GRANITE STATE

JANUARY-FEBRUARY, 1966

ARCHITECT

FIFTY CENTS

GRANITE STATE

ARCHITECT

VOLUME 11 NUMBER 6

JANUARY-FEBRUARY, 1966

TABLE OF CONTENTS

Pictures of design award winners announced at the annual meeting of the New Hampshire Chapter of the American Institute of Architects are featured in this edition beginning on page six. An exhibit of the design winners will be open to the public at the Union Building in Durham for three weeks starting February 9; at Hunt Memorial Library, Nashua, for three weeks, starting March 1 and at the Hopkins Center, Hanover, for three weeks starting April 15.

Front Cover: Entrance to St. Raphael Church, Manchester. Photograph by Walt St. Clair.

GRANITE STATE ARCHITECT is published bi-monthly under the direction of the president and board of directors of the New Hampshire Chapter American Institute of Architects and is the official publication of that chapter. Advertising rates furnished upon request.

FIFTY CENTS A COPY THREE DOLLARS A YEAR

Notes And Comments

HIRING architects on an "in-state" basis in federal building projects has resulted in greater participation by smaller firms and has produced designs suitable to the various regions of the country, Bernard Boutin, Deputy Director of the Office of Economic Opportunity, told members of the New Hampshire Chapter of the American Institute of Architects at the annual meeting.

Mr. Boutin, whose career has progressed from a real estate office in Laconia to his present position in less than a dozen years, has also served as Executive Vice President of the 43,000-member National Association of Home Builders, the position he held when the speaking engagement was arranged. Prior to the NAHB appointment, Boutin, a one-time mayor of Laconia, was first Deputy, then for three years Administrator of the General Services Administration, having been appointed by President John F. Kennedy. In this latter position he supervised the work of some 37,000 GSA employees and had custody of assets exceeding twelve billion dollars. His responsibilities included management and construction of federal buildings throughout the nation.

During his GSA service Mr. Boutin worked closely with President Kennedy to raise the architectural standards of federal buildings from the traditional mediocrity toward a goal of creative excellence. Boutin spoke of low quality government building design as "the stone mausoleum approach." He said these buildings seem to symbolize an impersonal government preoccupied solely with its own operation rather than a concerned human government involved in the welfare of all the people.

Appointment to a special Presidential committee to study the subject brought him the opportunity to examine the whole nature and over-

(Continued on Page 32)

Design Award winners were selected by a panel of judges including (left to right) Richard Brayton, Morse Payne, Roman Zorn and The Right Rev. Msgr. Thomas S. Hansberry.

Exhibit 1965

(Left) Bernard L. Boutin, Deputy Director of the Office of Economic Opportunity, and John A. Carter of Carter & Woodruff, Nashua. Mr. Boutin was the principal speaker at the annual meeting of the New Hampshire Chapter of the American Institute of Architects.

Photo by Dick Smith

Kennett High School addition, Conway — Frank Kennett, Jr., Architect.

First Award

Broad St. Elementary School, Nashua — Carter & Woodruff, Architects. *Photo by Joseph W. Molitor*

Second Award

Third Award

Holy Redeemer Church, West Lebanon – W. Brooke Fleck, Architect, Edward C. Lewis, Associate in Charge.

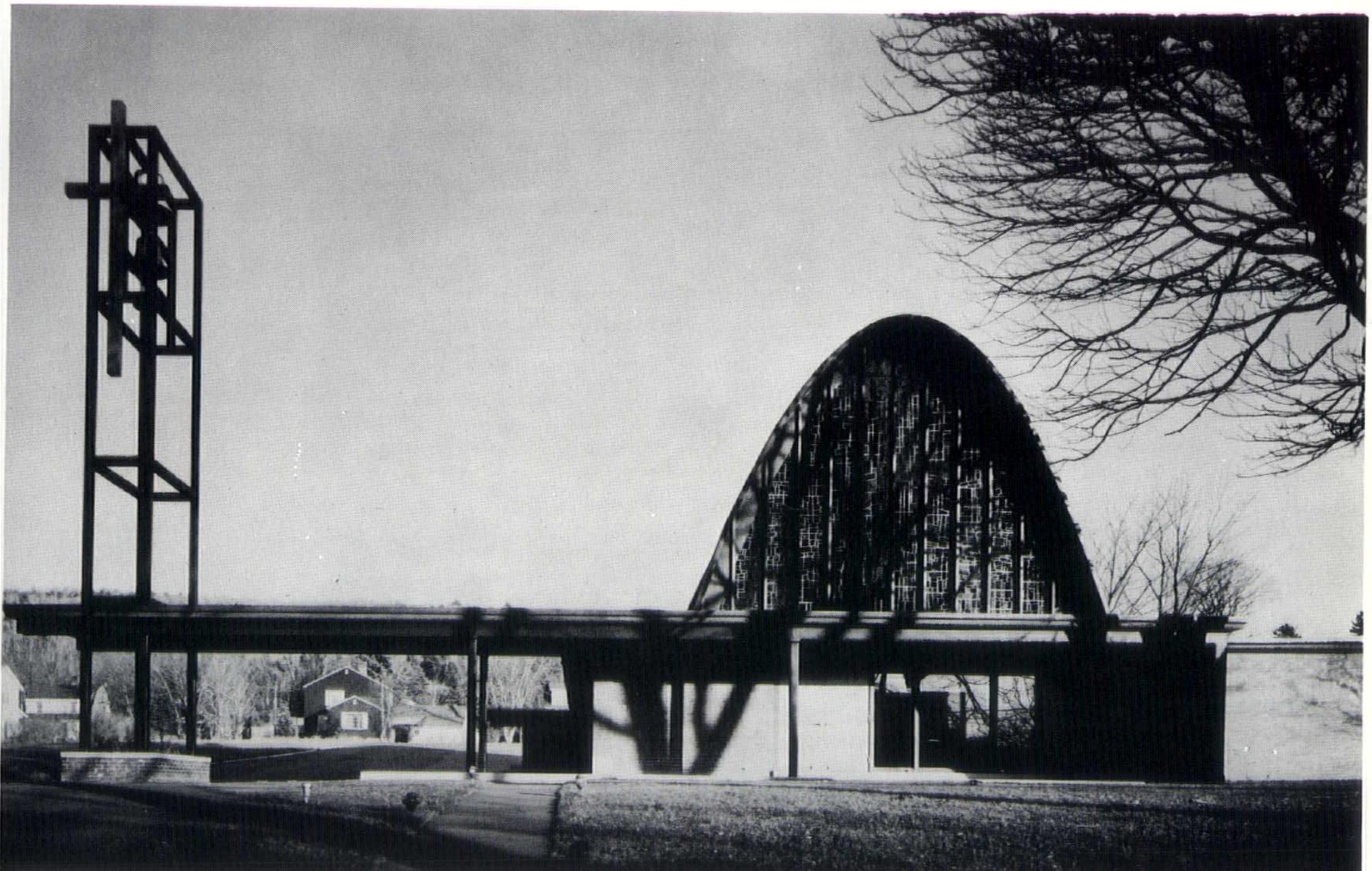


Photo by Walt St. Clair

Mention

Alministration Building, Roman Catholic Diocese of New Hampshire – Koehler and Isaak, Architects.

