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Discussion of the effects of nuclear weapons and consequent radiation fallout precedes justification of the need for fallout shelters. Competition for the design of an elementary school with a population of 300-500 and an emergency population of 600-1000 is then described. Criteria and requirements are detailed. The winning entries illustrate that--(1) shelter capability can be incorporated in a school with no interference to the educational process, (2) cost increase for shelter capability is reasonable, (3) dual use shelters need not adversely affect the esthetics nor the function of a school, and (4) principles of shelter integration with educational buildings are applicable to other building types. The seven winning entries are described and illustrated through plan and perspective views. (MH)

SECTION MEETING

Schoolhouse Planning and Construction

THURSDAY AFTERNOON, NOVEMBER 7, 1963

Room No. 1, Lower Level, Denver Municipal Auditorium — 1:00-2:30 P.M.

COMMITTEE CHAIRMAN: SIMEON J. DOMAS
Administrator
Massachusetts School Building Assistance Commission
Boston, Massachusetts

PROGRAM CHAIRMAN: DR. GEORGE J. COLLINS
Chief, Elementary-Secondary Educational Surveys Section
U. S. Office of Education
Washington, D. C.

RECORDER: DR. WILLIAM O. WILSON
Director of School Facilities Laboratory
University of New Mexico
Albuquerque, New Mexico

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FALLOUT PROTECTION IN SCHOOL CONSTRUCTION

by JAMES E. ROEMBKE
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U. S. Office of Civil Defense
Washington, D. C.

INTRODUCTION

The uncertain political and ideological situations that exist in the world today make nuclear warfare something for all of us to consider. Last October, the Cuban crisis brought the United States close to the brink of such a war. For several days, while messages were exchanged between the President of the United States and the Soviet Premier, the world waited and finally breathed a sigh of relief when the Soviet missiles were withdrawn. Whether we like it or not, a nuclear war — be it deliberate, accidental or a miscalculation — is a distinct possibility that we must face.

I. Nuclear Weapons Effects

Most of you have seen photographs and motion pictures of the initial stages of a nuclear explosion and it is not necessary for me to illustrate them now. I would like, however, to briefly describe some of the effects resulting from such a detonation. The split-second blast of a modern nuclear weapon lets loose awesome amounts of energy, so awesome in fact that it is usually measured by comparison with the force of thousands or millions of tons of TNT. At the instant of a nuclear explosion, the vast energy release raises the temperature of the weapon materials several million degrees and gasifies them to form a luminous mass or fireball. Emitting nuclear and thermal radiation, this fireball grows and rises. Heat waves travelling at the speed of light radiate outward from the fireball. For a 10 megaton surfact blast, there would be sufficient heat for exposed individuals to receive second-degree burns or for crumpled newspaper to ignite at a distance of 15 miles from ground zero.

Blast waves travelling at the speed of sound follow the thermal flash. High winds and increased air pressure demolish wood frame houses and knock down trees at a radius of 9 miles from the center of a 10 megaton surface explosion. After a few seconds, there is a reversal of wind and pressure causing structures which have been literally squeezed to explode outwardly.

The cloud continues to rise sucking up huge amounts of vaporized earth. As this material cools and condenses, fission products attach themselves to the debris and begin to fall back to earth. The first fallout arrives about 30 minutes after the explosion. The heaviest particles will drop first and fairly close to the burst point. The lighter particles will be carried by the wind and drop further out from the burst point. Fallout and its deposition on the ground will depend on such factors as yield of weapon, height of burst, wind velocity with altitude, wind direction, and size of particles.

II. Radiation from Fallout and Protection

Fallout particles emit three kinds of radiation, but only one, gamma radiation, is considered to be of major importance. The other two, alpha and beta radiation, penetrate such a short range that they are dangerous only if you cannot avoid inhaling, ingesting or coming into skin contact with them. Gamma rays on the other hand are like X-rays and have great penetrating power. They can cause sickness and death in humans by primarily damaging the blood manufacturing centers in the bone marrow and lymph glands. In the early stages, radiation sickness is usually accompanied by nausea and diarrhea. Loss of hair and skin ulcers may appear in more severe cases. Effects of radiation on humans depend on such factors as age, general health and exposure time. The human body has miraculous recuperative powers, and it is possible to recover from a dose of radiation just as one recovers from a sunburn, provided that the total dose absorbed is not too great. Present data indicates that a radiation dose of 600 roentgens or more received over a period of a few days will mean almost certain death. If the body receives the radiation over a long period of time, it can repair a substantial portion of the damage, and consequently, a greater amount of radiation can be absorbed before the same symptoms are evident.

One important thing to remember about fallout is that the radioactivity comes from the fission products which are attached to the bomb debris. The air itself is not poisonous.

Another important item for consideration is that the nature of radioactivity is such that it decays with time. An easy rule of thumb to remember is that for each increase in time by a factor of seven the radiation level decreases by a factor of ten. Seven hours after a burst the radiation level will be 10% of the level after the first hour. Forty-nine hours after a burst, the

THE SPEAKER

Mr. James E. Roembke, Director, Architect and Engineering Development Division, U. S. Department of Defense, speaking to the Schoolhouse Planning and Construction Section Meeting.

radiation level will be 1% or 1/100 of the level after the first hour. Because of this radiation decay, it would be possible for persons who have taken shelter to emerge when the radiation declines to a level suitable for living.

Let us examine the means by which protection can be obtained. We have already noted that time is a factor of protection in that radiation intensity decays or dies out with time. Another factor to be considered is distance. The further one gets away from the source of radioactivity the less the intensity. A third, and the most significant factor of all, is the placement of a barrier or shield between the source of radiation and the person to be protected. Gamma radiation striking this barrier can be (1) absorbed by the barrier, (2) scattered within the barrier and emerge in a new direction or (3) passed through the barrier unchanged in direction. What happens in any given case is largely determined by the thickness and mass of the barrier. Generally speaking, increasing the mass or density of the shield will decrease the amount of radiation that is likely to pass through.

The term "protection factor" is used to measure the effectiveness of a shelter by indicating the amount of protection afforded. A protection factor of 100 indicates that the radiation level within a shelter is one hundredth of the radiation level outside the shelter.

For common building materials, barrier shielding is proportional to the density of the shield. On a pounds per square foot basis, all normal construction materials are equally effective. For example, 3 inches of wood block flooring is equivalent to about 7/8 inches of concrete. To summarize then, it can be said that time, distance, and barrier are the three basic principles for protection from fallout radiation.

III. Why Fallout Shelters?

Estimates from systematic vulnerability studies in the Defense Department credit a nationwide fallout shelter system with a potential saving between 25 and 65 million people in a wide range of hypothetical nuclear attacks covering both cities and military targets looking ahead over a period of years. These are the people who would be located far enough from ground zero to survive the direct effects of nuclear explosions but are nonetheless within the widespread patterns of fallout carried hundreds of miles downwind of ground bursts.

The estimates are based on the most reliable system of analysis available and show that more lives can be saved and at far lower cost by a fallout shelter system than for any other single active or passive defense system, including blast shelter and prospective anti-ballistic missile systems.

The objective of the National Fallout Shelter Program is to develop fallout shelter space for every person in the United States. The projection is for 235 million shelter spaces to be obtained by locating shelter in existing buildings and incorporating shelter in new construction in federal, State and privately owned buildings. The recently completed shelter survey has located over 104 million shelter spaces in existing structures which could be used as group shelters. The spaces are being marked and stocked with emergency rations of food, water, medical supplies, and radiation detection instruments. The survey identified over 7 million shelter spaces in more than 18,500 school buildings in the United States. An additional 5.8 million spaces can be obtained in schools by improving the ventilation requirements at an average cost of $1.17 per square foot of shelter space. There are, however, 50 million students and teachers in schools today so you can readily see that we have a long way to go to provide protection for all.

The fallout shelter program is concentrated on the creation and provisioning of public fallout shelters throughout the United States. Schools, particularly elementary schools, are a community facility with many characteristics appropriate to fallout protection requirements.

Elementary schools are located in all residential neighborhoods, and their locations are well known to the public.

The neighborhood served by an elementary school is generally small. Thus, the ability of the local population to reach the shelter in the school within a short waning period appears reasonably good.

Schools are generally publicly owned and staffed by competent public employees trained in leadership. An administrative staff is available within the facility.

Schools are usually equipped with facilities for feeding and caring for large groups of people. Essential plumbing and other mechanical requirements are already met.

Many new schools are being built, particularly in suburban areas, where the National Fallout Shelter Survey indicated that shelter available in existing buildings falls far short of accommodating the population. The school buildings often represent the most substantial building within the residential community.

To provide a broad nationwide professional capability for evaluating existing structures and including protective features in the design of new buildings, an aggressive professional development program was initiated by the Department of Defense. Special courses in Shelter Design and Analysis for architects and engineers have been conducted at various schools and universities throughout the country. This Fall, over 70 courses are in progress. To date, over 4000 architects and engineers have completed the course and have been certified by the Department of Defense.

