New Hampshire ARCHITECT

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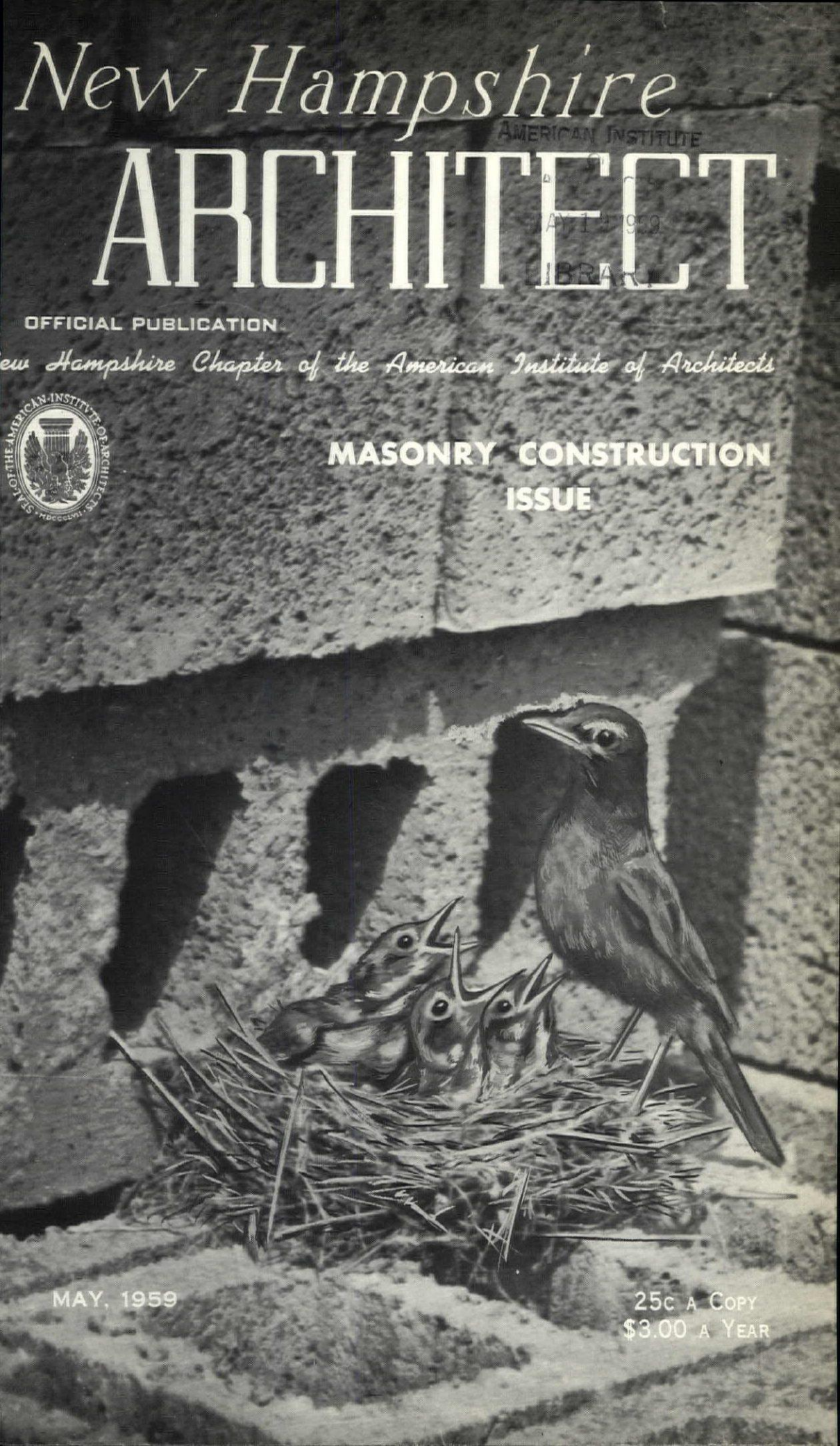
New Hampshire Chapter of the American Institute of Architects