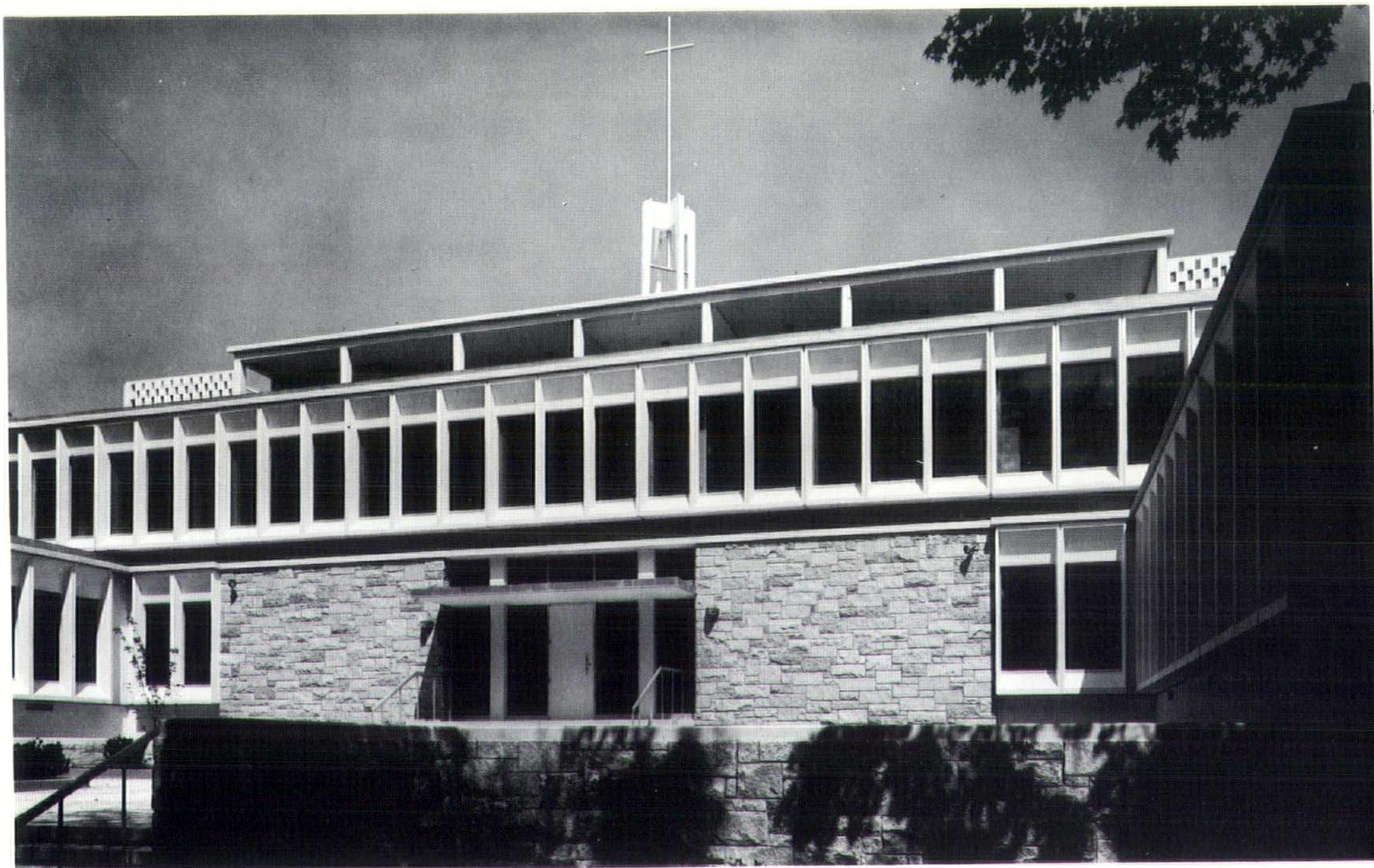


Photo by Eric Sanford

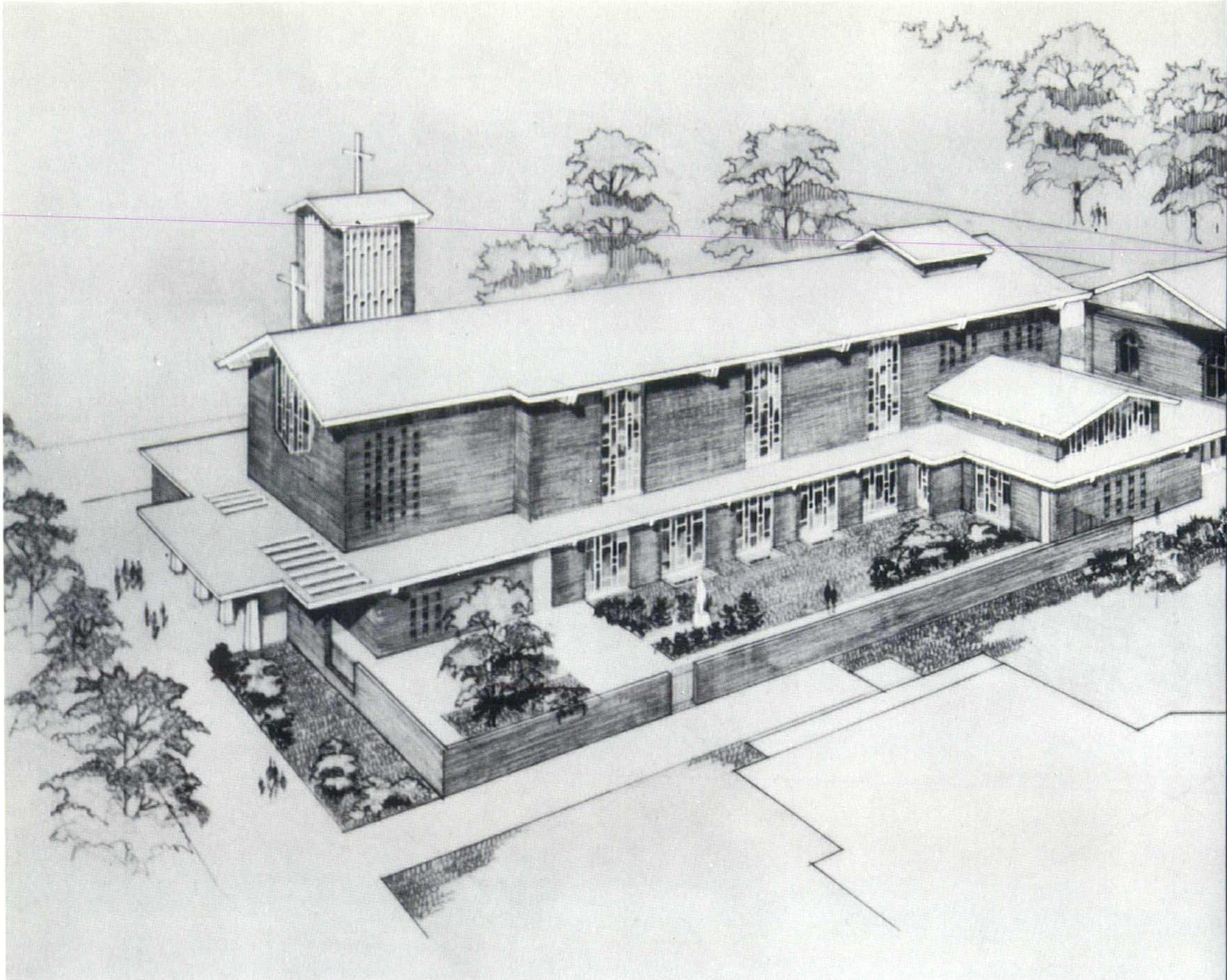
John A. Carter, President of the N.H. Chapter of the American Institute of Architecture, presents Norman H. Cotton, center, of the MacMillin Co., the A.I.A.'s award for excellence in workmanship in the recently completed First Baptist Church, Keene. Looking from the left, John R. Holbrook, a director of the A.I.A.; Hugh Q. Morton of the First Baptist Church and Arthur M. Doyle of the A.I.A.

AMONG the more significant highlights at the recent annual meeting of the New Hampshire Chapter of the American Institute of Architects was the presentation of its Workmanship in Construction Award to the MacMillin Company. The presentation was made by the Honorable Oliva Huot, member of the U.S. House of Representatives.

The award jury's task was made more difficult because the standards were so high among the eight projects submitted. Each nomination was considered an honor in itself, and the jury made every effort to visit each one for a complete first-hand examination. Both the public and members of the profession are invited to visit these design and construction award winners. By encouraging and recognizing superior workmanship, this entire awards program serves both Chapter and contractors, offering points of departure and orginality for future projects.

The workmanship competition made one salient point — that the architect cannot realize complete attainment of design unless his ideas have been fully executed by the contractors. A large portion of responsibility for details is in the realm of the latter's profession. There also must be a coordination or a blending of the sub-contractor's work. The ability of the contractor to strictly conform to the guidelines set forth by the architect is of primary importance.

Seemingly insignificant points of concern can make or break the final impact of a building, such as whether the trim of one wall precisely lines up with the trim of the next wall. All tiles should adhere properly. When specifications call for flush molding, it in reality must be flush. There must be no gently wavering lines. Attention to detail and exact translation of design, as specified, form in part the basis of awards such as that won by the MacMillin Company.