IV. The Competition

In the Fall of 1962, The American Institute of Architects conducted a design competition for the Office of Civil Defense to obtain school shelter designs which would not interfere with the educational function of the schools and yet provide structures which have esthetic appeal. The competition program called for the design of an elementary school to house a daytime population of 300-500 students and an emergency population of at least 600-1000 people. The shelter area was required to be dual use space that would be utilized as part of the school facility and yet still provide shelter with a protection factor of at least 100. First, second and third prizes were offered in each of the 8 Civil Defense Regions, and the jury was permitted to award up to 50 honorable mentions. From among the regional first prize winners, a grand prize winner was to be selected who received a total award of $15,000. Regional first place winners received $4,000, second place winners received $1,000, and third place received $500.

The awards were offered to develop and promote ingenuity, originality, economy and advancement in the field of dual use school shelter designs. The plans developed are being used to provide general suggestive guidance to the many school planners and designers throughout the United States.

The jury comprised Linn Smith, FAIA, Architect; William Wayne Caudill, FAIA, Architect; Harold D. Hauf, AIA, Architect; William H. Byrne, Engineer; and Paul S. Visher, former Deputy Assistant Secretary of Defense (Civil Defense). The professional adviser was A. Stanley McGaughan, AIA, and Mr. John Cameron from the Office of Education was the educational technical adviser. The jury was carefully selected to include leading school architects and outstanding engineers representing the specialized disciplines involved in design of schools and protective construction. Professionals both with and without experience in design of fallout shelters were selected as a safeguard against creating specialized bias in the collective judgment of the group.

The competition was open to teams of architects and engineers, or faculty members of accredited architectural and engineering schools. Because of the scope of the competition and because a school commission of this magnitude in the average architect's office would not be attempted without the services of consulting engineers in the structural, mechanical and electrical phases, it was strongly recommended that entries be submitted by a team of architects and engineers as a collaborative effort.

Economy of construction and maintenance and operating costs were essential considerations in the school designs. In recognition of the wide range of professional opinion on good school design and the variations in practice across the country, no attempt was made to establish detailed criteria for the educational facility. The design problem was defined in the broadest terms, since many of the architects and engineers that would compete would have considerable experience in the design of schools and have an understanding of the educational aspects involved. It was clearly indicated that attention should be focused on the design of a good school, fully meeting all functional, economic and esthetic requirements of a permanent educational facility.

Each team was permitted to choose its hypothetical site within the OCD Region in which its members resided. Since great variations of site conditions exist within some regions, such as the dry-sub-tropical areas of Arizona to the sea coast and high mountains of California, each team was required to describe its site in detail. Particular attention was given by the jury to the suitability of the building to the climatic conditions.

Shelter areas were required to provide at least 10 square feet of usable space per person. With mechanical ventilation, above-ground areas required 65 cubic feet per person for 50% of the occupants and 40 cubic feet for the remainder. Below-ground areas required 65 cubic feet for all occupants. When mechanical ventilation was not provided, the net cubage per person was increased to 65 cubic feet for above-ground shelters and 500 cubic feet for below-ground areas. Provision was to have been made to allow for storage of basic shelter supplies such as water, wheat biscuits, medical care kits, sanitation kits, and radiation detection instruments. At least 1½ cubic feet per shelter space was to be allotted for provisioning.

The jury report indicated that the objectives of the competition were fully met and that the competition results as expressed in the prize-winning designs would have a positive impact upon attitudes toward school shelter space. The jury felt that at least four very important lessons were to be learned from the competition.

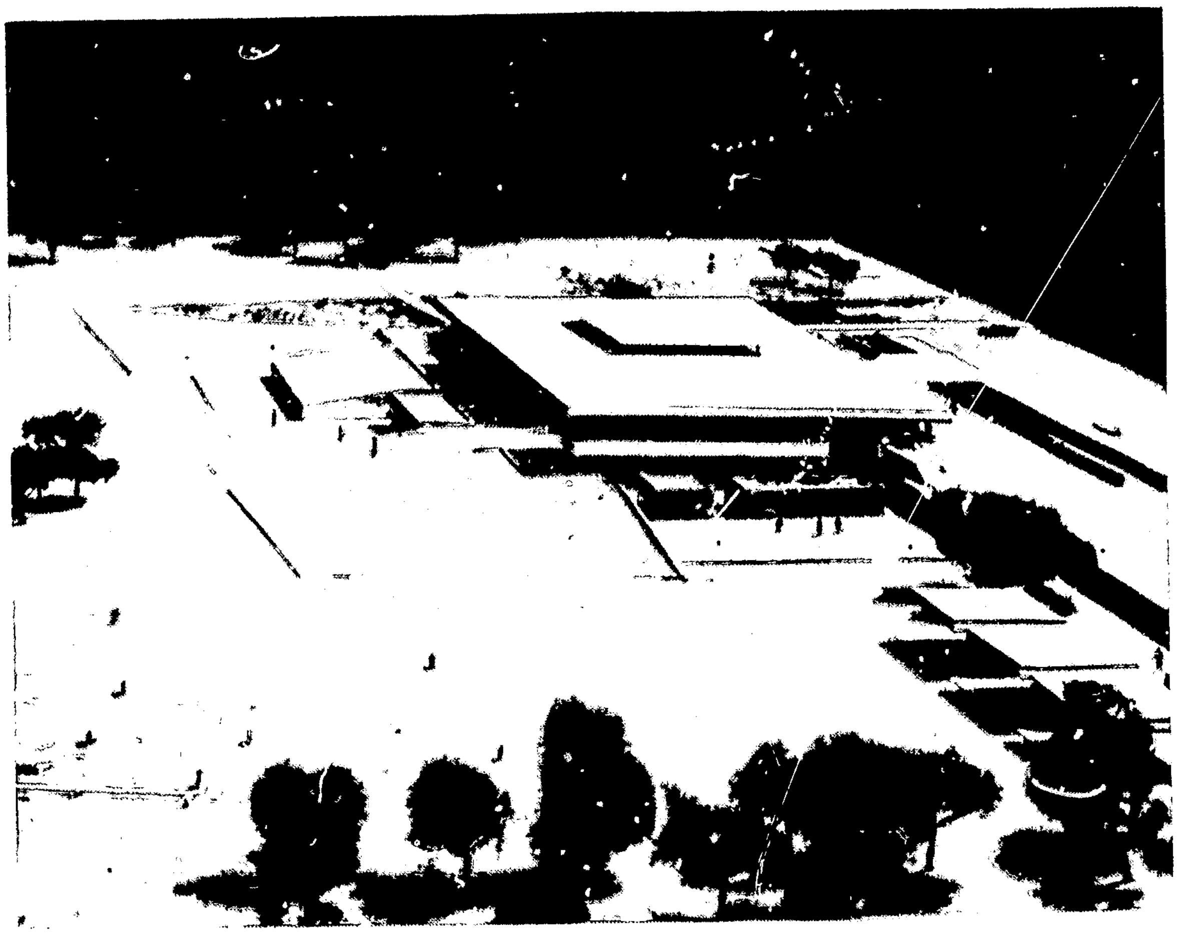
1. Probably the most important lesson is the fact that shelter capability can be incorporated in a school with no interference whatever in the educational process. In many of the school designs, it would be difficult if not impossible to know that shelter was included.

2. Although the addition of fallout shelter capability to a school will increase its cost, there are many ways it can be done at a reasonable cost.

3. A team of talented and capable architects and engineers and shelter analysts can devise a dual use shelter which will not adversely affect the esthetics nor the function of a school.

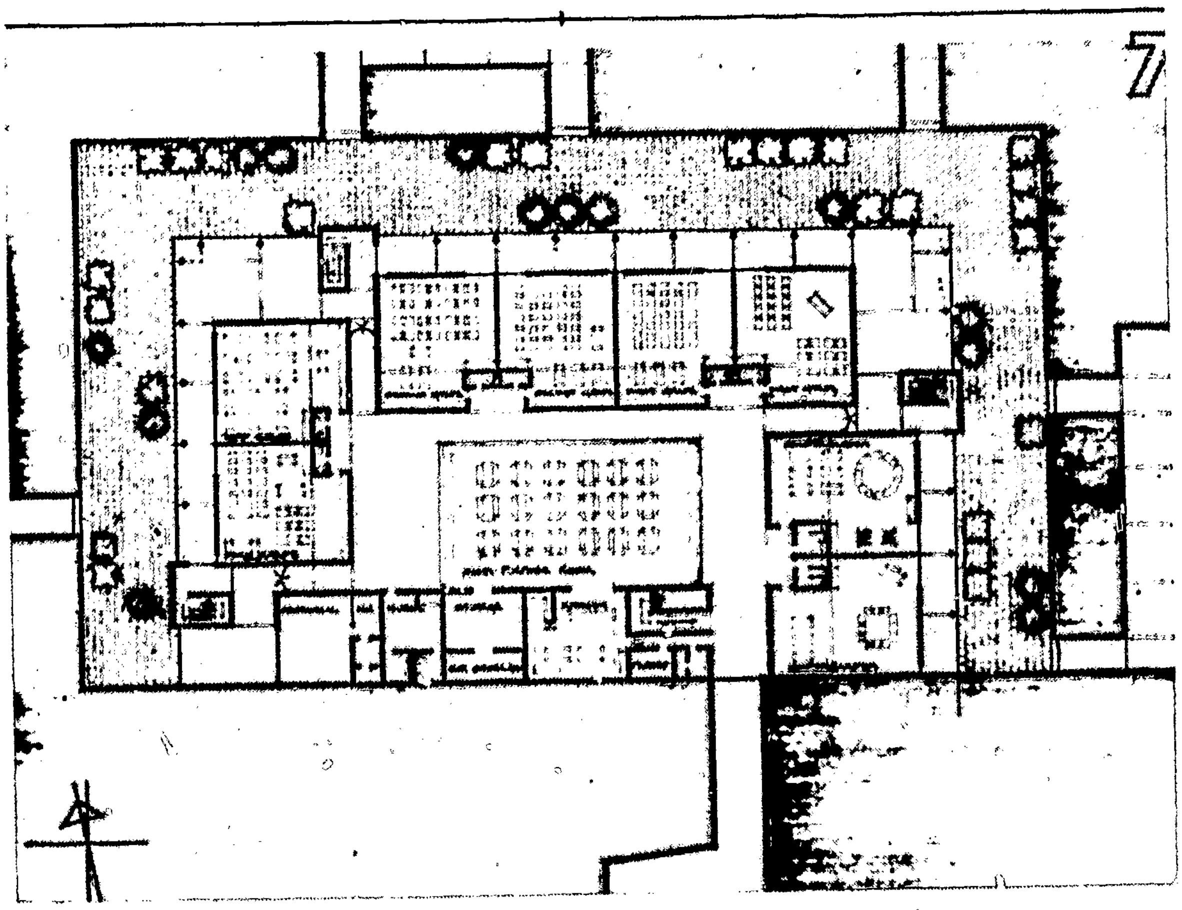
4. The principles learned relative to schools are equally applicable to other building types.

