depth varies with different make bleachers. Some remain static regardless of number of rows, others increase as number of rows are increased.

The average section of folding bleacher is usually sixteen feet, but some companies have eight foot and twelve foot lengths.

Foyer

Where finances and space will allow, foyers should be placed so they will serve as entrances to gymnasiums. Toilet facilities for men and women, ticket sales windows, ticket collection arrangements, cloakrooms, public telephone, refreshment counter and lockable display cases should be provided, opening directly to the foyer.

Bleachers

Portable knockdown bleachers are expensive in their use of labor and time taken from activities. Any obstruction on a gymnasium floor when not in use is a safety hazard.

Gymnasiums should provide folding, telescopic, or roll-away bleachers rather than permanent or portable seats. In new buildings the bleachers should provide a reasonable flat

surface when folded which can be used for handball, tennis, bounding board or for testing activities.

B. Auxiliary Teaching Rooms

Auxiliary rooms provide additional teaching stations for an enrichment of the program.

Apparatus Instruction Room

This room should be large enough to accommodate tumbling and apparatus. This room is to be used for teaching only, so no seating facilities are needed.

If wrestling is to be considered in the multiple use of this room, provision must be made for the storage of apparatus when used for wrestling.

Rhythm Room

A rhythm teaching room (40' x 60') including storage space is another teaching station for use. Ceiling height should be approximately 14'. This room may be used for dramatics, small assemblies, and social gatherings. Storage space for such equipment as piano, phonograph, and records should be considered.

Wrestling Room

A wrestling room should be large enough to accommodate adequately the wrestling mat 24' x 24' with sufficient space to the walls for safety. It may be used as multiple purpose room for tumbling and apparatus, exclusive of high bar.

Remedial or Modified Activity Room

A room for special assignments of pupils needing remedial and special teaching may be desired. Standard classroom size is satisfactory. Storage is also important for special equipment needed for the program.

Recreation Room

This room is used as a teaching station in which to conduct those activities which do not require a facility with the

characteristics of a gymnasium; for example, mass tumbling, low organizational games, conditioning exercises, small dance groups, etc. The room should be large enough to accommodate thirty children in the elementary school. It should be at least the size of two standard classrooms. Storage area is another consideration for this area.

All Purpose Room (Primary Grades Only)

If this room is to be used for physical education activities, it should provide a minimum of 45–50 square feet per pupil in the largest class using it to provide adequate safety for physical education activities. Ceiling height should be 12 to 14 feet. This room should be of minimum size 30' x 50'.

Swimming Pool

Swimming ranks at the top of the list of most popular activities according to studies involving school-age children. There is something exciting and challenging about swimming. It has no age limitations, there are water activities for the highly skilled as well as for the lowly skilled person; it can be performed alone or in groups; there are activities to challenge both sexes, and even the handicapped person may find enjoyment in certain types of aquatic activities.

Swimming with its variety of related activities has long been recognized by educational leaders for its contribution to physical development, enjoyment, health, recreation, social growth and self-reliance. The swimming pool represents a facility in which a variety of activities may be conducted. School swimming pools must be taken out of the class of the so-called "frill facilities". They must be recognized as a teaching station for physical education. In planning a physical education plant the swimming pool should follow directly after the gymnasium in the priority of facilities needed.

Cost factors usually influence the construction of a swimming pool. Great advance has been achieved over the past few years and pools are now being used all year round (by use of plastic dome) at the hotels in New Jersey. Also the fear that operating costs will make a pool prohibitive is a fallacy, *provided the pool is properly designed and equipped.*

Activities which are generally carried on in swimming pools include: instruction to non-swimmers; instruction to swimmers and advanced swimmers; diving; water safety and survival swimming; recreational swimming; rehabilitation and special exercise; synchronized swimming; demonstrations; competitive swimming and water polo.

For regular class instruction purposes *only* in swimming a pool 30' x 60' will adequately service 40 pupils at one time. However, if the pool is to be used by 60 pupils and for competitive swimming a pool 75' x 45' is recommended.

The depth of the water is vitally important in an instructional pool (30' x 60'). The depth would graduate and not exceed five feet so beginners of all sizes could be instructed. If the pool is to be used for competitive swimming as well as for instruction then the width and length of the pool would be increased with provision for adequate depth of water and ceiling height at the diving board.

Swimming should never be justified merely on the basis that it may contribute to the saving of life although this is vitally important to every parent in a community. However, the values inherent in swimming can be summarized in the enjoyment and satisfaction; development of strength, coordination and health; achieving and maintaining physical fitness; contribution to social adjustment and adult recreation; safety; and therapeutic values each child, youth and adult may obtain.