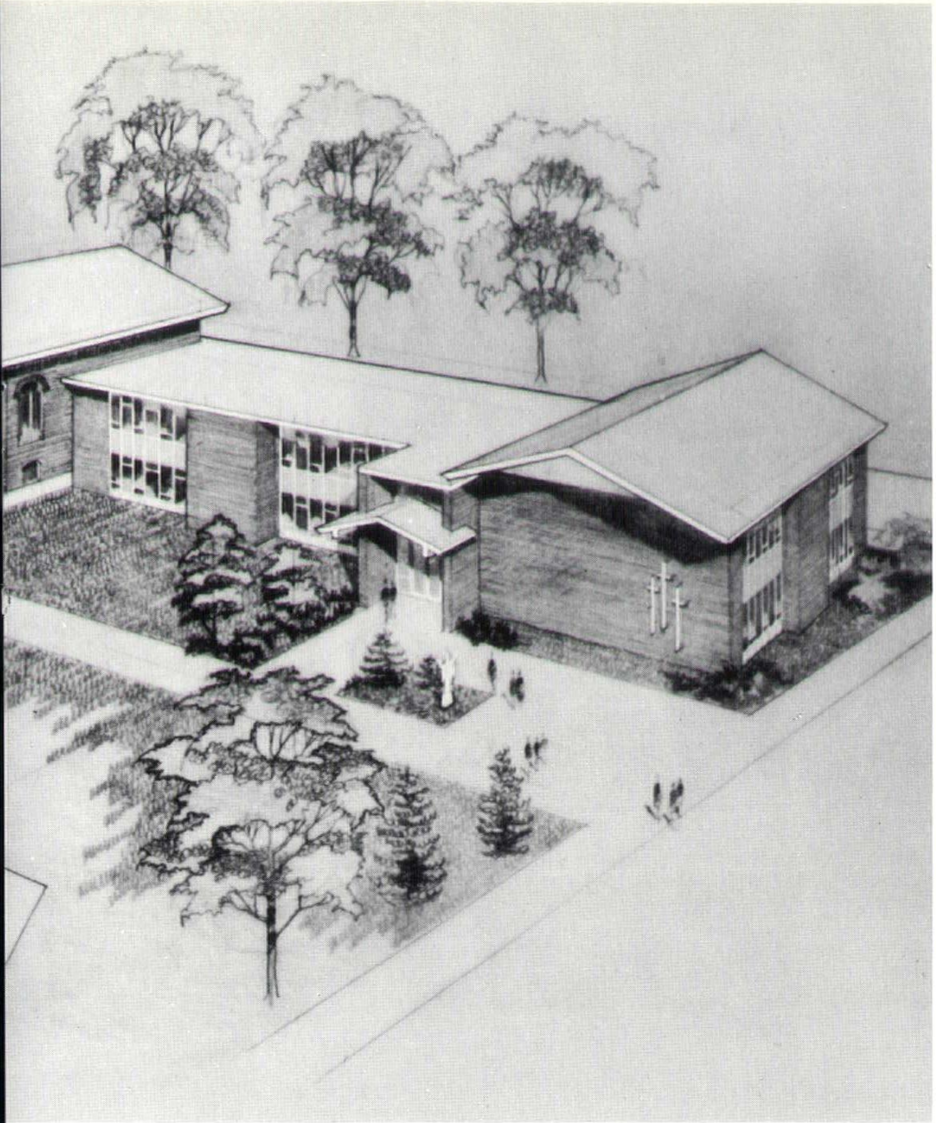


Incorporating the old church building the St. Raphael complex has as its focal point the belltower which faces a park and business s

St. Raphael Church and School

Manchester, N. H.

Architects — Church — Koehler and Isaak
School — Andrew C. Isaak
General Contractor — Blanchard Stebbins, Inc.
Photographer — Walt St. Clair



The over-all project was the result of the combined planning and design of both Koehler and Isaak and Andrew C. Isaak.

BUILDING a new church in a long-settled residential area presents some unique problems, for rarely does such an area provide a clear environmental character toward which a structure of this size can be keyed. This was the situation met in construction of St. Raphael Church and School in Manchester, N.H. Despite the problems the goal was accomplished, as the church-school now brings vitality to an older neighborhood and acts as a new focal point.

The small site was occupied by an old church which was inadequate for both church and school requirements of the present. The location, facing a park, was innately attractive. A street which once separated the property from the park has been closed, providing the church a closer relationship with the park as well as some welcome additional land.

Actually the limited site and its orientation in conjunction with the main street and park helped shape the building scheme. The old church was retained, but in a highly modified form. Two floors were removed and a new roof added that conforms to the overall design. This building will now serve administrative and educational needs, including that of physical education.

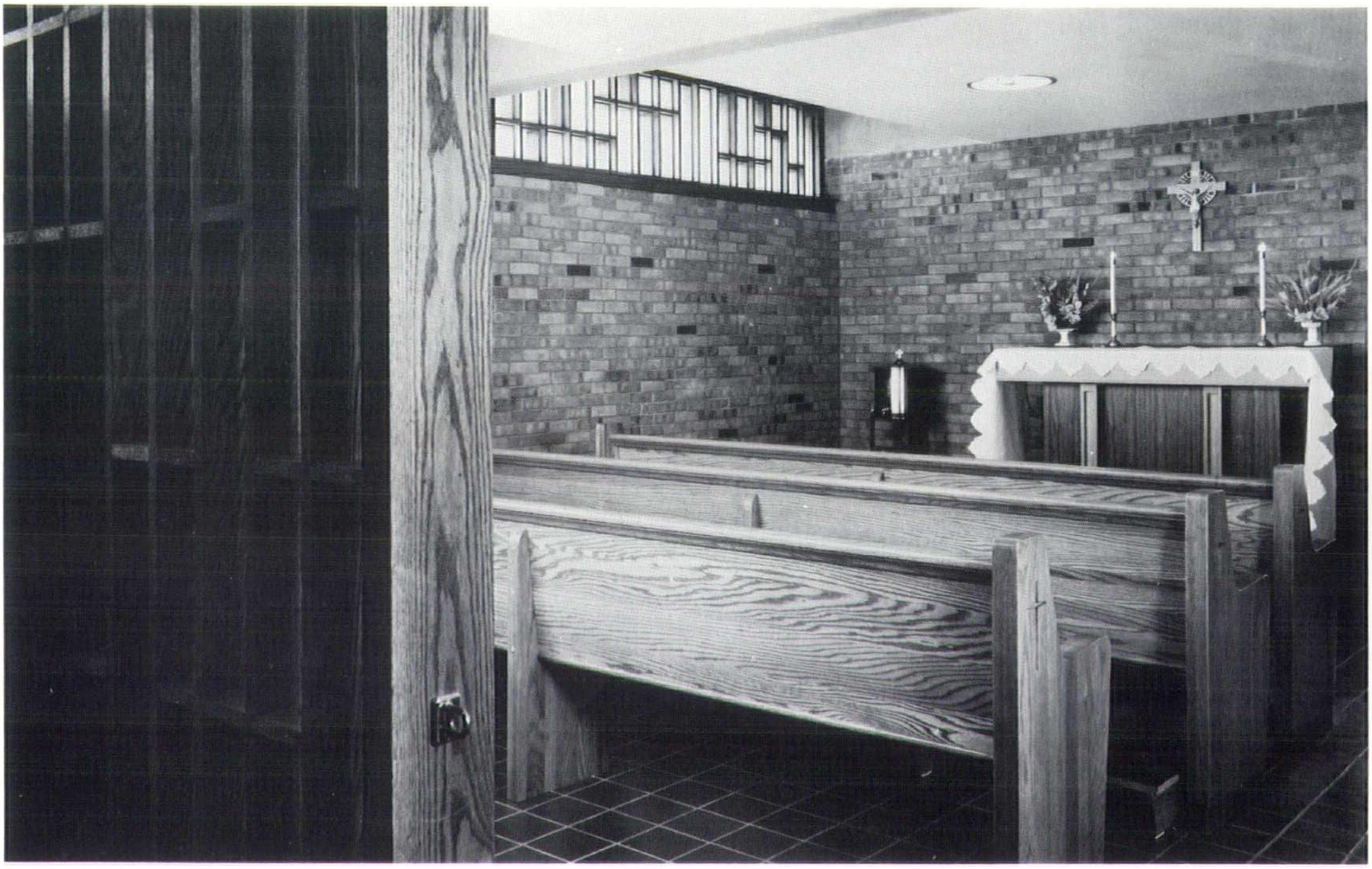
The new church, with gabled roof and bell tower, faces the park and business section. When viewed from the park and surrounding neighborhood the bell tower makes a fine new landmark.

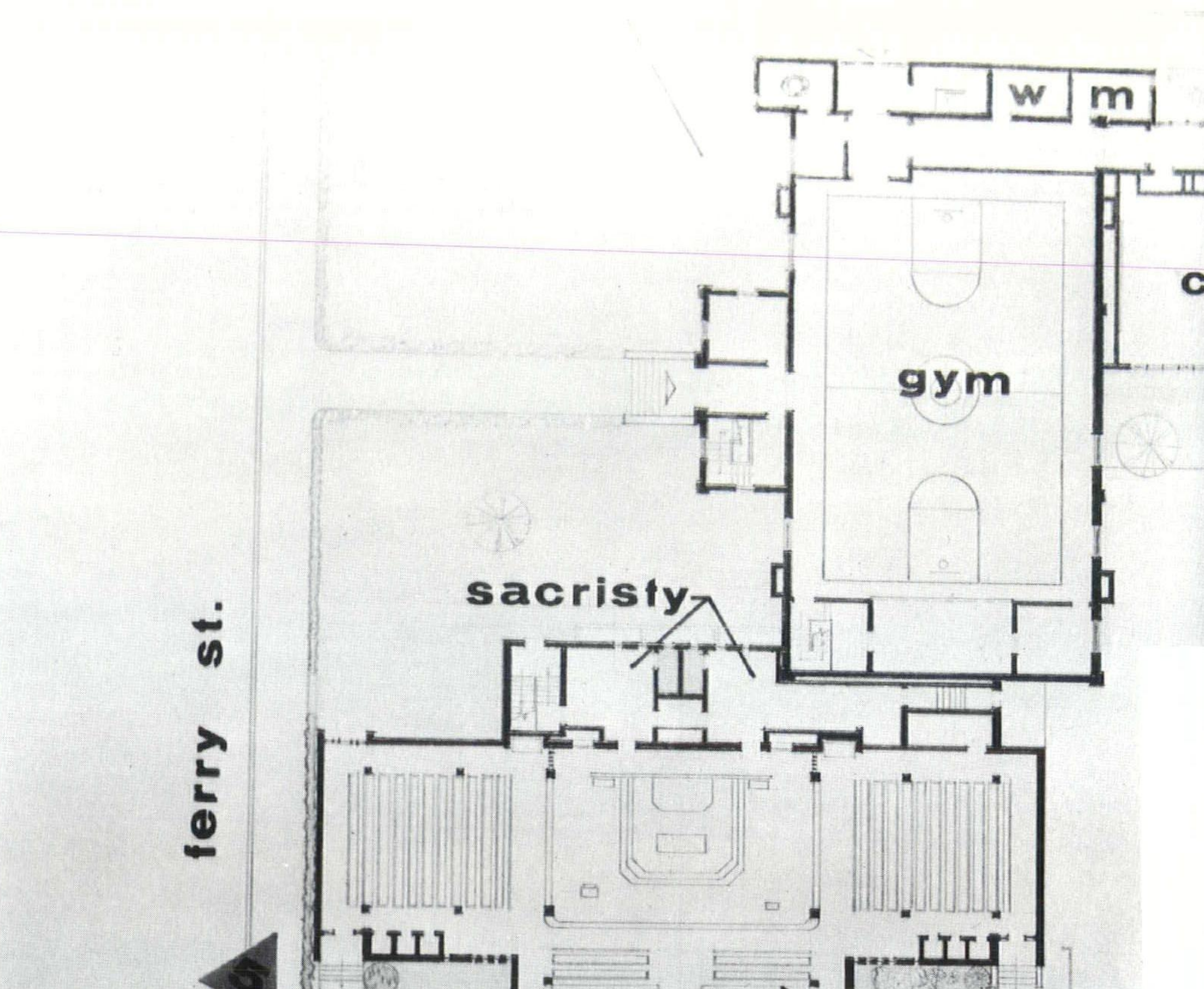
The architects were given a program that included eight classrooms and a chapel. Wisely they were given wide latitude in designing the interiors. This is important in that it provided the opportunity for complete design continuity. Most notable of the design elements carried throughout the complex is the sash pattern. This is first met in the bell tower and continues through the stained and cathedral glass in the nave and transept. The active pattern is picked up in the school decor but in a more subdued form. It is echoed in the vinyl asbestos flooring of the school, in the wood screen behind the altar, the chapel wood