I have some pictures on some of the winning entries to the design competition that I believe would be appropriate. In looking at these, bear in mind that it is not necessary to have an underground windowless box to obtain shelter in schools. Many of the schools shown are above-ground and contain generous amounts of glass.



Picture No. 1 — View of Grand Prize Design

Picture No. 1 is a model of the grand prize winner in the competition. It is a two-story concrete school designed by Ellery C. Green, of Tucson, Arizona. The fallout shelter aspects of this school are handled skillfully as are its architectural and educational aspects. Most important, there is little if any interference or conflict with the normal functioning of the school. The protective requirements have been achieved simply and inconspicuously. In fact, it is not readily apparent that the building was designed as a shelter. The shelter area is located in the ground floor of the building. Protection is provided by judicious placement of earth berms around the building. These berms will reduce the major portion of the radiation emanating from the fallout particles on the ground and provide a savings in cost by reducing the required exterior wall thickness. A patio area on three sides of the school allows natural light into the classrooms and provides grade-level access to the second floor. As this is a two-story concrete structure, the overhead protection accumulates by the weight of the roof and floor. The school has a student population of 420 and a shelter capacity for 900 persons.



Picture No. 2 — Plan View of First Floor — Grand Prize Design

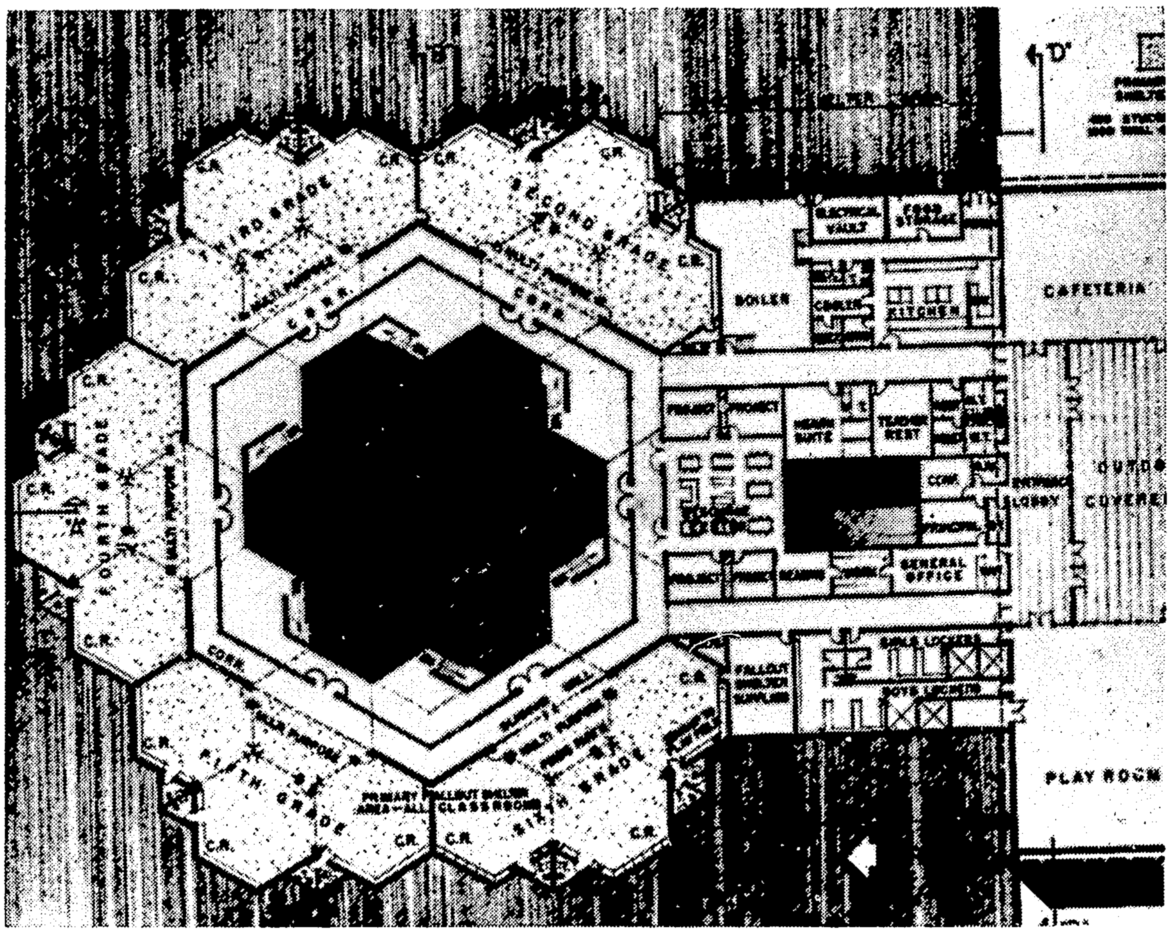
Picture No. 2 is the plan view of the grand prize winner. The shelter area is located in the multi-purpose room which has a depressed floor. Classrooms are on three sides of the building, the fourth side has the kitchen, nursing and storage facilities.

During normal use, the multi-purpose room serves many educational functions and could be utilized as a dining room, auditorium, or recreation room. Radiation emanating from fallout particles on the patio passes over the heads of the occupants in the multi-purpose room. Door openings are protected by use of the stair towers and toilets as baffles allowing for daylight to filter through and for the movement of air.

The inclusion of fallout protection adds relatively little to the cost of this school. The use of earth berms is quite inexpensive. This type of building often is built as a concrete structure; using the cumulative weight of roof and floor for shielding adds little to the structure ordinarily required. The jury considered this to be a well conceived, truly creative solution to the problem posed for the competition.

Picture No. 3 — View of Region ONE First Prize

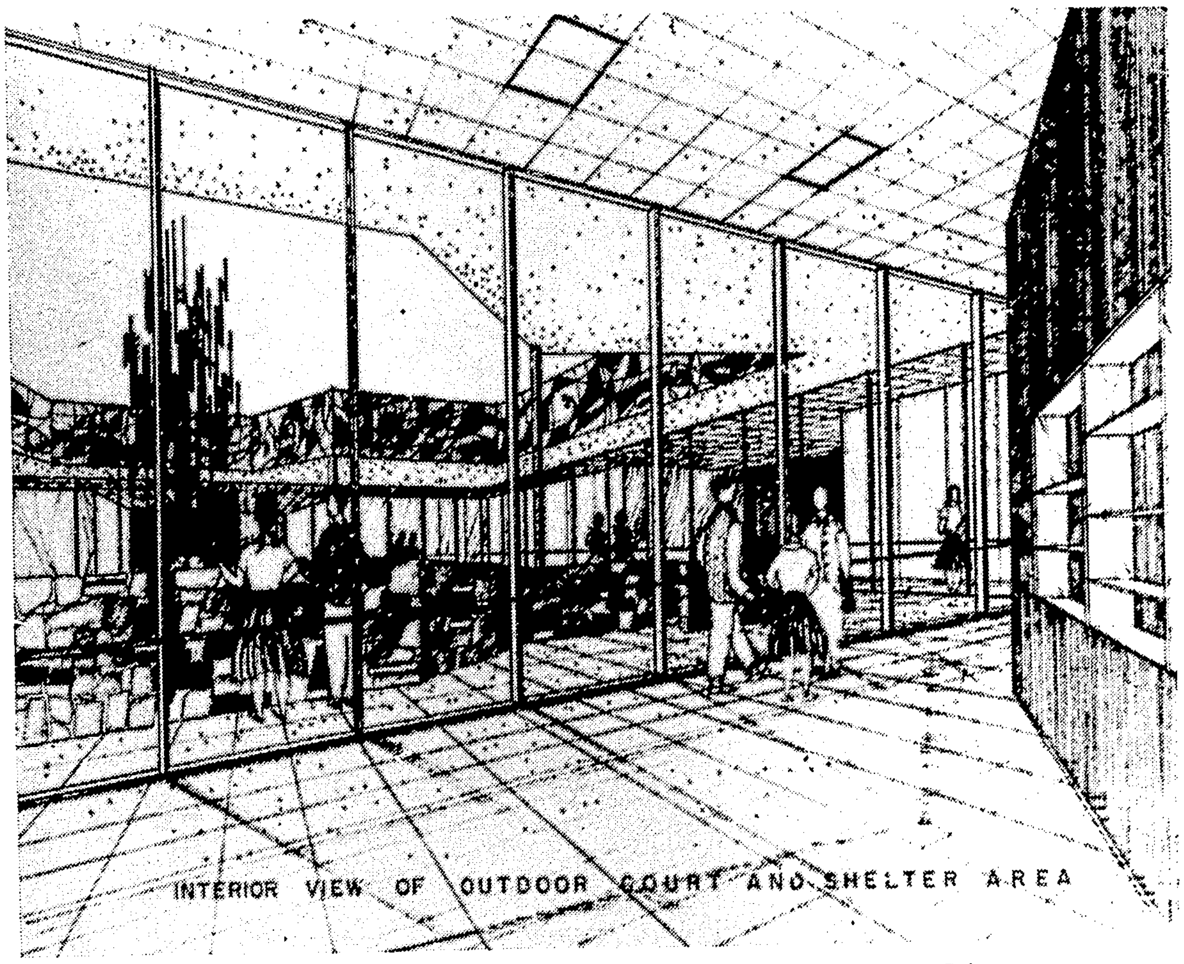
Picture No. 3 is an artistic rendering of the Region ONE first prize winning design. This school was designed by Sargent, Webster, Crenshaw and Folley of Syracuse, New York. It is essentially a one-story school with classrooms located below-ground and with above-grade entranceways. This is accomplished by artificially raising the ground level by means of a retaining wall. An earth cover is used as a shield over most of the building roof. A large open court in the central area of the building, together with a smaller court in the service area, provide natural light and add an open feeling to this essentially underground building.