C. Locker and Shower Rooms

Locker Room

Dressing locker rooms should be provided in every school. Such facilities are needed for participants in physical education, athletics, and recreation programs. Special feature requirements are:

- Dressing rooms should be located on the gymnasium floor level directly adjacent to and connected with the gymnasium.
- Basket or fixed lockers or a combination of both are necessary.

- An acceptable standard is 20 square feet of dressing and locker space per pupil in largest class size. This should not be reduced below a minimum of 15 square feet per pupil.

- Girls' locker rooms should have ample dressing mirrors with shelves, as well as full length mirrors. One dressing mirror for each five to seven girls in largest class size is recommended. Mirrors are also desirable in boys' locker room. Mirrors placed over hand lavatories for hair grooming cause plumbing problems.

- There should be no exposed radiators or heating pipes where pupils might contact them.

- Properly placed drains as well as faucet outlet for hosing down should be planned.

- Stationary benches secured to the floor are recommended. A seat board of hard wood, eight inches in width, surfaced on both sides with rounded edges and corners is best.

- Height of bench; from 15" to 16" or lower, as desired.

- Space relations of lockers to bench, and bench to bench should be planned for traffic control and dressing comfort. Allowance should be made for 30" passage between benches.

- A built-in drinking fountain should be placed in both boys' and girls' locker rooms with faucet under each for hose attachments to wash down locker and shower areas.

- A tack board should be provided for the locker room.

Storage Lockers

The storage type locker used with the large dressing locker has proven the most popular. One storage locker should be provided for each pupil enrolled, with an additional ten percent more lockers than the total enrollment to allow for expansion. In the storage type lockers, it is recommended that the size of both boys' and girls' be either 12" x 12" x 18", 9" x 12" x 18" or 9" x 12" x 24".

Basket type lockers present many problems. They do not allow for hygienic care of clothing; they are not economical; they are subject to hard wear; an attendant is essential for

proper administration. If an attendant is not used, there is likely to be destruction and pilferage.

Dressing Lockers

The number of lockers large enough to accommodate street clothes should equal the planned peak class load plus ten percent for leeway. Dressing lockers 9"x12"x60"–72" or 12"x12"x60"–72" are recommended. Lockers should be on a solid coved base six to eight inches high to allow for cleaning or flushing the floor. Peaked type lockers make possible easier and better custodial care. If lockers are to be installed against walls, they should be flush with window height sufficient to clear the tops of the lockers.

If storage and dressing locker units are used, consideration should be given to number of periods in the school day. If there are six periods in the school day, six storage lockers and one dressing locker will comprise a unit for dressing.

Toilet Room

Toilet and lavatory facilities should be provided in proportion to the designed peak period load. Special attention should be given to:

- Entrance should be provided to toilet area from showers and locker rooms.
- Toilets should not be located in the shower room.
- Toilets should be in an enclosed unit, separate from locker rooms.
- Adequate ventilation and automatic flush should be provided in stalls.
- Mirrors should not be placed over hand lavatories for hair grooming.

Shower Rooms

The size of the room is dependent upon the extent of the facilities and the largest number of pupils to be served at one time. Adequate ventilation should be provided. The following are recommended:

- Location adjacent to locker rooms, easy access from the gymnasium and athletic field.

- Separate from, but adjoining the locker room through a toweling-body drying room.

- Non-slip floors and walls tiled at least to a six-foot height.

- Proper drainage in shower floor is very important. The shower floor should be pitched to drains in the center area and particularly away from the shower room entrance.

- No exposed radiators or heating pipes.

- The temperature of the hot water going to all shower heads should be thermostatically controlled by a central mixing valve. Individual shower heads should also have manual control valves, designed to temper the water to suit each individual.

- Shower heads which are permanently fastened to the wall in a fixed position are most desirable from the standpoint of maintenance. Wherever possible all water piping should be hidden in access space behind the wall.

- Liquid soap dispensers for cleanliness and better safety.

- For boys, current trend is one shower head for each five to six in largest class size. It is suggested that approximately ten to twelve-gang shower heads be provided spaced three to four feet apart and six feet above floor level.

- For girls, current trend is to provide gang area showers and some individual units. In some communities a satisfactory ratio would be three individual units to each ten-gang shower heads. Other communities will demand more individual units. Trend is one shower head to each three or four girls.

- For girls, shower heads should be shoulder height–4' 6" (elementary, 5' 0" (secondary).

- The walk-around type shower area is popular for girls.

Toweling – Body Drying Room

The drying area should be situated between the locker room and shower area. A floor area approximately half the size of the shower area should be planned.