(Continued on Page 34)

The nave, which seats 900, has brown l
walls, complemented by the stained, varni
wood plank ceiling and quarry tile f

Located just off the main entrance the chapel receives natural light from high windows.




w
m
c
gym
sacristy
ferry st.
5
8
nave
7
n
f
cry rm
e
chapel
baptistry

Left — The learning center provides a study workshop where students and faculty may function effectively as individuals or in groups. Handy study desks are placed so that natural light is available.

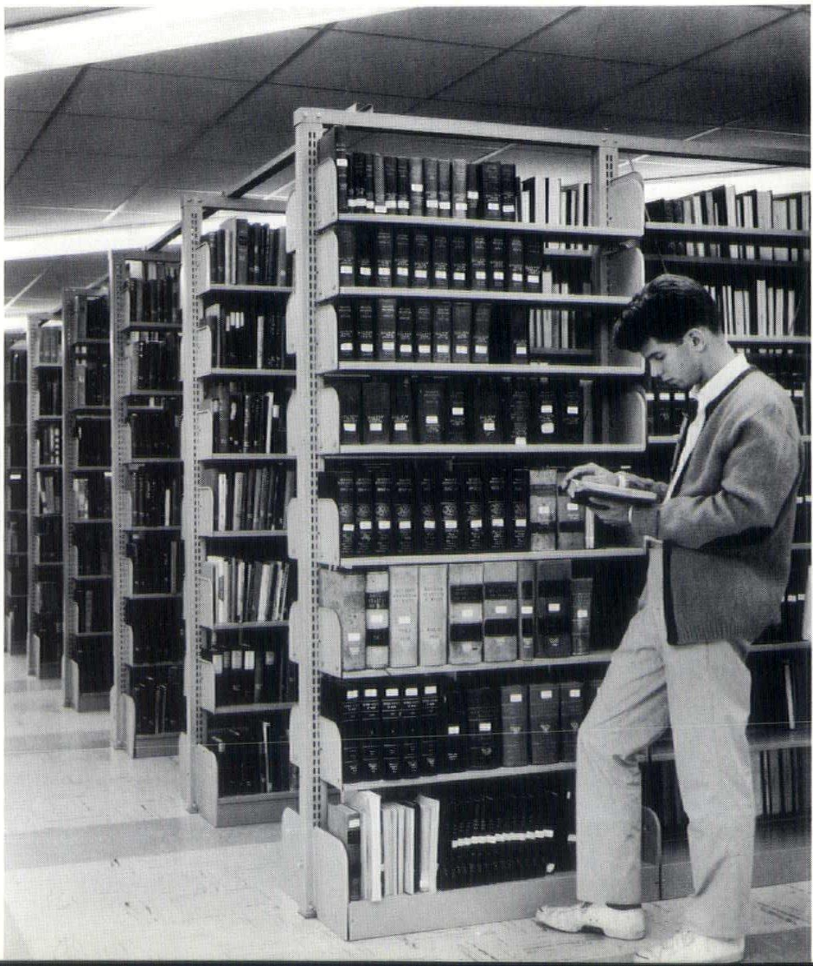
Below — The library section has 65,000 volumes in open stacks. Metal shelves are adjustable.

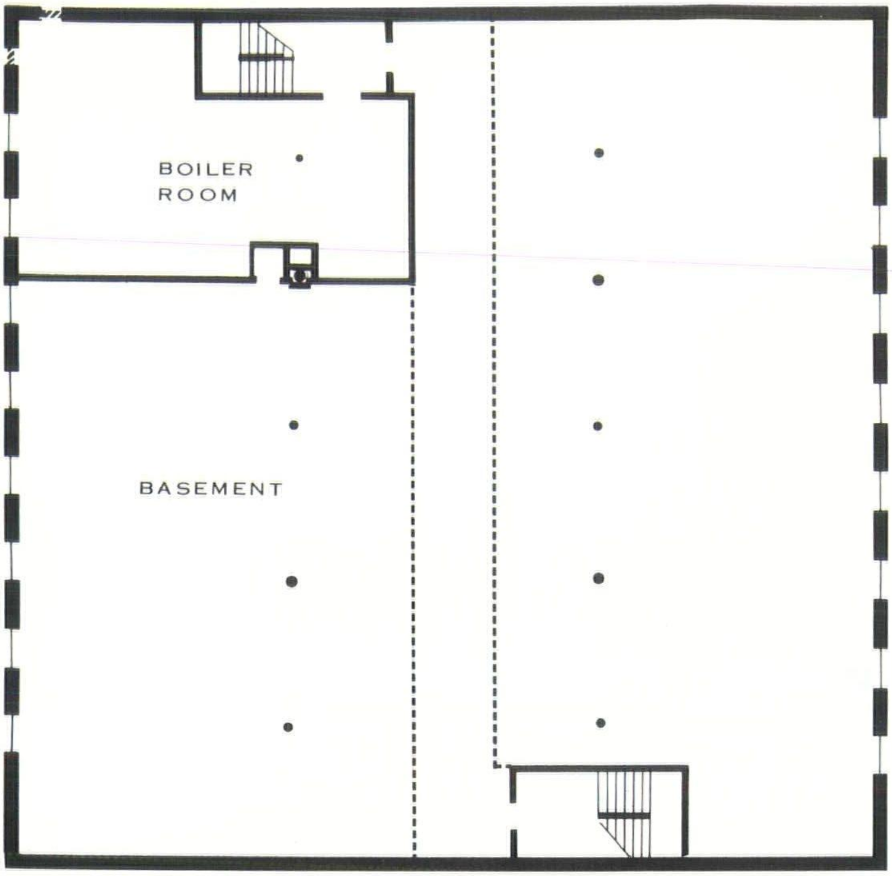
THE Learning Center at Nasson College, Springvale, Me., is just as its name implies, the scholastic center of the campus. It was planned to bring together many important sources of knowledge and to foster constructive thinking.

In the library section of the center are open stacks holding 65,000 volumes, but the building is more than just a storehouse for books. It provides a learning workshop where students and faculty may meet and work together in small or large groups, reading, viewing, listening, discussing and reflecting. Supplementing the books are speeches and specialized education programs recorded on tape, records, sound and silent films, micro film and there are plans for video tape for either individual or class study.