Picture No. 4 — Plan View of Region ONE First Prize

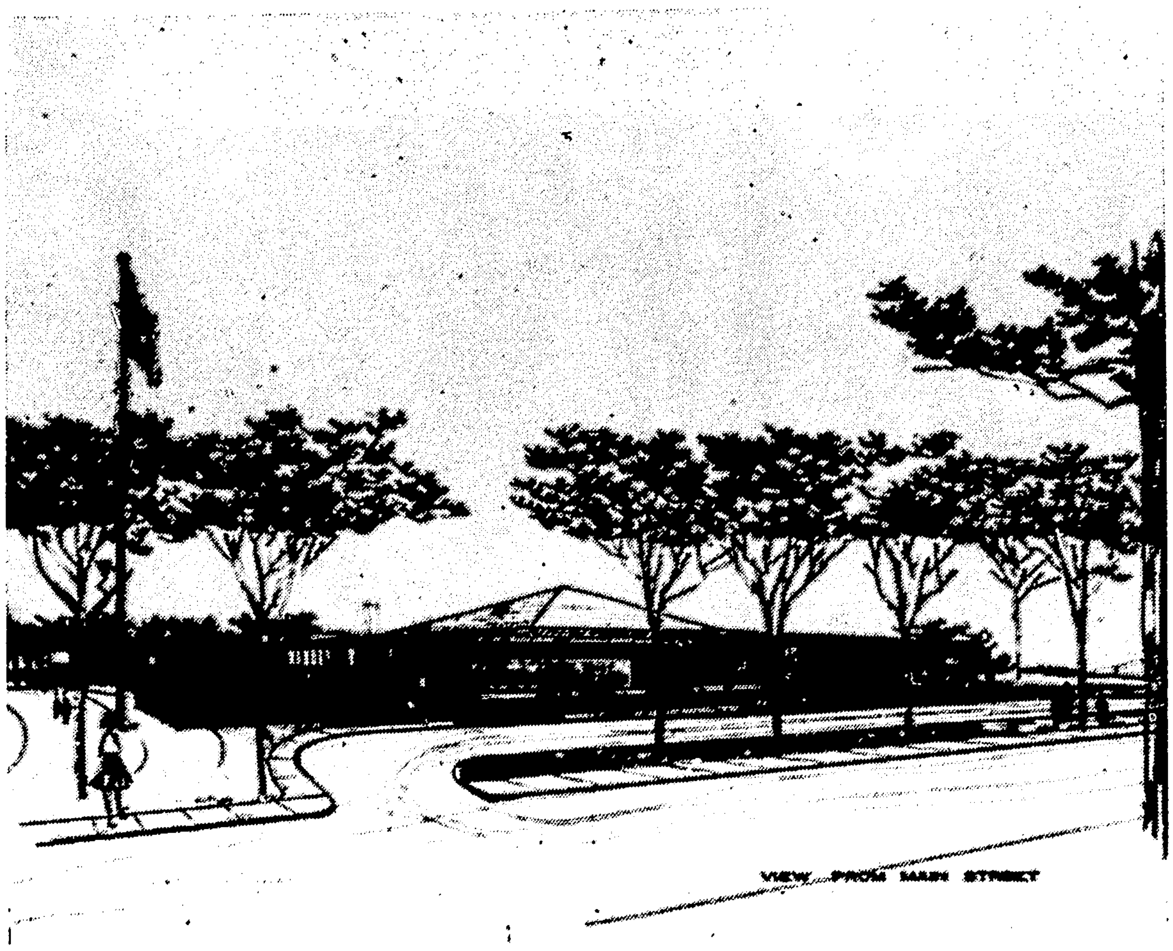
Picture No. 4 is the plan view of the school you have just seen. The classrooms, in flexible clusters of three rooms, are grouped around a large open central court. This typifies many new school plant designs. As a result, each classroom though actually underground, has a view to the outdoors and long interesting vistas. The open central court can be used as a playground area. Facilities are available to house a student population of 420.

A relatively high percentage of the building is utilized as shelter area with a capacity of 1350 persons. The primary shelter areas are located in the classrooms. The earth cover, of course, provides the primary protection while the depressed open court is well screened by overhangs and low screen walls. Shielding against the limited contamination from fallout particles in the open courtyard is accomplished by sliding walls which will attenuate the radiation.



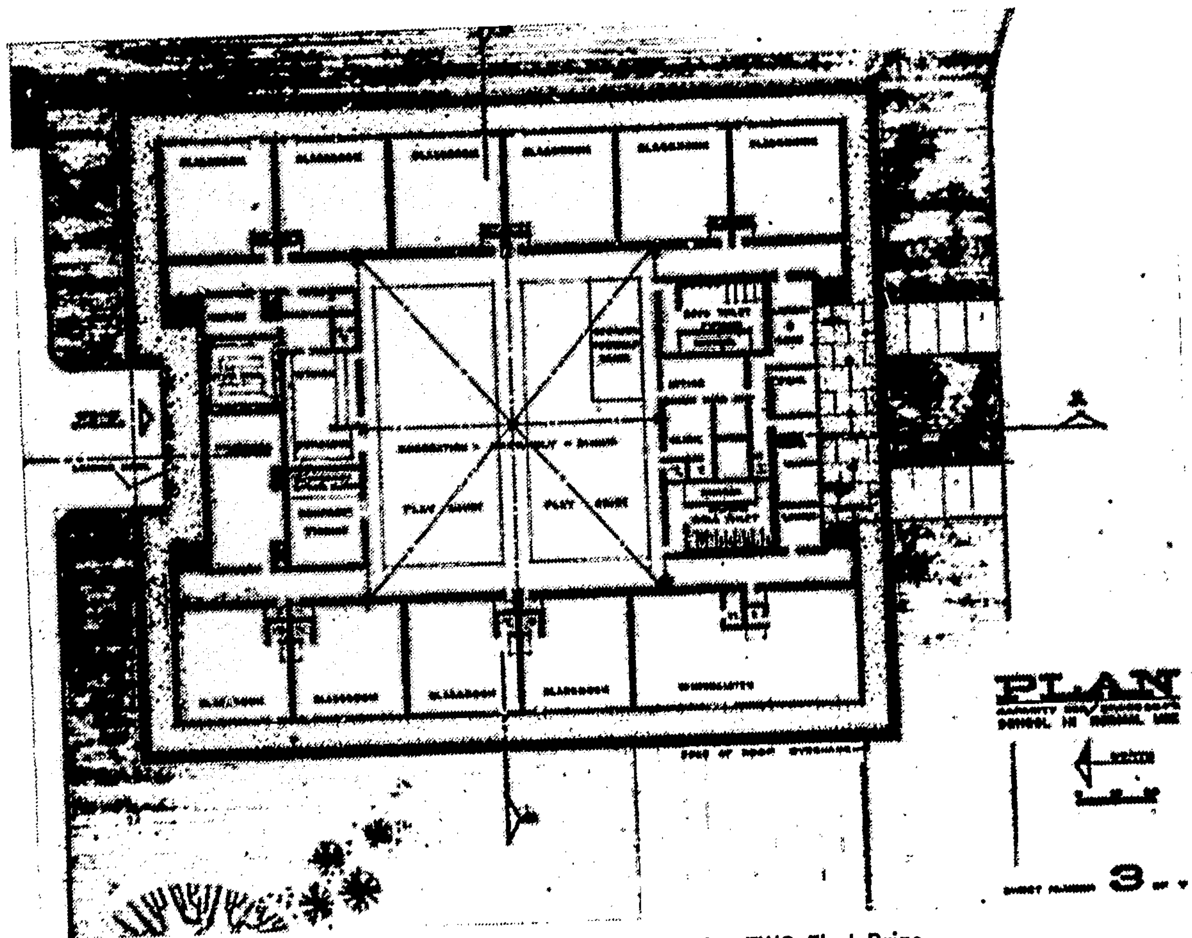
Picture No. 5 — Interior View of Outdoor Court Region ONE First Prize

Picture No. 5 is a view that one would have in looking onto the outdoor court. Notice the generous use of glass which permits natural light to filter in. The overall atmosphere in this facility is one of openness and airiness. The classroom wing is an effective, well-thoughtout shelter. It is an extremely economical solution. It is no more expensive than above-ground schools and has many advantages. The interior environment is completely controlled. The playgrounds are close to the classrooms, maintenance is reduced, acoustics are improved, and the educational program enhanced.