A towel bar or hooks should be installed for hanging of towels. The bar should be high enough so as not to become a safety hazard.

Wall partitions need not extend from floor to ceiling.

Drainage pitch should conform to standards set for shower rooms.

If this area is used in connection with a pool, hair dryers for girls may be provided in this area.

Towel Issue Room

The size required will depend upon the amount of storage to be maintained and the frequency of distribution of towels. Adjustable shelves in sufficient number to accommodate the load are needed. A check-out window should open into locker room. The dutch-door type is most frequently used.

The location of this room should be related to normal dressing room traffic. Locating this room just inside locker room at gymnasium exit to locker room has been successful particularly in the girls' area because the towel is fresh and unhandled before class; girls have an opportunity of using it as drape to shower; traveling back and forth from locker for issue is avoided. Before leaving locker room for next class, used towels are deposited in laundry containers at exit from locker room.

Laundry

If a laundry is provided, it should be of sufficient size to accommodate equipment and personnel needed to handle full daily load of towels, uniforms, swim trunks, etc. A washing machine and a drying machine are essential for each laundry.

D. Offices

If there are two teachers of physical education, there should be one office for the man and one for the woman. Each office should be not less than 120 square feet in area with a nine-foot ceiling as a minimum. Where the staff is larger, add 80 square feet for each additional staff member.

The office should be accessible to the gymnasium, locker room, and playground and should not be located in the basement away from these areas.

The staff shower-dressing unit should include a floor area of not less than 100 square feet. This unit should include a shower, toilet, and hand lavatory. Provision should be made for a clothing closet.

For larger staffs, this unit should be enlarged to include closets for each teacher and two showers.

In the men's unit, additional space should be included to accommodate lockers for athletic officials during games.

In the design of staff offices observation windows looking into the gymnasium, locker room, and even the showering area have been provided. Much wall space is sacrificed besides providing a bird-cage office for the staff. It is recommended that supervision of classes be handled by on-the-spot observation rather than through an office window.

E. Equipping the Gymnasium (Secondary)

The selection of any type of equipment should always be done in light of the objectives desired. In the selection of any type of equipment, safety must always be an important objective.

The department does not desire to curtail the program of activities for physical education, but in presenting the following list of equipment wishes to invite attention to the type of equipment which will best meet the needs for secondary schools with relatively safe participation by the pupils. Established schools will also find this list beneficial in reviewing their programs for the purpose of obtaining maximum accomplishment with the facilities that are available to them.

TYPE OF EQUIPMENT

Essential

Fixed	Movable
Basketball Backboards and Goals	Mats
Bulletin Board – Chalkboard	Mat Truck
Telescopic Bleachers	Phonograph
Climbing Ropes	Standards (for nets-jumping)
Floor Fasteners (Apparatus)	Vaulting Box
Horizontal Bar	Parallel Bars
Net Hooks on Walls	Horizontal Bar
	Piano

Highly Useful

Fixed	Movable
Public Address System	Table Tennis Tables
Traveling Rings	Horse
Stall Bars	Balance Beam
Horizontal Ladder	Mat (Wrestling)
Chinning Bar	Instructor's Platform

Optional

Fixed	Movable
Chest Machines	Low Parallel Bars
Striking Bag Machine	Weights (Barbells, etc.)
Archery Backdrops	Golf Nets
	Beat Boards

Not Recommended

Fixed	Movable
Flying Rings	Boxing Ring
Trapeze	Trampoline
	Springboard

No recommendation is made concerning the amount of the above-listed equipment. The size of the gymnasium, number of pupils enrolled in the individual classes, and the interests of both the boys and girls will be factors in determining the amount of equipment needed for the program.

F. Outdoor Equipment Storage

In the event that no provision is made outside of the building for the storage of equipment and apparatus that is used out-of-doors, storage rooms should be located in the building immediately accessible to the outdoor playing area. Such rooms should be at ground level, otherwise, ramps are required.

For storage of physical education and athletic equipment, the room should be of sufficient size and appropriate shape to store such equipment as archery targets, hockey cages, hurdles, vaulting poles, jumping standards, nets, etc.

For storage of maintenance equipment, the size of room will depend upon amount and type of equipment to be stored. Usual equipment includes lawn mowers, rollers, wheel barrows, hose, etc. Space for a work and repair center is recommended also in this area. This area should be ground level with double or garage type doors.