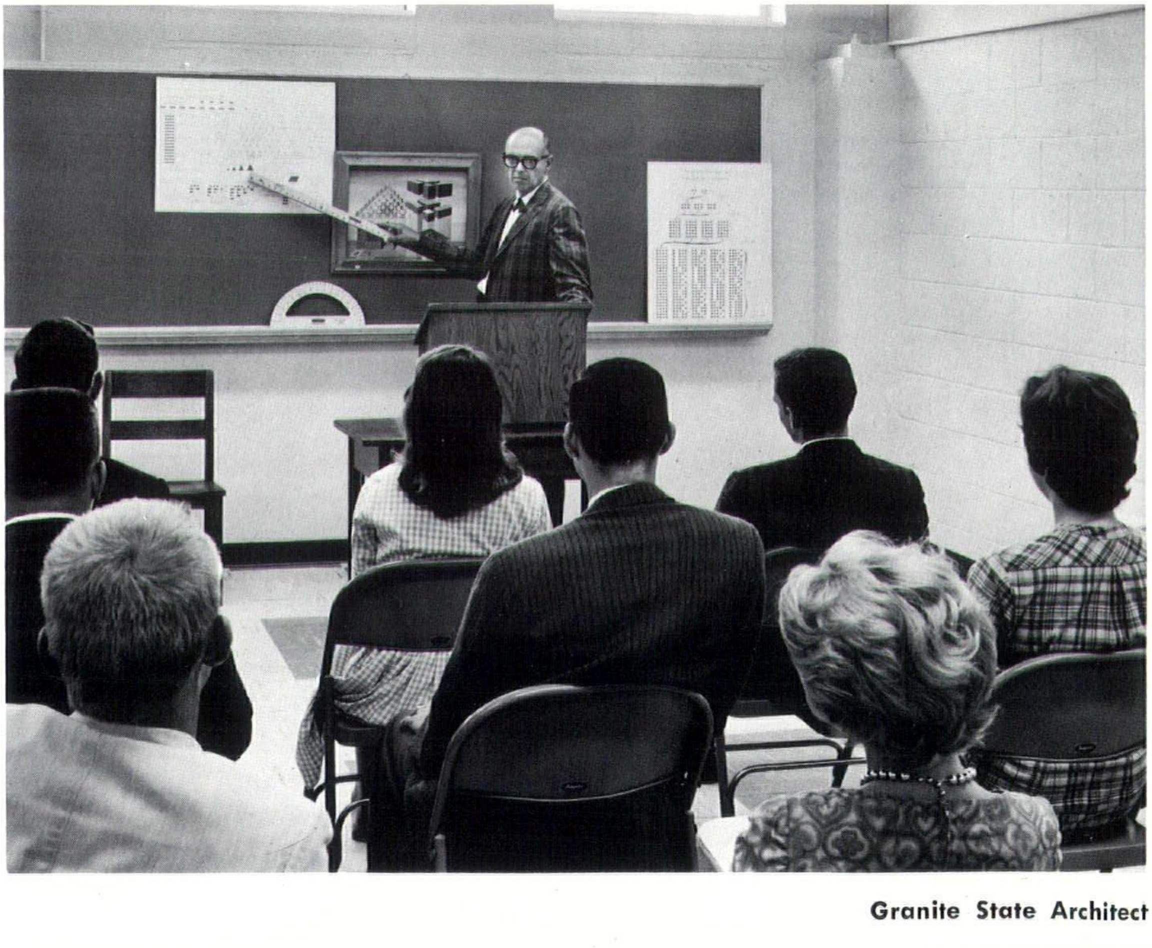
The language laboratory, as well as the video amphitheater and micro-film readers are arranged for either monaural or stereophonic listening. All these serve as tools in

Story *(Continued on Page 22)*

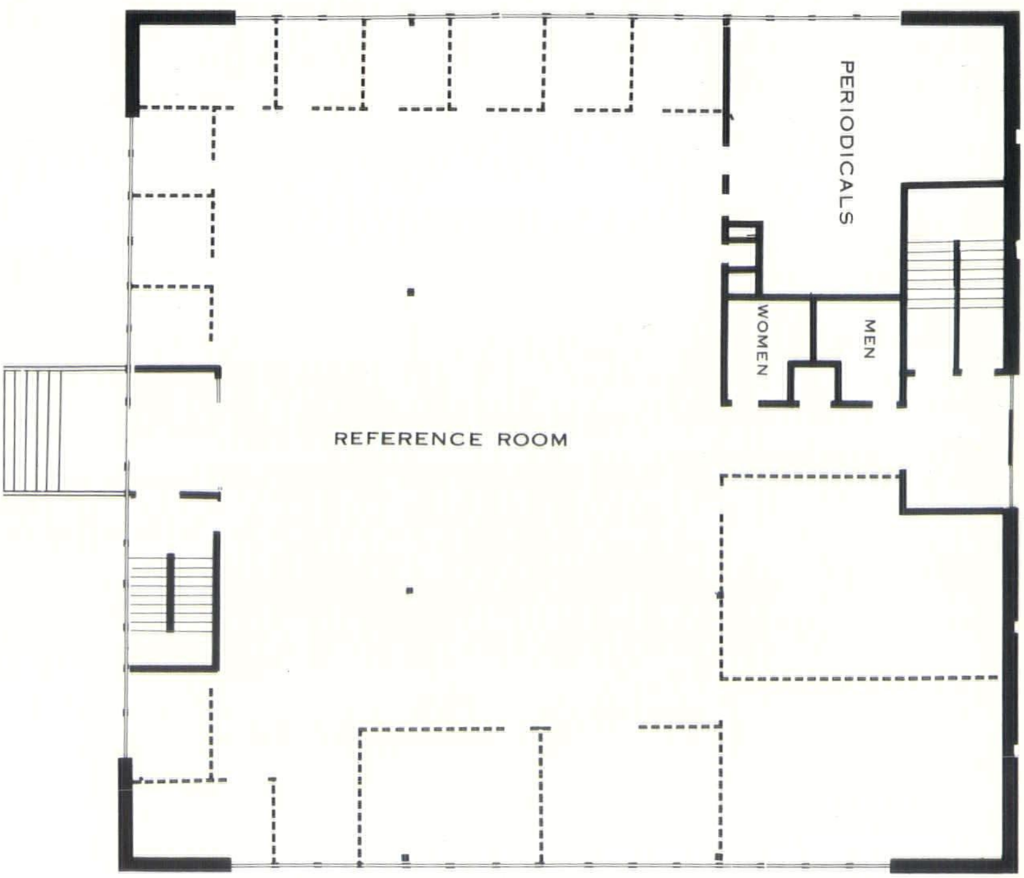


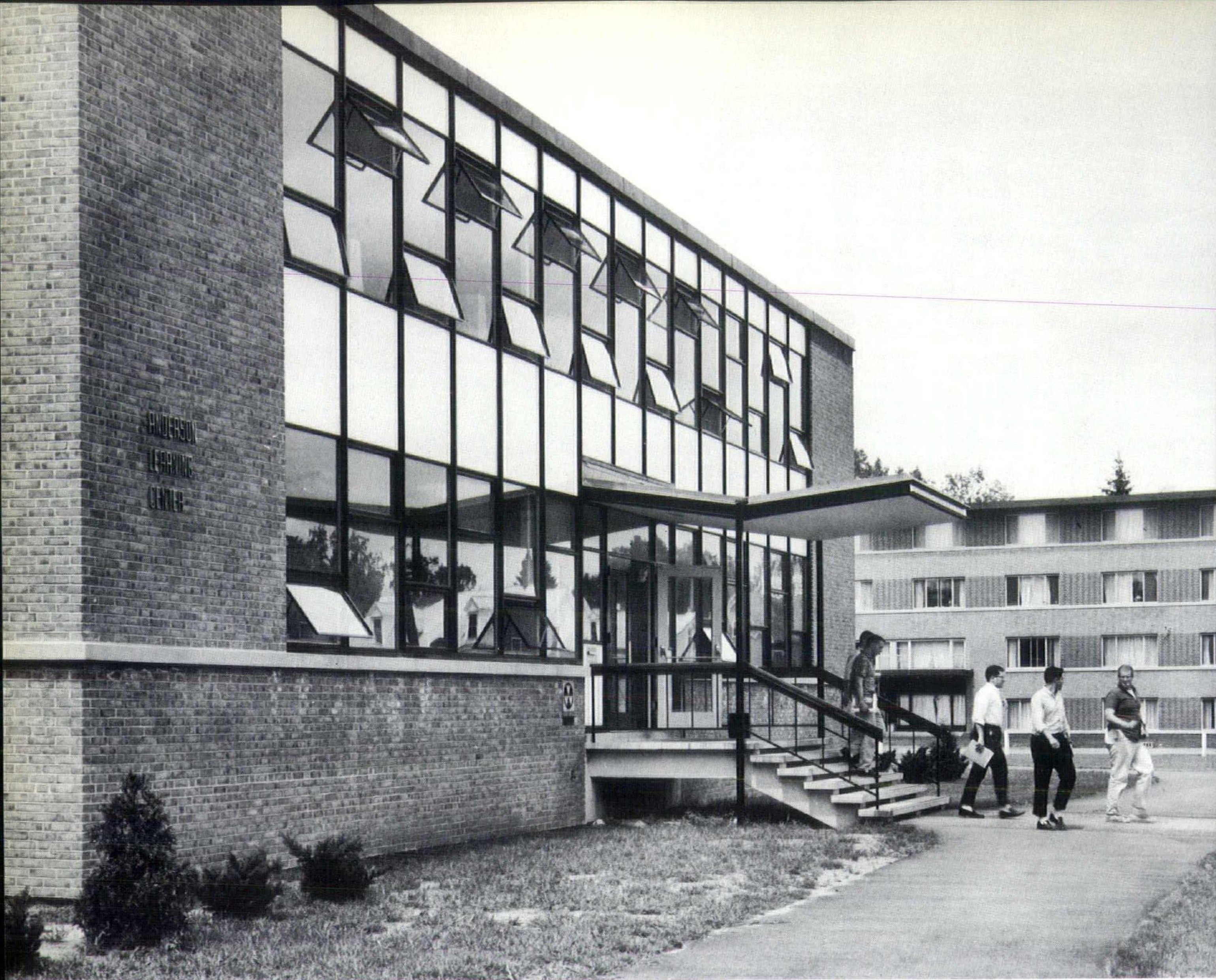


Tack boards of perforated hardboard are located conveniently in all classrooms and elsewhere throughout the building.



Cinder block and concrete walls in light reflecting pastels form permanent classrooms in the basement. Floors are of vinyl asbestos and the ceilings are acoustical tile.





End exterior walls are of brick with concrete block backing. Insulated glass and porcelain curtain walls from foundation to roof, corniced in between the corner pylons, complete the closure around the building.

Story *(Continued from Page 19)*
bringing to the students the sights and sounds which teach of the world in which we live.