SEAL OF THE AMERICAN INSTITUTE OF ARCHITECTS MDCCCLVII

MASONRY CONSTRUCTION ISSUE



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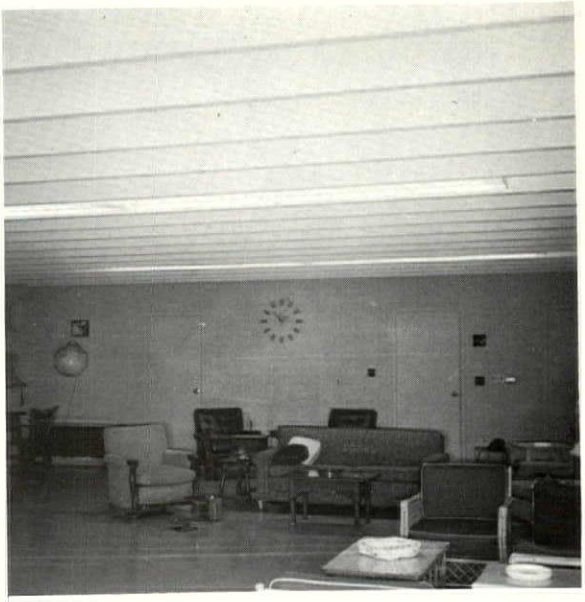

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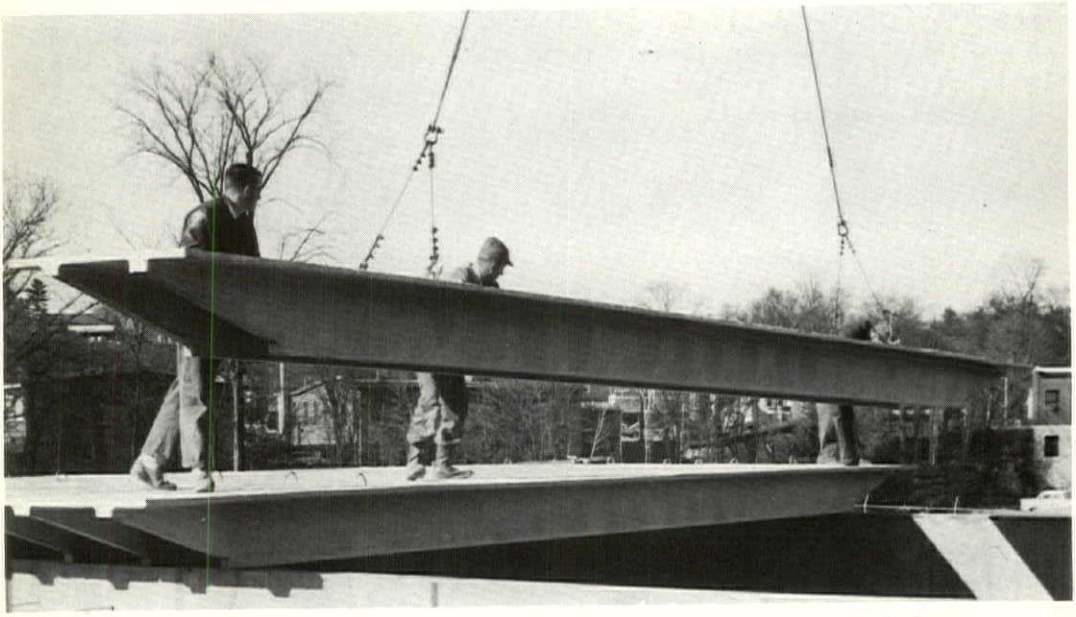

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New Hampshire ARCHITECT

VOL. 10 MAY, 1959 NO. 10

Annual Masonry Construction Issue

Covering
Maine, New Hampshire
Vermont and Massachusetts

— Cover Photo by C. Dougela, Bedford, N. H.