III. OUTDOOR PHYSICAL EDUCATION FACILITIES

In the design of outdoor space for physical education and recreation, factors requiring consideration include location of the various areas, safety, ease of supervision and control, utility and beauty. Spaces allocated to the primary grades, paved multiple use, and apparatus should be located in close proximity to one another and to the building. The field games area may be further removed from the building, but should be easily accessible to it. The section of the field games area used primarily by girls should be accessible without necessity of crossing the boys' section.

Supervision and control are facilitated by the grouping of areas for related use.

As stated in the "Guide for Schoolhouse Planning and Construction" the desirable size of a school site for elementary schools is a minimum of five acres, plus one acre for every hundred pupils enrolled. For elementary schools which also embrace seventh and eighth grades a larger area than the five-acre plot should be considered for out-of-door space. Consideration should be given to eight to ten acres plus one acre for each 100 pupils enrolled. This should provide adequate space for play areas for each grade level. Additional acreage should be available if future expansion should become necessary.

Primary Grades Area

This area is intended primarily for children between ages five and eight. Expensive permanent equipment should not be purchased at expense of supplies like balls, jump ropes, bean bags, and so forth. It is recommended that equipment be selected which will encourage developmental activities on the part of the child. Desirable apparatus is that which will provide opportunities to clumb, hang, balance, and drop to the ground. Apparatus which requires in the main sitting or riding has little developmental value.[1]

[1] Office of Health, Safety and Physical Education, New Jersey Department of Education: *Children at Play.* 1951

The following lists some suggested permanent equipment in order of relative value:

1. Jungle gym 6–9' high
2. Horizontal bars 3–5' high
3. Horizontal ladder 5–6' high
4. Balance beam
5. Automobile tire suspended on rope
6. Sand boxes

Tan bark or soft sand should be used under horizontal bar, jungle gym and other comparable apparatus. Under no conditions should any type of hard surface be placed under such apparatus. New developments have provided for an interlocking rubber mat for use out-of-doors under apparatus.

Middle and Upper Grades Area

Playground apparatus is also popular with middle grade children. Such apparatus might include, climbing structure, horizontal bars, horizontal ladder, climbing pole, rope ladder, etc. Heights would vary with age groups using apparatus.

Games such as soccer, touch football, softball and speedball require a turf surface. These areas should be free of obstructions such as swings, seesaws, etc. Large areas are needed to service both the physical education classes and free play periods. For games like soccer, touch football, etc. one and one-quarter acres are recommended. Field sizes and markings for soccer, football, speedball, hockey and other outdoor games may be found in bibliography listing.[2]

High School Grades Area

The amount of space needed depends upon the number of pupils enrolled and the type of program planned. Ample space should be provided so that both boys' and girls' classes may be scheduled at the same time. Enough space should be considered to provide a broad intramural program to be carried on after school hours for both boys and girls as well as the athletic programs.

[2] *A Guide for Planning Facilities for Athletics, Recreation, Physical Education* and Health Education, Athletic Institute, Chicago. Revised 1956.

The guide states that the school plant should ideally be considered an instrument of great value in furthering, facilitating, and making effective the type of educational program desired by the community.

In the selection of a site for a school plant it is recommended that consideration be given to the following factors: size, topography, accessibility, environment, safety, health of pupils, nearness to public utilities, and services, the orientation of the projected building on the site and the overall master plan for schools in the community.

The desirable size of a school site should be determined by the nature, scope, and the envisioned future of the contemplated educational program. For secondary schools and vocational schools a minimum of twenty (20) acres is recommended, plus one acre for every hundred pupils enrolled.

A suggested breakdown in terms of recommended minimum acreage for a school plant is herewith submitted for consideration for a secondary school.

School Plant	Enrollments	Listed Agreage
Type of Facility	800	1000
School Building–Lawns, Driveways	5.0	5.5
Parking–Teachers, Students, Others	2.0	2.0
Physical Education–Boys (Intramurals after school)	2.0	2.5
Physical Education–Girls (Intramurals – Band Practice)	2.0	2.5
Girls' Field Hockey (Extramural Program)	1.5	1.5
Stadium – Football Track Seating	7.0	7.0
Football Practice Field (Track Field Events in Spring)	1.5	1.5
Soccer Field (Lacrosse – Golf – Archery)	2.0	2.0
Tennis Courts	1.0	1.0
Baseball Field	2.5	2.5
Softball Fields	1.5	2.0
Total Acreage	28.0	30.0

Hard Surfacing

One of the major problems in promoting physical education and athletics out-of-doors is to provide suitable all-weather surfacing for the various play areas at a cost schools can afford. It provides for many activities using courts of standard sizes, such as basketball, volleyball, badminton, tennis, paddle tennis, handball, and shuffleboard. It also provides for activities of variable sizes such as circle games, hopscotch, roller skating and other low organization games.