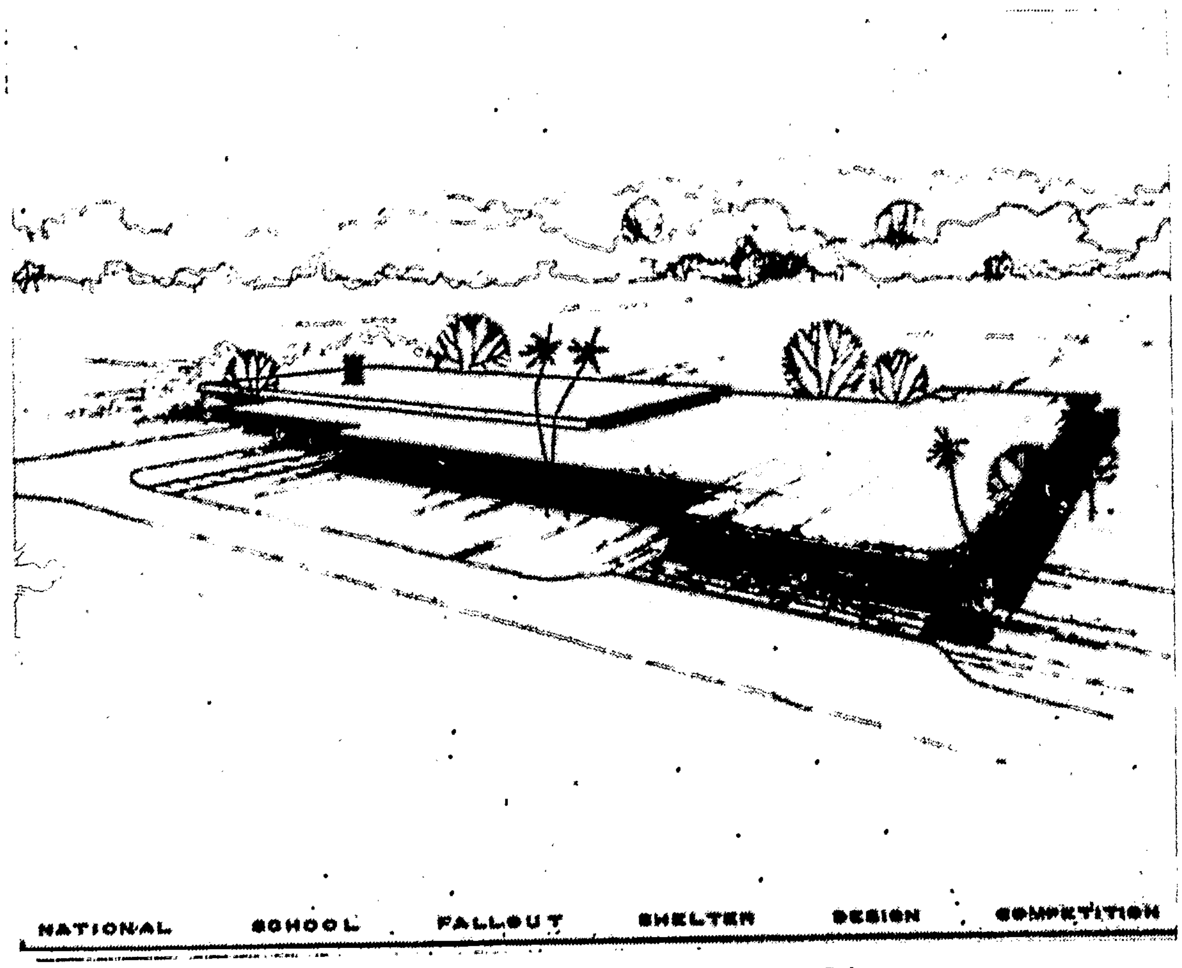
Picture No. 6 — View of Region TWO First Prize

Picture No. 6, designed by Joseph Baker & Associates of Newark, Ohio, is a delightful little school which would be an asset to any community. It is a one-story above-ground concrete structure with a capacity of 330 students during normal use and 660 persons during emergency shelter use. It has a delicate refined quality which covers an efficient shelter core.



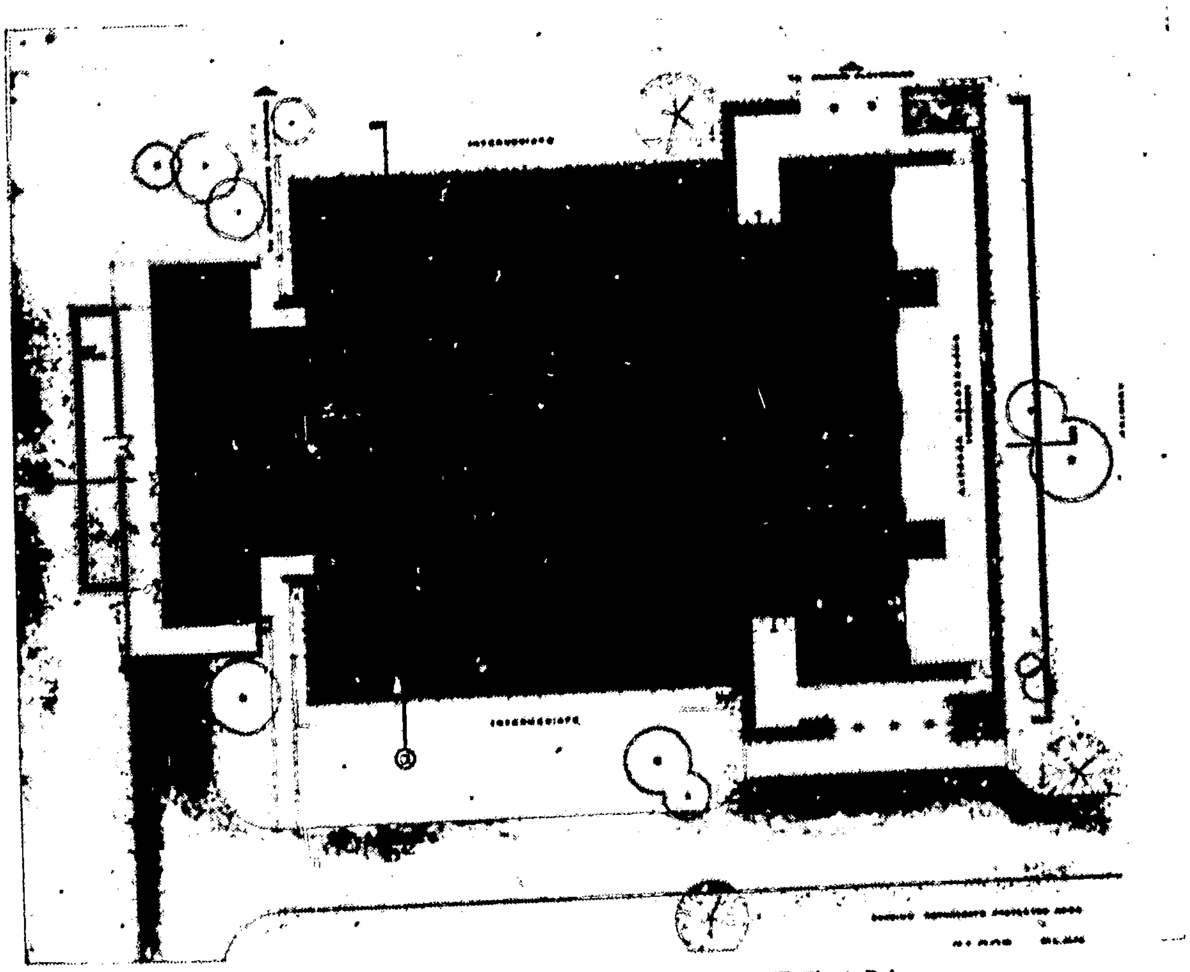
Picture No. 7 — Plan View of Region TWO First Prize

Picture No. 7 classrooms are located along the east and west exterior walls of the school. The fallout radiation protection is achieved by the use of a heavy concrete roof and walls surrounding a shelter core. The core provides a spacious, open activity – circulation area, together with all required services, for normal use. As a shelter area, it is well developed and well baffled at the entranceways so that a high protection factor well in excess of competition requirements is achieved.