The center is constructed on a concrete foundation, with cinder block walls forming an interior core of utility and toilet rooms. The end exterior walls are of brick with concrete block backing. Insulated glass and porcelain curtain walls from foundation to roof cornice in between the corner pylons complete the closure around the entire building. All other interior partitions are seven feet high and demountable. Floor covering is of vinyl tile while the ceilings are 24-inch squares of acoustical tiles suspended on T-bars. This type of ceiling permits easy access to the heating and plumbing lines and duct dampers concealed above it.

Tack boards of perforated hardboard are located conveniently on all floors for the display of educational material. Larger exhibits have been kept in mind in the inclusion of standing pegboards which may be used to sub-divide areas in the center. There are lavatories on each floor. The ground floor holds permanent classrooms. The interior walls are painted concrete block. The flooring is vinyl asbestos tile and the ceiling acoustical tile. These rooms may be used for lectures and offer handy access to the library and specific discipline areas.

The structural frame of the building is entirely steel: columns and spandrel beams with long span bar joists carry the floors and roof. The roof is of built-up fiberglass with a 25-year bond.

The construction cost approximated $180,000 with an additional $40,000-$50,000 expended on initial equipment. Additional equipment will be financed by a capital gifts campaign, a continuing program of the college's financial development.

Through the use of open modular construction, movable partitions and a minimum of fixed installations, the building can readily be expanded as future needs may determine.

The Civil Defense Shelter Program in N. H.

Noting that a U.S. Army Corps of Engineers survey revealed New Hampshire has only 185,000 approved fallout shelter spaces, built to accommodate a like number of persons, Gov. John W. King has released the following report on the status of a program of defense design courses for Granite State architects and engineers. Governor King has served as a member of the Governor's Conference on Civil Defense and Post Attack Recovery.

The Department of Defense, Office of Civil Defense, is engaged in a program to provide facilities to protect the population from radioactive fallout in the event of a nuclear war. The 185,000 shelter spaces surveyed by the Army Engineers have been marked, stocked with food, water and medical supplies to care for the designated number of shelterees for two weeks.

It is obvious that additional shelters are needed in New Hampshire and one of the most logical methods of obtaining the required number is by incorporating such protective features into new construction or into alterations made on existing buildings. It is in this area that architects and engineers can wield a great deal of influence. Techniques have been developed by CD researchers or by others with CD approval, to provide optimum protection at minimum or no additional production costs. These techniques should, however, be applied by someone knowledgeable in radiation shielding during the initial design phase of a project. Once a design is completed and definitive drawings prepared it becomes extremely difficult to incorporate any changes to enhance fallout protection.

Architect-engineer firms are now offered technical assistance in shelter design through the Professional Development Services Program. Under this plan qualified instructors are engaged to review building designs and to provide technical guidance concerning analysis, design and construction to maximize protection against fallout. The instructors will, upon request, conduct one or two-day seminars, courses, lectures and on-the-job training for architectural and engineering firms.

When building committees, property owners and others initiating construction projects learn that they can protect the lives of the occupants-to-be, whether they are patients, students, tenants or employees, in the event of a nuclear holocaust, this knowledge will be incentive to include shelter features in construction.

The Corps of Engineers revealed that in New Hampshire most of the structures qualifying as public fallout shelters are in urban areas. It was stressed that the deficiency in rural and suburban areas can be alleviated in part by including shelter areas in homes. There, also, if included in the original plans, the additional cost would be minimal.

Architectural firms desiring government assistance in this area are urged to contact the New Hampshire State Civil Defense Agency. In the words of Governor King: "All of us would be remiss in our responsibilities to the people of the state should we not encourage the taking of all possible steps to protect the lives of the citizens of New Hampshire."

* * * * *

Random Reports on the Status of the Program

These college graduate level courses are held in the spring and fall on a nationwide basis in locations where twenty or more eligible applicants have enrolled. Classes meet weekly, usually at night, for three to three and a half hours per session over a thirteen to fifteen week period. Enrolees can expect six hours of homework per class. Professors and instructors have taken special training. There are no fees, tuition or textbook charges. A fallout shelter analysis course has already been planned for Concord this spring. Details may be obtained from Basil Broadhurst, N.H. State CD Agency, Airport Road, Concord, telephone-225-6611.

The courses are known to be difficult and may well require more home study than estimated above. Architects, to whom time on the job is valuable and hours spent in other pursuits non-productive of income, may well question the worth of these courses. How well spent is the time thus consumed?

How many clients will want these facilities? How many shelter projects have architects and engineers been called upon to design? And how many have been built? The answer is two or three per certified office in New Hampshire. On at least one major federal project now under construction in the state shelter facilities were separated as an alternate cost item. The Office of Civil Defense is fond of the term "slanting," defined as "the incorporation with little or no extra cost or reduction in efficiency of certain architectural and engineering features into all new structures, to protect personnel from fallout gamma radiation in event of an emergency."

How carefully "slanted" the facilities were is not known. It is known that the federal government did not choose to pay the added cost of shelter facilities. This type of ambivalence seems to have plagued the shelter program from the beginning. The shelter consultants are available to architects or engineers engaged in this specialized work. It is the clarity of policy and the willingness to back the policy, once determined, with adequate funds that have been lacking.

At the risk of entering an area of great complexity, we offer that it may be that there are some valid reservations to the shelter program and these reservations may prevent the policy from becoming clear and direct.

Dry Masonry . . . An Architectural Heritage

By Richard F. Upton

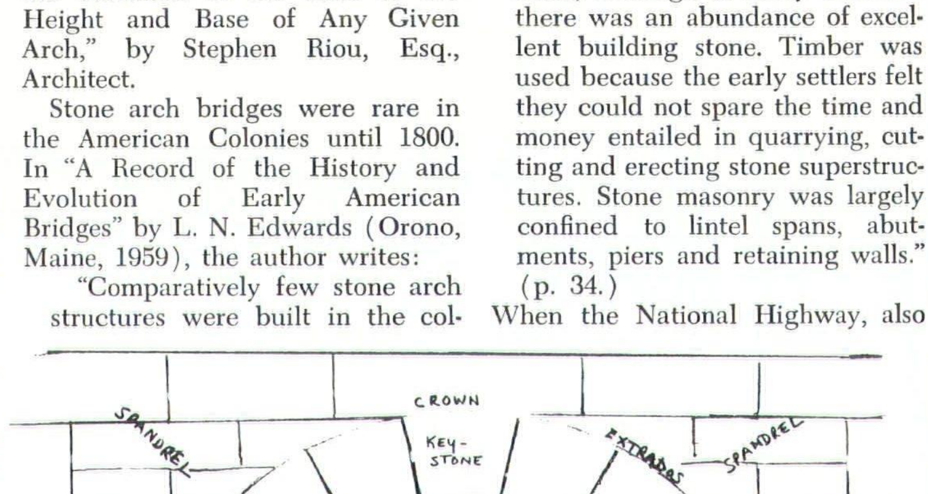
THE well-beloved, covered wooden bridges of New Hampshire, which were built from the 1790's until the Civil War period, have tended in popular literature to overshadow the graceful stone arch bridges of our State, relatively few in number and built in the period 1830-1860. However, from the standpoint of architectural importance, these stone arch bridges have perhaps been too long neglected by historians and antiquarians.

The stone arch bridge is said to have originated in ancient Mesopotamia. The art was further developed by the Romans. In the Eighteenth Century, the famous French bridge engineer, Jean Perronet, carried this type of architecture to still higher stages. The earliest book in the English language on the subject was published in London in 1760, entitled "Short Principles for the Architecture of Stone Bridges with Practical Observations and a New Geometrical Diagram to Determine the Thickness of the Piers to the Height and Base of Any Given Arch," by Stephen Riou, Esq., Architect.

Stone arch bridges were rare in the American Colonies until 1800. In "A Record of the History and Evolution of Early American Bridges" by L. N. Edwards (Orono, Maine, 1959), the author writes:

"Comparatively few stone arch structures were built in the colonies, although in many locations there was an abundance of excellent building stone. Timber was used because the early settlers felt they could not spare the time and money entailed in quarrying, cutting and erecting stone superstructures. Stone masonry was largely confined to lintel spans, abutments, piers and retaining walls." (p. 34.)

When the National Highway, also



Mr. Richard Upton, a Concord attorney and a member of the firm of Upton, Sanders and Upton, is chairman of the New Hampshire Historical Commission.

known as Cumberland Road, was built in the early days of the Republic (1806-1818), stone arch construction was chosen for some of the bridges in Pennsylvania, Maryland and Virginia, but these structures were grand and few.

What significance lies in the fact that many of the stone arch bridges of New Hampshire are located in the Contoocook Valley? The early town records in this area show that the Contoocook River and its branches were always highly turbulent waters in times of freshet and flood. History records the repeated destruction and rebuilding of many of the earlier bridges which had wooden superstructures, leading the townspeople here and there to seek more rugged and enduring forms of construction. Then, too, it may be significant that many of the towns in the Contoocook Valley area were settled by Scotch-Irish immigrants, who were reputed to produce the best stonemasons of the period with the art often being handed down from father to son.