A suitable outdoor hard surface area should be: (1) safe, (2) well drained and usable in most types of weather, (3) inexpensive, (4) resilient, (5) firm, (6) smooth, and (7) durable. At present time no one surface meets all of these standards, but industrial research along these lines is continually improving materials.

There are over 40 different types of hard surfaces used today for outdoor play areas. Many of the types are overlapping, the materials being much the same but carrying different trade names. The two most common types of hard surface areas will be reviewed, but this does not imply that these two are the best. Expert advice should be sought by each school district in terms of the school's needs and the surfacing which can be adapted best to local conditions.

Concrete Surfacing

Concrete is most suitable for playing court areas such as tennis, shuffleboard, badminton, paddle tennis, etc. The principal requirement of playing courts is that it be a true even surface which should be durable and extremely hard. Concrete, if properly placed, provides a permanently true, even, all-weather surface requiring little or no maintenance except for painting lines each year. Even this may be eliminated by using colored concrete for the lines during construction.

Concrete surfacing, however, is the most costly for play areas and it should never be used as a surfacing under play apparatus. When necessary, repairs are extremely difficult to make.

In general it has been found that concrete has no particular advantage over bituminous surfaces which are considerably cheaper in cost.

Bituminous Surfacing

This includes the wide field of materials in which either coarse or fine materials are solidified by bitumens. It may be made a resilient surface by the inclusion of asbestos, cork or woodpulp, or it may provide a hard surface by inclusion of granite, limestone, and the like.

The experience of one district may be of value to cite. A city in New Jersey, in searching for an ideal surfacing for its playgrounds used asphalt as the binding and cement agent in a bituminous concrete base with cork to provide the resilience. They found that cork asphalt has many advantages; namely, it is resilient; it is easy on the foot; it wears well; it resists impact and abrasive action of playground use; there is little or no dust; it can be used immediately after laying; it requires no time for curing; it is usable immediately after a rain; it is unaffected by frost; it is readily repaired; it is easily cleaned; its maintenance cost is small; its installation cost while not the lowest, is reasonable and final. At the beginning it feels hot under foot because of the dark color, but after time and usage the cork becomes exposed and the color lightens. Other areas have reported favorably on cork asphalt especially as to its resiliency and firmness.

At the present time hard surfacing is not recommended under playground apparatus. Tanbark or a mixture of tanbark and sand has proven to be the best surfacing for this purpose. In the past few years considerable interest has been aroused in the possibility of the use of rubber in surfacing. This is still in the experimental stage but one company has developed a rubber cushion mat which interlocks and can be placed under out-door apparatus or on an entire play area. It is a non-abrasive weather wear and shock resistant mat to make playgrounds safer for children.

Many authorities recommended a hard surface area in schools where space is limited and intensive use is necessary. The advantages of such surfacing are low maintenance

cost, availability at almost any time during the year regardless of climatic conditions, elimination of mud and dust, and protection of school building floors from mud and gravel usually carried into building on the shoes of children playing on turf or non-surfaced areas. The injury hazard usually presented by hard surfaced areas can be eliminated to a large degree through education of children in how to play properly.

IV. ATHLETICS AND RECREATION FACILITIES

Team–Community Rooms

In the senior high school, a room should be provided for the inter-scholastic athletic squads. Such team rooms provide dressing areas for varsity teams as well as for community recreation groups.

Separate home and visiting team dressing rooms should be provided, allowing approximately 15 square feet per pupil.

The home team room should be larger in size than the visitors' area. The visitors' area is often used by junior varsity and freshman squads during practice sessions.

The team rooms should be provided with dressing lockers 12" x 12" x 60" – 72" for street clothing storage and benches. They should be easily accessible to the shower area.

The shower area should be large enough to handle the team squad of the sport using it. A shower area of twelve showers should adequately accommodate an average high school basketball squad. The shower room may be located between team rooms so both teams can use the same area. Toweling-body drying rooms should be provided between shower room and each team room.

The team rooms should be so located that they may be entered from out-of-doors or corridor, with easy access to gymnasium or pool and without access to physical education locker room or rest of school building.

Equipment Drying Room

Special equipment drying facilities for senior high schools are essential. The size and capacity of the equipment drying room will be determined by the size and kind of athletic squad using it. (For a football squad of 60 players – 300 square feet.) For football and baseball larger areas are needed than for basketball or track. This room requires special heating and ventilation as well as appropriate arrangements for hanging uniforms.