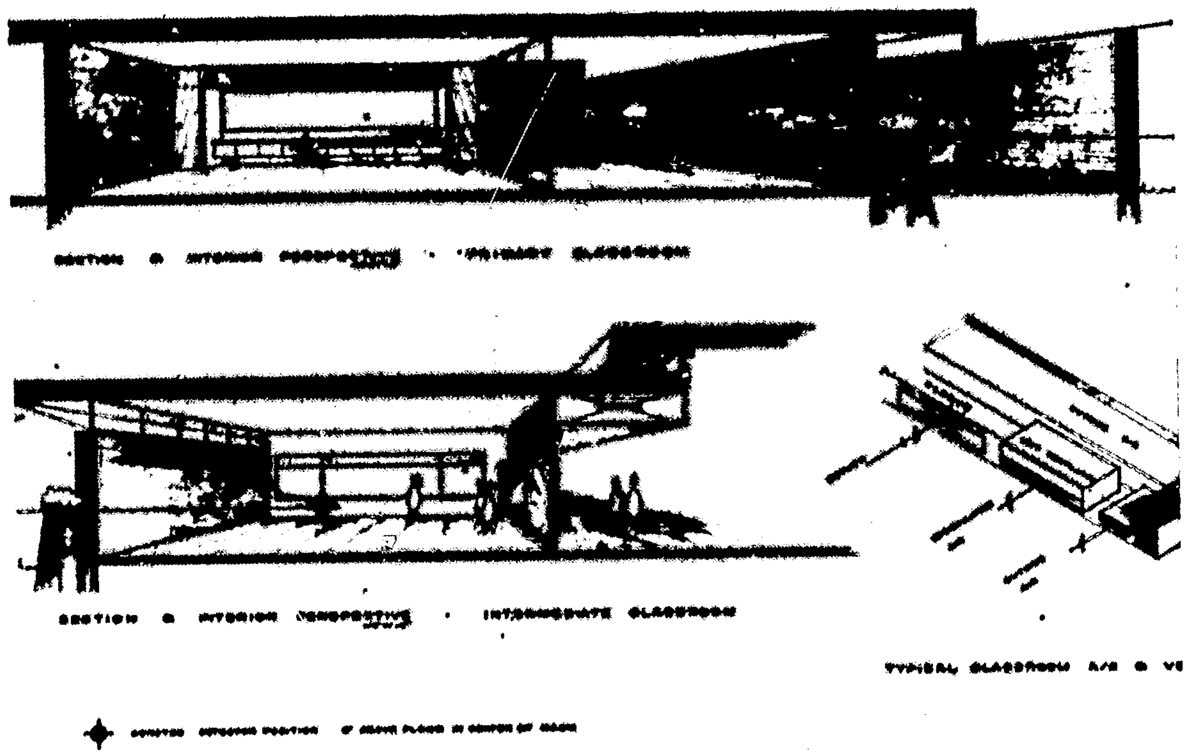
Picture No. 8 — View of Region THREE First Prize

Picture No. 8 is a single one-story school designed by Francis E. Telesca, Miami, Florida for an area in South Florida with an average ground water table fairly close to the surfce. During normal usage, the school houses 375 persons. The building has high window sills combined with an exterior planter box almost completely surrounding the school.



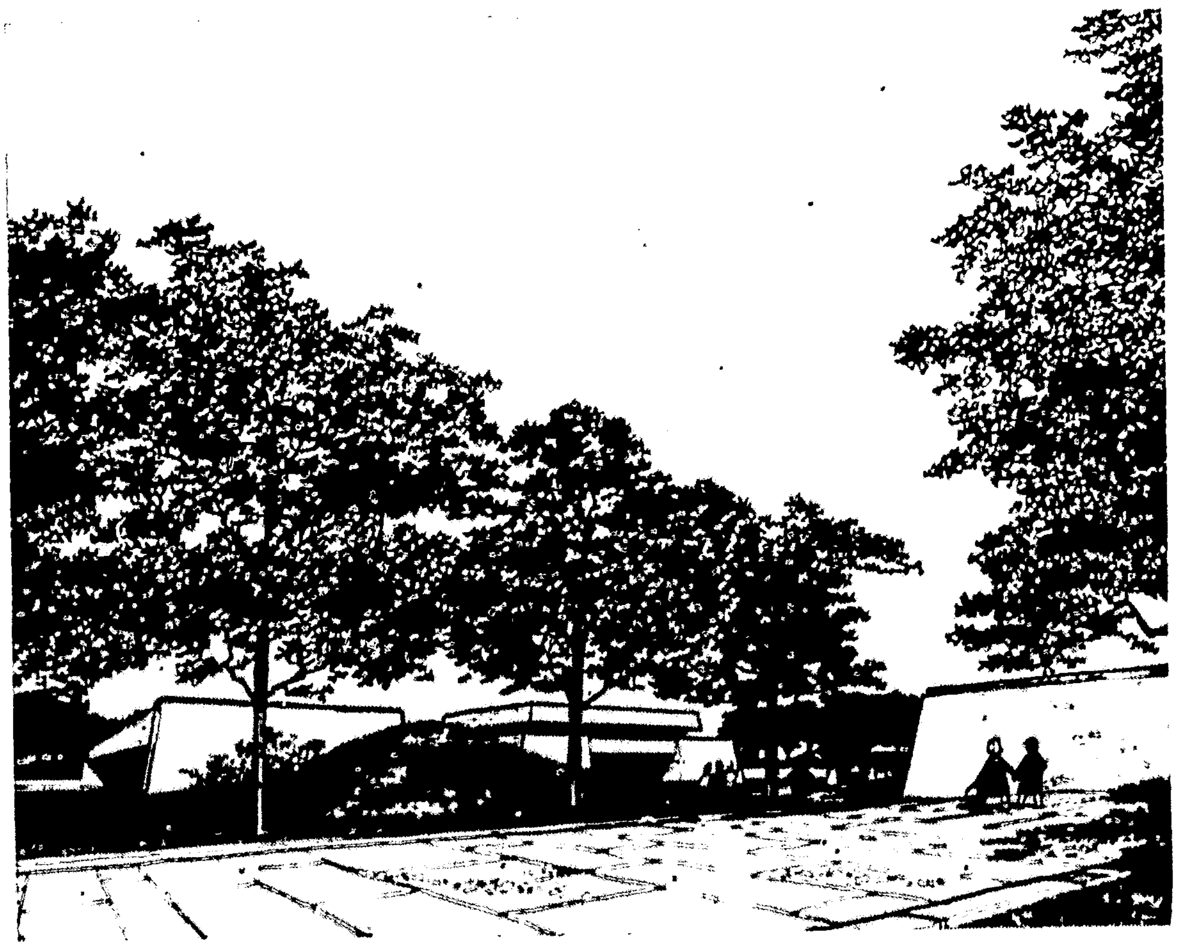
Picture No. 9 — Plan View of Region THREE First Prize

Picture No. 9 is the plan view of the building. Note how the classrooms are arranged as well as the service facilities. The primary classroom on the right side are shielded by an exterior screen wall, a planter box and a covered play area. The entire building, which uses glass extensively, becomes shelter area. The shelter area can accommodate up to 1900 persons. The building is a light, airy, open structure which always has a view to the outdoors. In addition to providing an efficient, high capacity shelter, this scheme is not heavily dependent on mechanical ventilation and could serve well even if power were not available.



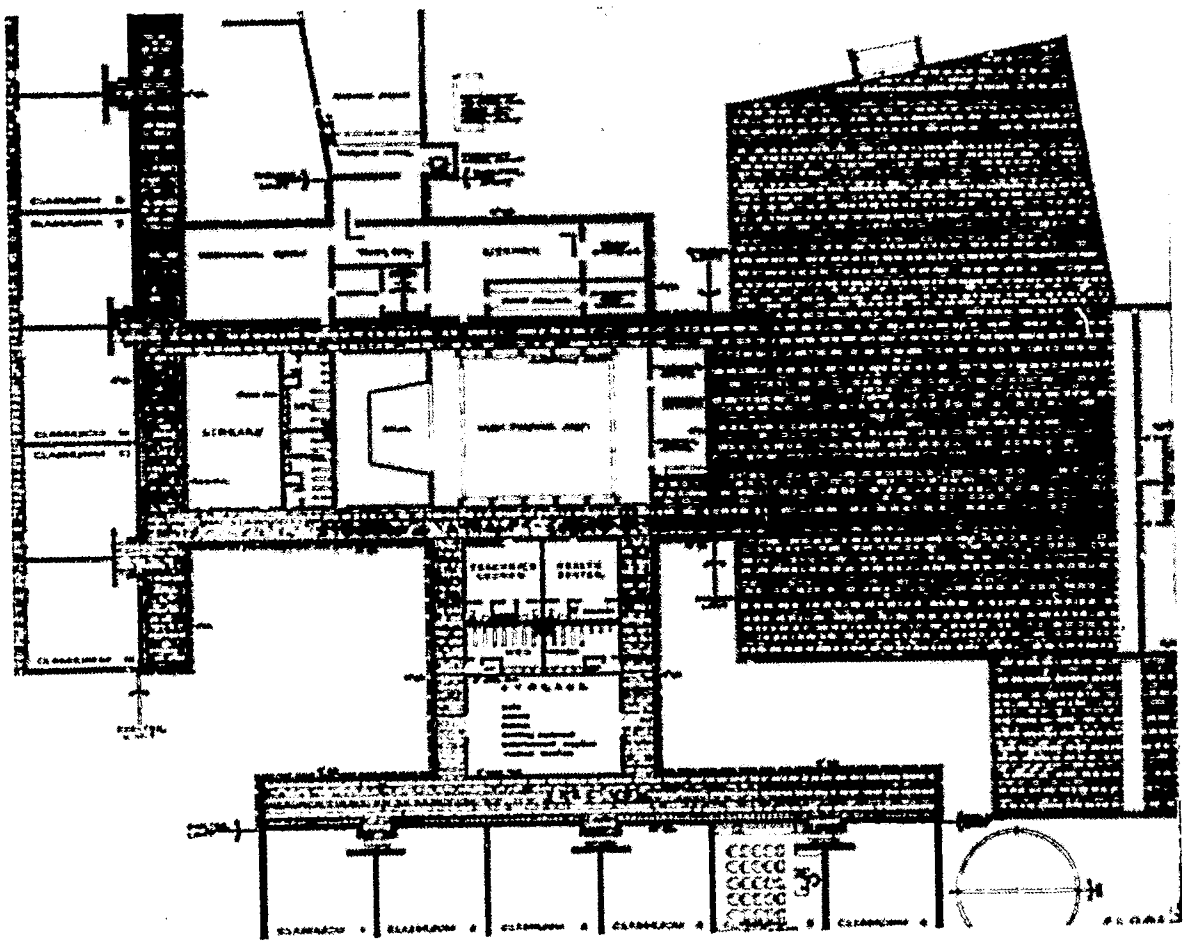
Picture No. 10 — Section View of Region THREE First Prize