The use of the technique of "dry masonry" (i. e., construction without mortar in the joints), which was characteristic of these early American stone bridges, was compelled by circumstance. In earliest times, the Romans had chanced upon a natural material for mortar in stone construction which had many of the qualities of modern hydraulic cement, due to its content of a certain amount of volcanic residue (pozzuolana). With the fall of the Roman Empire, the art of using natural mortar of such strength was lost for several centuries. Lime mortar, which was used in the later masonry, was not a very satisfactory substitute. It was not as strong as the stones used in arch contruction, often failed to harden in the interior of the arch walls, sometimes crushed under the horizontal pressure of the arch stones on each other, and also did not set in water. By a more careful cutting and fitting of the stones, it was possible to make stronger stoneworks than could be made with use of the conventional lime mortar of the period; hence, the development of the technique known as "dry masonry."

The difficulties of masonry engineering without an adequate hydraulic cement were discussed with considerable feeling by a contemporary engineer of note, D. H. Mahan, in his "An Elementary Course in Civil Engineering for the Use of the Cadets of the U.S. Military Academy" (New York, 1838), where he wrote, "There is no subject connected with the art of engineering, upon which more ingenuity has been uselessly expended, than upon that of mortar."

Incidentally, the art of making hydraulic cement was not rediscovered until near the beginning of the Nineteenth Century in England. Such material was in short supply in this country for many years. In fact, the manufacture of such cement in artificial form (i.e. Portland cement) did not become common in America until after the Civil War.

In its "heyday," dry masonry stone arch construction was not confined to the stone arch bridges on highways. It was used in early railroad bridge construction. It was also commonly found in the arches over the tailraces of the early mills powered by waterfalls. Upon the advent of a ready supply of Portland cement and iron as building materials, in the second half of the Nineteenth Century, the stone arch bridge of "dry masonry" construction ceased to be practical.

By common repute, the first of such stone arch highway bridges to be constructed in New Hampshire was that over the Contoocook River in the center of Henniker Village. The townspeople had become exasperated because the wooden bridge in this location had been swept away so many times in spring floods or ice jams. In 1832-34, the Selectmen investigated the possibility of a stone bridge and consulted James Hayward, Engineer of Lowell, Massachusetts. The town records also state that "Dr. Moses Long" was invited to exhibit his well-known models of wooden bridges. Is it possible that the records err and that the man consulted was really the famed Col. Stephen H. Long of Hopkinton, the inventor of the "assisted truss" used in covered wooden bridges? Or is the "Moses Long" referred to, the father of Colonel Long? In any event, the final decision was in favor of a stone bridge. Eventually, the specifications were developed and appear in the town records as follows:

"The bridge shall consist of two Arches; one of forty-five feet diameter at the base, and the other of forty-two and one-half feet, to be raised on two new abutments, one on each shore, near where the old ones now are, which must be nearly, or entirely removed.

"They (the abutments) shall be built in perfect range with the Middle Pier and of equal width; the outside Course shall all consist of large split Granite Stone laid up from the Pan or Solid Earth, with every other course of the same kind of split stone, laid endwise or crosswise, and the whole foundation upon which the Arches are to be raised, shall be of large split stone, and laid close, in a good and workmanlike manner.

"All of said stone in the foundation upon which said Arches shall be raised, shall consist of large Stone, as aforesaid, not less than ten feet in length, and laid alternately endwise to the stream, and cross-wise, and all to be laid in this manner up to the traveled path, and the outside of the remainder of said Abutments shall be of split Stones and tied together with headers not less than eight feet long, and put in through every other course, and the inside filled, and chinked well with small stones.

"The Arches shall commence eight feet below the plank of the old bridge at the Middle Pier, and shall rise three feet above the plank of said old bridge. All the Arches shall commence on a perfect level. The header of the middle pier must be raised six feet above where it now is, and well dowelled together with round iron of one and a quarter inch diameter.

"It is however understood that the stones which are to be laid endwise, and crosswise, on the South Shore Abutments, are not to be ten feet where the large Stone will not permit it, but as long as can be. The Stone of the Arches shall not be less than twenty inches wide at the bottom, nor less than eighteen inches at the top, and hammered and hewed on each side so as to come to a bearing, or rest, one upon another from end to end; the beveling of each stone should correspond with the Circle with the Arch is turned upon: each stone to be perfectly square at the end and laid so as to break joints, at least six inches. There shall be a tier of Stone on the top of the outer edges of the Bridge of eighteen inches square, and a Railing on the top of that tier of Stone consisting of two other tier of stone: they shall be eighteen inches at the bottom and eight inches at the top, and hammered, so as to correspond and lay close together, and well dowelled together with one and a quarter inch round iron, and laid so as to break joints; the two top stone aforesaid, shall be three feet high, making the whole railing three and a half feet high."

(From Henniker Town Records, Adjourned Meeting of October 27, 1834.)

The first contractor took the job at $2,000 but promptly defaulted when he realized that he had grossly underestimated the cost. The second contractor undertook the work for the sum of \$3,500, with the Selectmen having some discretion to vary the specifications as the work progressed.

Temporary wooden arch centers or substructures were built to assist in the construction of the Arches. When these centers or substructures were finally knocked away upon completion of construction, the skeptical ones of the local populace had assembled to laugh at the collapse of the bridge; but, much to the relief of its sponsors, it held together, just as the principles of architecture required it to do. This beautiful, double arch stone bridge of "dry masonry" construction was completed in 1835 and lasted for nearly one hundred years, before finally falling before one of the major floods of the Twentieth Century.

In the neighboring Town of Hillsboro, the stone arch bridge found even greater acceptance. In the first half of the Nineteenth Century, eleven of these bridges were built in Hillsboro, both on the Contoocook River and on Beard Brook, one of its tributaries. Hiram Monroe, then active in town affairs, favored such bridges as being "cheaper in the long run" and for a considerable period his views prevailed. At the present time five of these bridges survive.

One of the most interesting, and still largely unspoiled, is the double arch bridge over Beard Brook, known as Lottery Bridge or Old Carr Bridge, built by Captain Jonathan Carr in 1840 and allegedly paid for with counterfeit money, which fraud later caused his undoing at the hands of the law. This structure is notable for the pronounced arch in the roadway over the bridge.

Another Hillsboro structure of note is the double arch bridge over the Contoocook River at Hillsboro Lower Village on the Second New Hampshire Turnpike. This turnpike was in existence as a toll road from 1799 to 1837, when its charter was repealed. It ran from "lottery bridge in Claremont to the plain in Amherst near the courthouse" and for many years it carried a heavy traffic of farm products and lumber to Boston, the teams returning with loads of rum and store goods. The gates were about eight miles apart, there being two in Francestown and one at Hillsboro Upper Village.

In nearby Stoddard, there still stands one of the best known examples of such bridge architecture. It is a double arch bridge of dry masonry stone construction over the North Branch of the Contoocook River, adjacent to State Highway Rte. 9 just west of the Antrim-Stoddard town line. It was built in 1852-53, when the highway between Mill Village in Stoddard and Antrim was reconstructed.

The Historic American Buildings Survey, begun in 1933 by the National Park Service, lists the following such structures in New Hampshire as important examples of architectural and historical merit:

1. Hillsboro Lower Village: Second New Hampshire Turnpike Bridge over Contoocook River – 2 arches.
2. Hillsboro Lower Village Vicinity: Stone Bridge over Contoocook River near intersection of Routes 9 and 202 – 2 arches – (has been reinforced by cementing the arch joints and adding concrete walls in recent years).
3. Hillsboro Upper Village Vicin-

ity: (a) Lottery or Old Carr Bridge over Beard Brook — 2 arches. (b) Gleason Falls Bridge on Beard Brook — 1 arch. (c) Stone causeway bridge over Beard Brook with 2 arches.

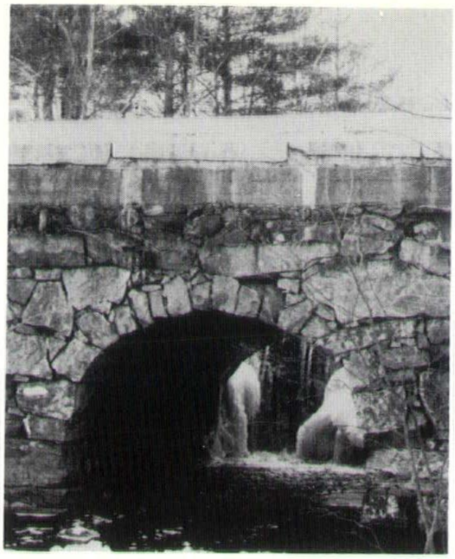
4. Stoddard: (near Antrim line) Stone Bridge over North Branch — 2 arches.

Other structures not mentioned in the Historic American Buildings Survey include the following:

5. Hampton Falls: Single arch span over the Hampton Falls River on Route 84 at Dodges Mill. Built in 1855 (Brown, "History of Hampton Falls," p. 371), it still stands. Overlooking it is the office of former Governor Wesley Powell located in the old mill. The upstream face of the bridge has been reinforced by cement but the downstream face is in its original condition.
6. Pelham: Double arch bridge over Beaver Brook on Route No. 38. It has been widened by a reinforced concrete structure on the downstream side, but the original arches are intact.
7. Pelham: Double arch bridge over Beaver Brook on Route 111-A. Note the fault in one of the arches on the upstream side caused by the sliding of one of the arch stones on another. The original works are intact, but new sidewalls have been added at road level. (There are open granite ledges in Pelham which were probably the source of the stone used in the two bridges over Beaver Brook.)
8. Gilsum: Single arch bridge over Ashuelot River at intersection of Route No. 10 and Surry Mountain Road. Built in 1861-63, it is the largest and highest single span of dry masonry construction in this state, with great precision in stone cutting. There has been some modern restoration and cementing.