Storage and Issue Room

This room should provide sufficient space well protected from pilfering for storage of all non-seasonal, new and reserve equipment and supplies. Appropriate cabinets, drawers, hangers and adjustable shelves are necessary. Sometimes one large area is provided separated by a solid partition to serve both this purpose and as check-out area for storage of supplies used during a particular season.

Trainer's Room (High School)

This room may serve a dual purpose by providing an additional center for first aid and rest facilities. One such room should be provided for each sex. The girls' area should be furnished with cot. The boys' area may have cot or rubbing table. Heating lamp and other therapeutic equipment for athletics might be used in the boys' area.

If No Field House is Available – Where there is no field house or stadium dressing and storage facilities available, and athletic squads must use the school building, extended areas must be provided. Consideration should be given to the following recommendations.

- Team rooms must be large enough to accommodate football squads of 50 to 80 players.

- Shower rooms must be large enough to accommodate peak load. Everyone wants to shower at same time.

- Equipment drying room must be large enough to accommodate football equipment of entire squad.

- Equipment issue room must be located near team dressing rooms.

- Equipment storage room for new and reserve equipment.

- Equipment apparatus storage for tackling dummies, hurdles, standards, nets, etc.

- Trainers' room, with rubbing tables, first aid cabinets, toilet lavatory, lamps and whirlpool bath space.

V. FIELD HOUSE

The field house for high school use is not an area adaptable to indoor and outdoor sports activities. Instead, it is a structure housing dressing rooms, showers, equipment storage rooms, coaches' and trainers' rooms. A separate building is recommended for the field house. Where permanent concrete stands are installed, the units of a field house are often provided under the concrete stands. The field house should provide:

- Varsity Dressing Room – 40 to 50 players
- Junior Varsity and Freshman Dressing Room – 40 to 50 players. (This room is to be used by Visiting Team on game days)
- Equipment Drying Room – accessible to all. (This room should accommodate 100 uniforms)
- Lavatory Facilities – For each dressing room.
- Shower and Drying Facilities – May be a combination serving both dressing rooms.
- Trainers' Room.
- Coaches' Room.
- Storage for both current season and out-of-season equipment.

Varsity Dressing Room

This room is used daily during the outdoor sports season. Consideration should be given the following:

High windows so clothes lockers can utilize all available wall space.

Lockers recessed, if possible, on concrete base. Lockers should be 12"x12"x60" minimum. Avoid lockers around center of room. If no lecture room is provided, the varsity dressing room will be used for conferences on rainy days and between halves in football. A blackboard should be available on wall or on stand. Drains in floor as well as faucets for hose connections should be available for hosing down room.

Room should provide, particularly for football with the amount of gear needed, approximately 15 square feet per player, exclusive of locker space. This size may be cut to 12 square feet per player in the junior varsity and freshmen dressing rooms.

Because of many uses of this area, particularly on rainy days when theory sessions are held, it may be necessary to have 80 or more players in this area for conference.

Mirrors (wall) should be installed.

Drinking fountain should be provided.

Benches (permanent type) in front of lockers should be installed.

Junior Varsity – Dressing Room

Same as Varsity

Equipment Drying Room

One of the most important features of a field house. Uniforms improperly stored overnight are not thoroughly dry for use the next day by players. This area should provide:

One room to service all players.

Space enough for 100 or more uniforms. Usually team will carry approximately 60 to 80 players on all squads. Extra provision will have to be made for 30 to 40 players selected to play on Saturdays. This group usually has game uniforms and must be dried after game each Saturday.

Separate heat and ventilation. Air circulation is necessary for proper drying. Large circulating fans provide the best method of drying equipment, together with some heat.

Methods for storage such as:

a. Rods in walls at different height levels for hanging equipment.
b. Special equipment hangers (most practical for handling). One to each player and hung on pipe rods for free air circulation.
c. Special hangers on movable carts that may be rolled out into dressing room.

Shoe storage boxes. This may be built of wood with cubicles 12"x12"x8" high. Frequently during practices only shoes are used, and if shoes are separated from other equipment, they can be obtained easily. They can be cleaned more easily after muddy day use.

Entrance to room by Dutch door so players may expedite issue and return of equipment easily.

Towel storage for towel issue from this room.

The size of this area should be determined by number of uniforms to be stored. A room for 100 uniforms should be approximately 20 feet long by 15 feet wide and 10 feet high or approximately three square feet per player.

Shower and Toweling-Body Drying Facilities

This area should be large enough to accommodate all players at the same time. It is difficult to stagger shower use.

One large shower area between dressing rooms could service both with a toweling-body drying area for each dressing room. Such practice helps for better socialization between home and visiting teams.