Picture No. 10 fallout protection concept developed in this school is considered to be the most intriguing of the competition. The classroom windows are up high and clearstory windows, lighting the central area of the building, are shielded by a deep overhang. The planter box exterior walls and concrete roof provide the shielding against the radiation. The designers have placed the shielding material where it is most effective, yet have maintained lightness and openness.



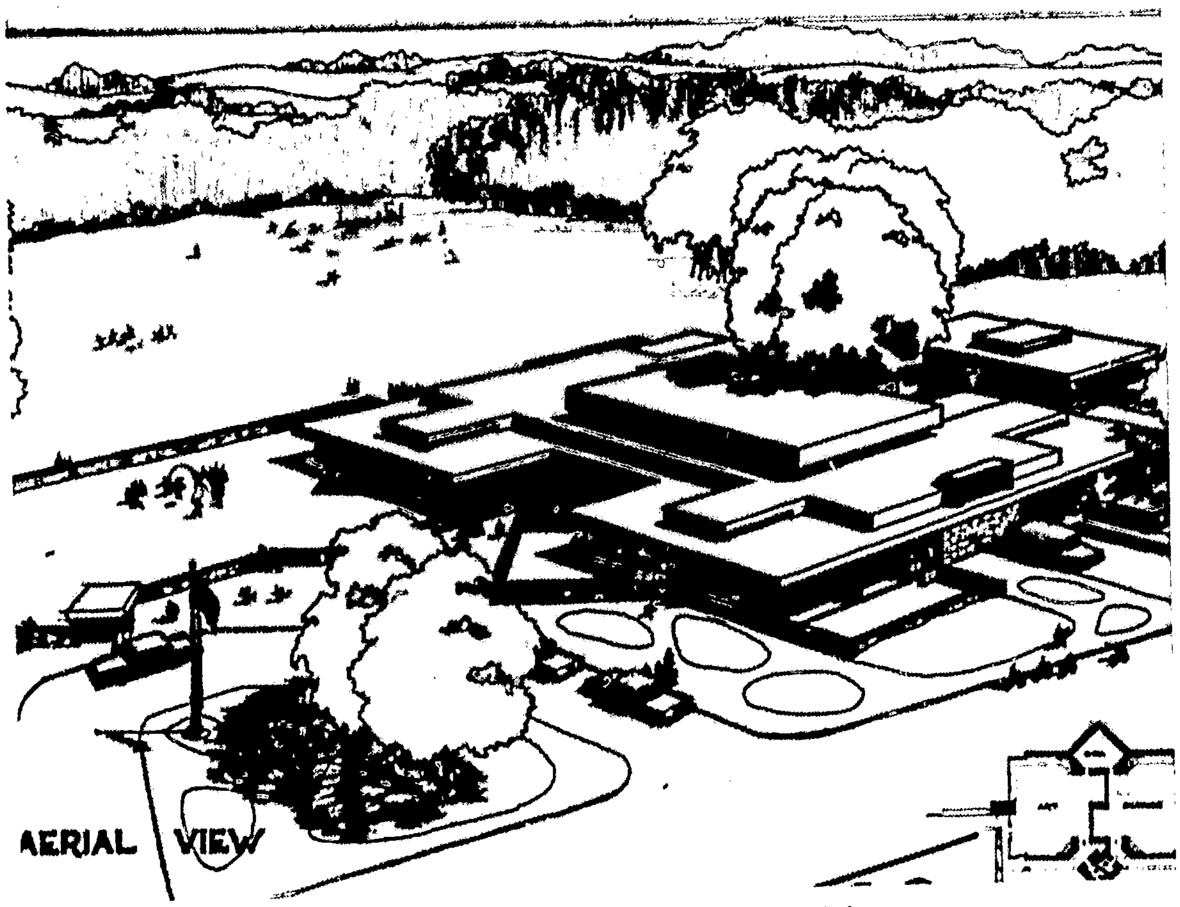
Picture No. 11 — View of Region FOUR First Prize

Picture No. 11 is a very interesting concept in which an above-ground school is combined with under-ground shelter area, and all on the same level. The school was designed by Brian Crumlish, Urbana, Illinois for a student population of 350 and a shelter capacity of 1100. As a school, it is extremely simple and well organized. The exterior is somewhat massive and imposing however, it is very much in character with the under-ground concept and provides a high degree of openness for instructional spaces.



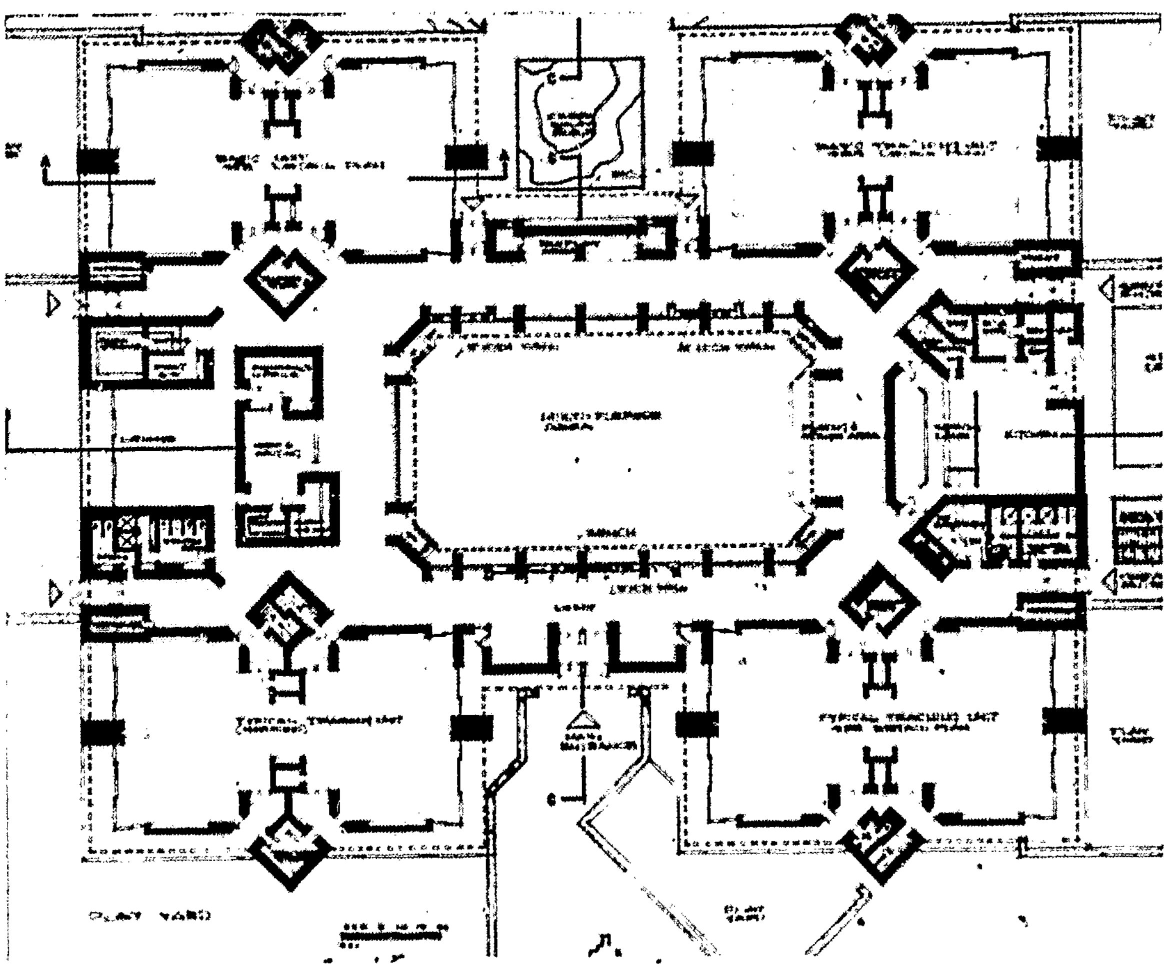
Picture No. 12 — Plan View of Region FOUR First Prize

Picture No. 12 is well organized as a shelter. The classrooms on the south and west sides of the building are above-ground and glass is used extensively. A two-foot earth cover over the central portion of the building containing the multi-purpose room, library and service area provides the necessary shielding for shelter. The multi-purpose area has a high, well-screened clearstory which provides natural light and ventilation in a portion of the shelter area. Notice how the classroom entrances are baffled to provide shielding to the central area. The basic design concept includes use of all conventional service areas (toilets, kitchen and health center) within the protected area.