The foregoing is probably not a complete list of bridges of this type although we have tried to list all known existing highway structures of "dry masonry" construction in this State. This story does not, however, include mention of the more modern stone arch highway bridges which have been built with use of cement, concrete, or other reinforcement, and are outside the scope of our research.

While the pioneer New Hampshire workers in such materials as metal, glass, clay and wood have received due recognition in literature, little has been written of the work of the early stonemasons, with the exception of those who made and carved gravestones. Yet the precision and skill required in the cutting, fitting and erecting of the arch stones of the early stone bridges, with no cement available for reinforcement or binding, were on a par with the work of the early craftsmen in the other materials. The works of these stonemasons have endured many decades under the greatest of natural stresses. Such of these bridges as remain today should be recognized as significant items in our American architectural heritage.



Strength and mass are salient features of the single arch over the Hampton Falls River, Hampton Falls at historic Dodges Mill — now the office of former Governor Wesley Powell.

Definitions of Terms in Stone Arch Bridge Construction

Voussoirs
The wedge-shaped stones of which the arch is composed. Also called archstones.

Keystone
The center or highest voussoir.

Extrados
The outside curve of the arch.

Intrados
The inside curve of the arch.

Soffit
The inner concave surface of the arch.

Crown
The highest part of the arch.

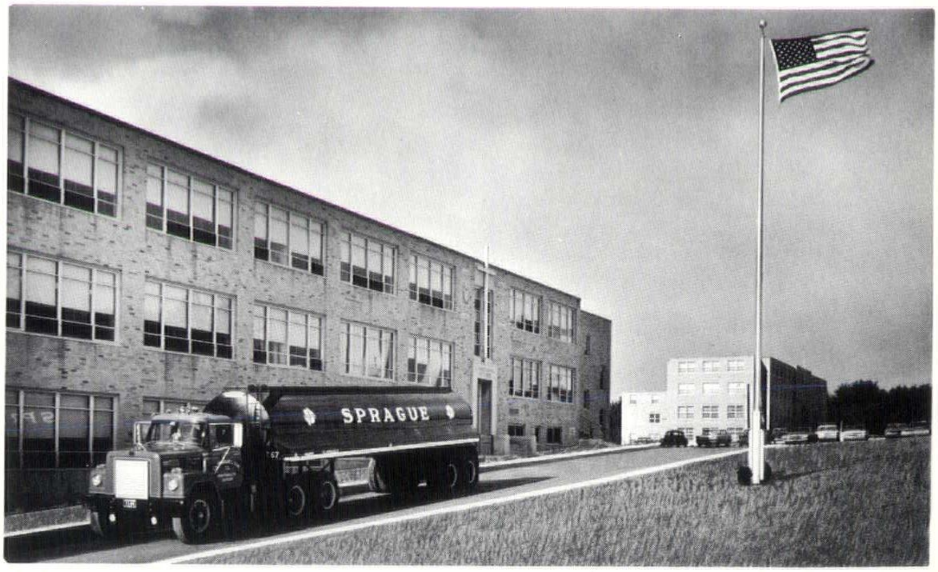
Skewback
The stone with the inclined surface on which the ends of the arch rest.

Haunch
The part of the arch between the skewback and the crown on each side.

Springer
The lowest voussoir or archstone on each side.

Pier or *Abutment*
The masonry which supports the skewback.

Spandrel
The space between the extrados and the roadway. The masonry in this space is called spandrel filling.



Notes and Comments *(Cont.)*

all intent of federal building programs, Boutin told the members. Many presently continuing policies and guidelines resulted from this close examination, including the policy of hiring local architects to work on federal projects within a state.

Mr. Boutin said the committee came to feel that in raising design standards and requiring good design, the humane qualities of buildings would be emphasized and the areas in and around the buildings would become better places to live and work. "The value and vitality of the American people should be reflected in the structures erected by their government," Boutin stated. Whole sites should not be covered by buildings. Set-backs allowing trees, shrubbery and complete landscaping, particularly in urban locations, are now considered necessities for relief from the endless planes of asphalt broken only by the masonry of buildings.

In addition to careful siting and landscaping to provide greater beauty, Boutin stressed the desirability of including art as an integral part of each project. The committee recommended that two per cent of the building budget be spent for art work. (In New Hampshire, where we have so many able artists and craftsmen, this policy should prove doubly rewarding. Ed.)

Exciting though the changes in federal building policy may be for architects, contractors and developers, Boutin pointed out, they should all be sobered by the realization that the industry has not met a major responsibility — housing the poor. He described the present rate of construction in this area as scarcely scratching the surface.

More than ten million new dwelling units are needed to fill the needs of both urban and rural residents in the low income bracket, he said, and added that unless the present trend is changed, we shall continue to build housing at an average cost of $20,000 per unit, far beyond the reach of individuals in the income category under discussion. Mr. Boutin called for a pulling together of architects, contractors and developers to provide reasonably low cost housing, of good design, pleasant to live in, of adequate durability and of a type of construction that will make for rapid erection. In this way, he said, they may meet some of the demands of a growing nation as responsible professionals. He recommended the Rent Supplement Program as a new and useful tool.

In simple and direct terms, Mr. Boutin pointed out the great responsibility and opportunity for architects to shape the face of America in the years ahead. "Economists forecast," he pointed out, "that we will have to build within the next 35 years the equivalent of all construction in this country since the time of the Pilgrims. Thus architects have within their grasp the opportunity to assure a beautiful America or, if they do the job poorly, an America of which we may very well be ashamed by the year 2000."

Mr. Boutin also stressed the need for a broad education for architects so that they will not only be concerned with the design of individual buildings but with the integration of those structures with others to form attractive city spaces. "Part of the present problems," he said, "could be solved by a bettering of communication between the various segments of the building industry. There has not been much frank, in-depth discussion between the nation's designers and its builders." Prior to leaving NAHB, Bernard Boutin arranged for an initial series of "summit" meetings between Morris Ketchum, national president of the AIA, and the president of the NAHB, with an eye toward formation of a task force which would initiate broad discussions of the role of the architect and that of the builder.

"Time is running out for us," Mr. Boutin emphasized, "and we must re-evaluate past performances and begin to do what is right and needed for the future rather than to spend coming years duplicating the mistakes of the past."

St. Raphael *(Cont. from Page 13)*
screen and the altar rail. Outside the sash are white while inside natural wood finishes have been used in conjunction with brown and red interior bricks; exposed beams and decking and rubbed concrete bring additional warmth to the large church area.

In the school pastel shades abound on doors and block walls and are complimented by the red brick and white trim. The sash pattern offers a design accent to the strongly related roof forms of the new and old church. The pattern also adds a modular element which gives continuity to the lower roof areas.

The new complex is reinforced concrete from the ground up, featuring masonry bearing walls above the low, flat roof sections. Laminated wood beams and a wooden plank roof have been used in the church. The granite block foundation of the existing church created a problem in continuity as the new foundations are concrete. By retaining the red brick of the old church as the primary wall material old and new elements were harmonized.

Wood facias have been painted and concrete piers have been rubbed and/or painted in all areas. With the exception of the church, all floors are covered with vinyl asbestos tile. Quarry tile has been used in the nave and carpeting provided in the sanctuary. The interior walls of the church are brown brick. In the school they are of pastel block and the gray concrete motif is visible throughout. The ceilings of the nave side aisles, chapel and narthex are plaster. The nave, sanctuary and transepts have exposed stained and varnished wood plank ceilings.

The new church seats nine hundred while the school provides classrooms for the first eight grades.

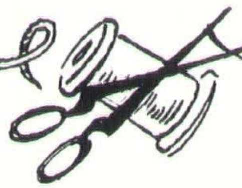
In the school the modular sash and brick pattern continues. Indented and extended alcoves provide space for coats and storage spaces so that these requirements do not compete with prime classroom area. The first two grades each have toilet facilities while other toilets have been centrally located on the floors occupied by the upper classes.

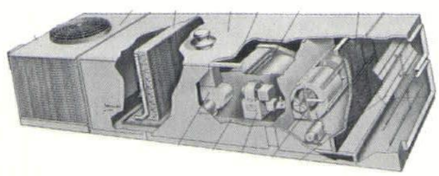
Throughout the school-church complex various subtle changes and renovations were made. All statues were recast and refinished including one in the meditation court beside the church. This court adjoins an open area which could one day be occupied by a new rectory.

Within the church the lower ceilings in the aisles and transepts accentuate the higher vaulted ceiling. A raised portion of the roof over the sanctuary provides additional light and gives emphasis to the altar. The altar area itself has been located to bring the service closer to the people.

In the nave and sanctuary stained glass is used with textured, cathedral glass used elsewhere.

Thus this building fits into its neighborhood and what has remained of the older structures has been blended with the new at St. Raphael Parish.





Index To Advertisers

GRANITE STATE ARCHITECT

1 Pleasant Street, Portsmouth, N. H.

RETURN REQUESTED

Bulk Rate
U.S. POSTAGE
PAID
Portland, Me.
Permit No. 1132