Athletic teams require soap baths necessitating approximately four plus players to a shower head. One large shower of 18 to 20 shower heads should service 100 players.

Toweling-body drying areas should provide about two to three square feet per player. Hooks for towels should be installed in this area.

Toweling-body drying area should be between shower and locker room to prevent carrying water on bodies into locker room.

Cake soap always presents a custodial problem. Mechanical liquid soap dispensers properly cared for are most serviceable.

Toilet Facilities

Separate units for each dressing room.

Location near shower area.

One water closet to each 30 players, one urinal for each 20 players and one lavatory for each 30 players, are basic standards. The horizontal urinal has been permitted for field house use and will service more players at same time than vertical type.

Toilet facilities are sometimes enlarged at the expense of the shower area. It is more important to have large shower areas because of constant use.

Trainers' Room

A room every field house should have, but too often located in a corner of the dressing room.

Large enough for cabinets for medical supplies, rubbing tables, heating units, whirlpool bath, toilet facilities, hand lavatory and tub lavatory.

Drainage outlet for whirlpool bath should be planned. Tub lavatory will serve many purposes; cold soaking, ice packs, etc.

A room approximately 12'x15' exclusive of toilet facilities is suggested.

Coaches' Room

This room services both coaching staff and officials for games.

Lockers or closets for clothes storage are needed. Extra ones available for officials.

One water closet and one hand lavatory should be planned.

One or two showers depending upon size of coaching staff.

Storage closet is recommended for emergency athletic equipment such as extra footballs, shoe laces, cleats, bats, baseballs, etc.

Wall blackboard and tack board are desirable.

Equipment Storage Room

This may be located on top floor of field house or it may be a combination of storage and issue room separated

by solid partition.

It should provide storage area for excess equipment, cold weather and rain gear, and game uniforms after they are dried following a game.

Lecture Room

This room provides opportunity for rainy day conferences, blackboard drills, movies, etc. It may be used as lounge for letter men, social center for both teams after game, or alumni during days of game. If cost prohibits proper construction of adequate size dressing, shower, equipment drying and trainers' rooms, the lecture room should be sacrificed first.

Maintenance Equipment Storage

The size will depend upon amount and type of equipment to be stored. Usual equipment includes lawn mowers, roller, wheelbarrows, hose, etc. Space for a work and repair center is recommended. This area should be at ground level with double or garage type doors.

Some Mistakes Observed in Field House Construction

- Lack of drains in dressing rooms.
- No hose faucets.
- Equipment drying areas too small for size of athletic squads.
- Lack of adequate ventilating fans in equipment drying rooms to properly dry equipment overnight.
- Lack of storage closets for equipment.
- Lack of wall space for lockers, making it necessary to install lockers in center of dressing rooms, preventing adequate supervision and rainy day conferences.
- Limited shower areas causing overcrowding.
- Toweling-body drying areas too small, with insufficient number of towel hooks.
- Not enough pitch in floors to drain properly.

VI. ATHLETIC FIELDS

Many problems relating to the design and construction of an athletic field in a given locality are highly technical in nature and require expert advice. Such factors involved as surfacing drainage, fencing, landscaping, seating and parking areas must be taken into account.

Multiple Use Areas

In planning and construction, due consideration should be given to use of field for events of wide and varied interests such as athletic contests, patriotic observances, pageants, services, celebrations, demonstrations, mass meetings, rallies, parades, drills, band concerts, special exhibitions and others.

Most fields are planned for more than one sport, and something of the ideal for each sport must be sacrificed, either from the standpoint of players or spectators. However, the intended use of the playing field for sports other than football should influence the planning. If it is impossible because of costs, and unwise because of current lack of demand to achieve this idea, the possibility of future inclusions should be part of the original plan.

Size

The size of such a field will depend upon the school needs, the number of sports participated in, and the spectator capacity desired. As a guide, 12 acres will provide:

Oval ¼ mile cinder track of standard construction including a 220 yard straightaway, 21 feet wide.

Regulation size football field.

Space for permanent stands with capacity of from two to three thousand and space for additional temporary seating facilities as desired.

Regulation baseball diamond (Practice baseball and football fields can be superimposed according to seasonal needs.)

Regulation softball diamond.

Parking area or soccer field or field hockey field whichever is desired.

Shape

There are at least four general classes of design: ovals and bowls; horse shoes; side stands; and crescents.

Side stands on one or both sides and on both ends are usually found in high schools.

The exterior of field should be designed in accord with the prevailing school type of architecture and materials available in the locality. There is no fixed standard of design or material.