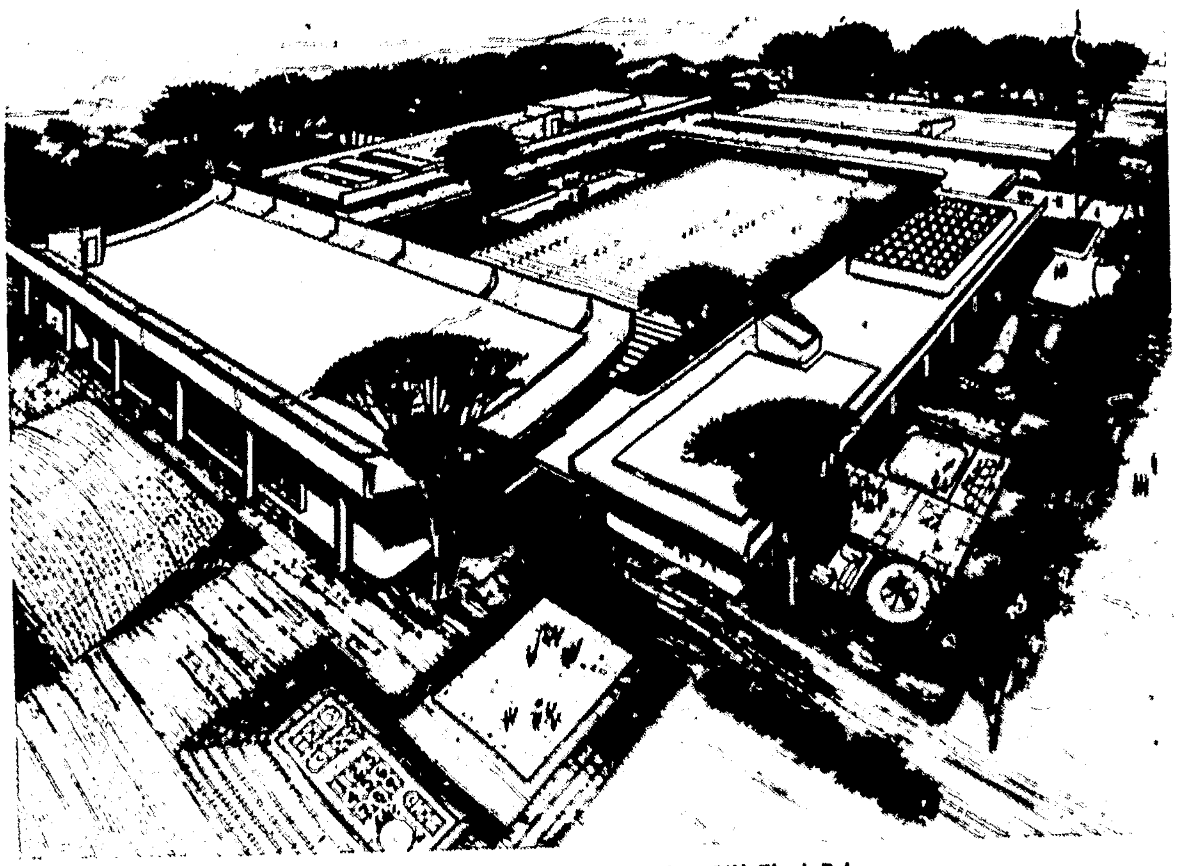
Picture No. 13 — View of Region FIVE First Prize

Picture No. 13 was designed by Robert F. Coffee of Austin, Texas. It was conceived to house 400 children and tailored for contemporary teaching methods, yet flexible enough to meet the changes of future concepts. Low screen masonry walls surrounding the building provide some shielding as well as esthetic appeal.



Picture No. 14 — Plan View of Region FIVE First Prize

Picture No. 14 shows four highly developed "teaching units" located at the corners of the building surround an open central multi-purpose area and the service areas. A very simple, well organized school is thus created with exciting vistas and space relationships. The creation of the protected area is of interest. Here is a completely open shelter area with a clearstory above. The shielding required is obtained through the careful placement of heavy masonry piers, sections of ceiling, high wall and low screen walls. The depressed floor in the multi-purpose room provides further inherent protection from the ground direct contribution by placing occupants below the path of the direct radiation from the ground. Natural ventilation further enhances the use of the 900 shelter spaces during emergency conditions. This design is an ingenious concept which totally eliminates any closed-in feeling, and at the same time provides excellent school and shelter facilities.



Picture No. 15 — View of Region SIX First Prize

Picture No. 15 designed by Neil Astle of Omaha. Nebraska for a capacity of 500 students is a very interesting development of a multi-level, below grade skylighted space. An ingenious and effective skylight covering a central at-grade court, lights two levels of instructional space and also serves as a shield against radiation. The use of earth berms strategically located around the building also serves as a shield.

V. School Shelters Today

The design concepts resulting from the competition clearly show that fallout shielding for elementary schools can be achieved in varied and imaginative ways without sacrificing educational or esthetic requirements. The concepts demonstrate that shielding can be unobtrusive with the facilities conveying a feeling of openness combined with natural lighting. It would be difficult for the layman to recognize these schools as shelters. Some individuals may not care for the design of any one school, but these designs can be altered and adapted to meet most any particular requirements of local school boards and school administrators.

After the competition, several of the winning designs were subject to a cost analysis to determine the added cost attributable to incorporation of the shelter features and further, to determine if we could identify with some precision, those added structural, mechanical or electrical components of the total building responsible for the creation of the shelter. Based on these studies we found that the costs of the designs you have seen today range in price from $14.00 to $19.00 per square foot and this compares favorably with current costs for new elementary schools. The costs directly attributable to shelter varied from below $2.00 to as much as $3.00 per square foot of shelter area.

In a subsequent cost analysis on industrial plant designs incorporating shelter, which was the result of the Rice University Industrial Architecture Design Fete, an almost identical range of shelter costs were obtained. The cost of shelter in 5 different industrial plant designs varied from $1.52 to $4.33 per square foot of shelter space, or from $0.08 to $0.56 per square foot of overall plant area. This range in cost figures is typical of what you can expect when shelter is provided during the initial design phase.

Some school construction groups have objected to providing shelter features in schools on the basis that shelter and educational requirements are not compatible in one dual use structure. While these objections may have been pertinent at one time, they are no longer valid. Educational concepts and building criteria are continually being adjusted to incorporate technical progress. The results of the Design Competition have clearly demonstrated that you need not have an underground, windowless box to provide shelter. Educational consultants who have reviewed the award-winning school designs have stated that superior schools can be built in which some of the educational space can be utilized in time of emergency as a fallout shelter without compromising the quality of the educational environment. As a result of reducing costs of air-conditioned schools, many buildings are being built today without provision for shelter, that have far less windowless space for instructional purposes than do the award-winning designs.

Other school groups are concerned about financing school shelters inasmuch as school financing authority is designed solely for the education of children. These concerns overlook the fact that today's educational plants already include protection from both natural and man-made disasters. It is inconceivable to think of a new school being constructed without one or more sprinkler systems, fire alarm systems, non-slip floor surfaces, safety valves on boilers and other heating and ventilating equipment, wire glass windows and countless other items. We have come to accept these protective devices as part of our everyday existence, and in fact, we insist on having them incorporated in our school buildings. Is protection against fallout gamma radiation any different? The day is approaching when fallout protection will be as non-controversial and as commonly accepted as the protective devices I have noted.

(Continued on Page 417)

Wherever possible, efforts should be made to avoid diverting substantial amounts of school construction dollars for shelter. It must be remembered, however, that providing protection for our school children is a responsibility to be shared by all levels of government; Federal, State and local. The results of the design competition have shown how to incorporate shelter in new school construction for little if any increase in costs.

There is now a Bill called HR 8200 awaiting congressional approval, which would authorize federal payments to non-profit institutions to State or local governments which provide shelter space in their buildings or on their property. The proposed assistance would be available for schools, colleges, hospitals, libraries, police and fire stations and other public character buildings. Financial assistance for shelter development will be based upon the amount of acceptable shelter space created and made available for public use in an emergency. Payments will be set at $2.50 per square foot or actual cost, whichever is less.

After holding extensive hearings and listening to the testimony of 108 witnesses, this proposed legislation has been reported favorably by the House Committee on Armed Services. We hope that it will be approved by both the House and the Senate. Should the proposed legislation be enacted into law, it would certainly go a long way to assist the school boards in obtaining shelter in their schools. The Federal Government will have taken the initiative and displayed its leadership in implementing the National Shelter Program.