Entrances and Exits

To prevent rushing, entrances should be well distributed and protected by several passageways with safety railings set in concrete sidewalks. Convenience, safety, crowd appeal, and public relations dictate that, in case of doubt, too many rather than too few entrance gates should be provided.

Exits should be planned for rapid and orderly disposal of crowds.

Drainage

The same drainage considerations apply as for other standard play areas. The drainage system should be planned with peak load and safety requirements in mind.

Seating

In the design of seating, several general considerations are important; the kind of contest or exhibition; the comfort and convenience of entering spectators, probable behavior of spectators; and proper balancing of cost against the degree of comfort desired or advisable.

If permanent concrete stands are desired the cost of construction will be considerably more than the movable bleacher. An important consideration in relation to the concrete stand

is its permanency. After it is located it cannot be moved. However, permanent concrete stands may be so constructed to provide team rooms, drying rooms, showers, equipment storage, spectator rest rooms and concessions, as well as permanent seating. If such facilities are installed, damp proof and water proof materials should be used.

In many high school athletic fields metal stands, semi-permanent in nature, are used on one side of the football field. These are supplemented by movable bleachers which after season may be moved to other sport fields or areas for other events. This type of stand is less expensive for initial installation than permanent concrete stands.

Rest Rooms

All athletic events which attract large crowds produce a need for rest room facilities. Rest rooms should be designed for proper light, ventilation and sanitary care.

Drinking fountains should not be located in the toilet rooms.

Press Box

Press and radio box accommodations for reporters, scouts and observers are frequently included as part of the general design of the field.

Facilities such as telephone connections, score board control, electric outlets for public address system, and artificial light may be features of the press box area.

Ticket Offices

The ticket booths which are part of the athletic structure obviously should be prominently and conveniently located and distributed near the major entrances. These permanently housed offices may be supplemented by mobile ticket booths easily accessible and widely distributed around the outside of the athletic field enclosure.

Concessions

Concessions have come to be considered a necessary public service in relation to public gatherings. Appropriate space, distribution and adequate fixtures of concession stands within the field should be planned.

Scoreboard

An illuminated scoreboard and time clock easily visible to all spectators is an excellent asset for any athletic field.

VII. CHECKLIST

It is hoped that many common mistakes in planning and constructing physical education and athletic facilities can be avoided. The following checklist is based on the experience of school districts which have had to make limiting program adaptations or costly alterations because of poor planning.

- Place the emphasis on inside functional arrangement of facilities rather than on exterior appearances.
- Plan for future additions, extensions, and possible necessary remodeling.
- Requirements for instruction and recreation should be first; accommodation of spectators, second.
- Provide a sufficient amount of spectator seating.
- Recognize that a combined gymnasium-auditorium always creates administrative and instructional problems.
- Design playing courts in relation to official rules governing length, height, and width.
- Plan for good interrelation between instruction, recreation, service, and administration facilities.
- Include suitable and adequate facilities for girls. Install shower heads in girls' area no higher than five feet.
- Plan suitable and adequate facilities for community use.
- Provide usable and suitable office-dressing spaces for physical education staff.
- Allow ample rooms, easily accessible for storage space.
- Provide vestibules for exits to play fields from gymnasium and locker rooms.
- Gymnasiums need acoustical treatment.
- Provide overhead framework or pipes for suspended apparatus, anchor plates for floor and wall apparatus, and wall cups and eyes for nets.
- Partitions in gymnasiums should be soundproof and motor driven. Provide key lock for entrance door in gymnasium partition.

- Plan sufficient and appropriate electrical outlets in the gymnasium.
- Provide for good illumination and a means of servicing the artificial lighting.
- Construct shower, toweling-body drying, and locker rooms with adequate floor fall and drains.
- Install moisture proof or water resistant coved base under lockers.
- Use only appropriate and suitable floor and wall materials in gymnasium, shower, toweling-body drying, and locker rooms.
- Use coved base and bull-nose corners on walls in gymnasium.
- Provide mud scuffs and grilles at all entrances from play fields.
- Field house is another classroom for athletic squads. Avoid locker placing in center of locker-dressing rooms so squad conference may be held during rainy days and in between halves of games.
- Avoid inadequate sized shower rooms for field houses. Remember football squads usually number over 50 players.
- Provide proper air circulation and heat for drying athletic team equipment.
- Avoid slippery ramps to and from field house as football cleats and baseball spikes cause sliding on ramps.
- Provide attic storage areas in field houses if other space is not available for out-of-season equipment and supplies.
- Provide double or garage type doors for field equipment storage area to move machines in and out easily.
- Provide some type of outside lighting around field house for police supervision at night.