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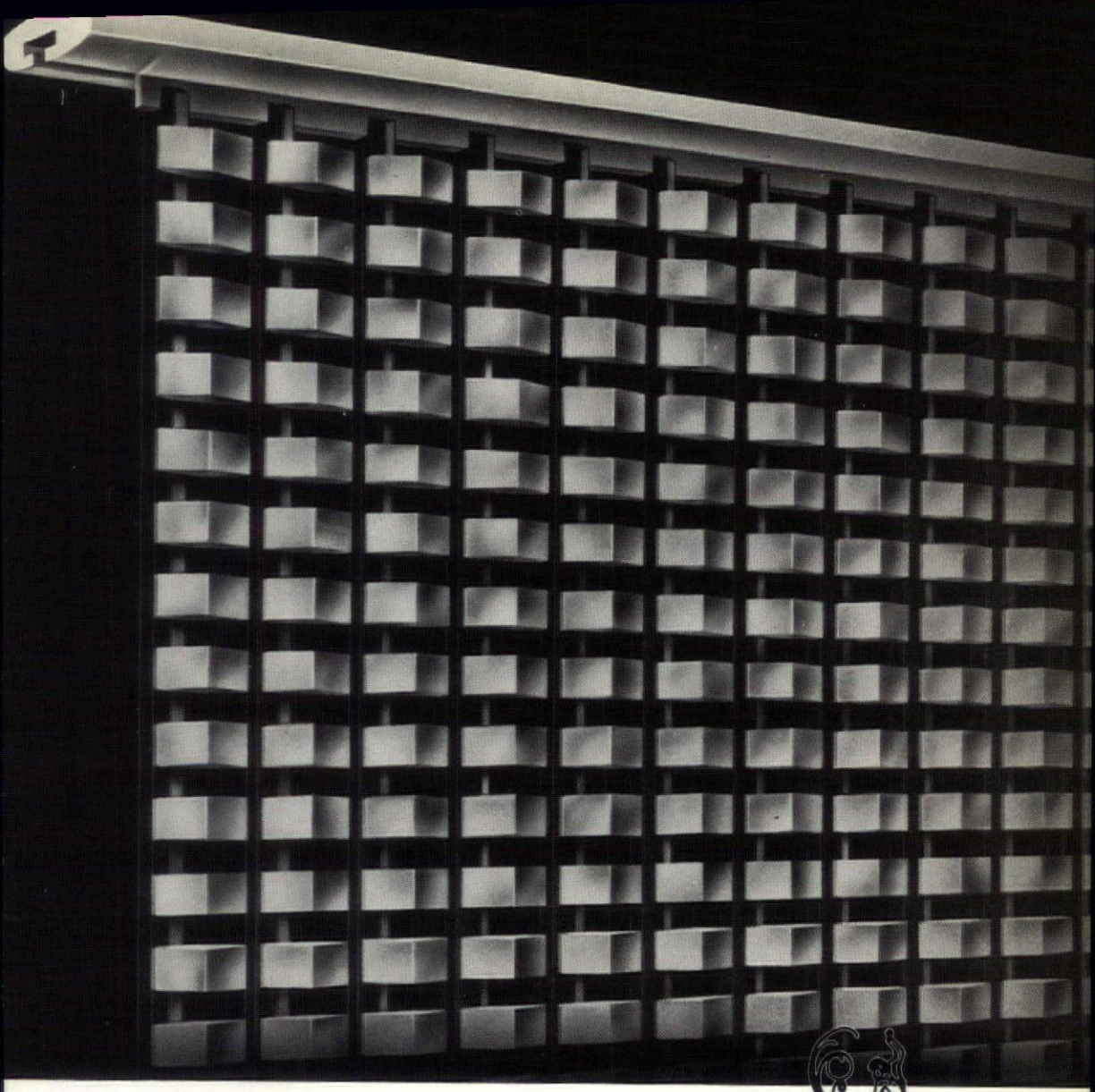

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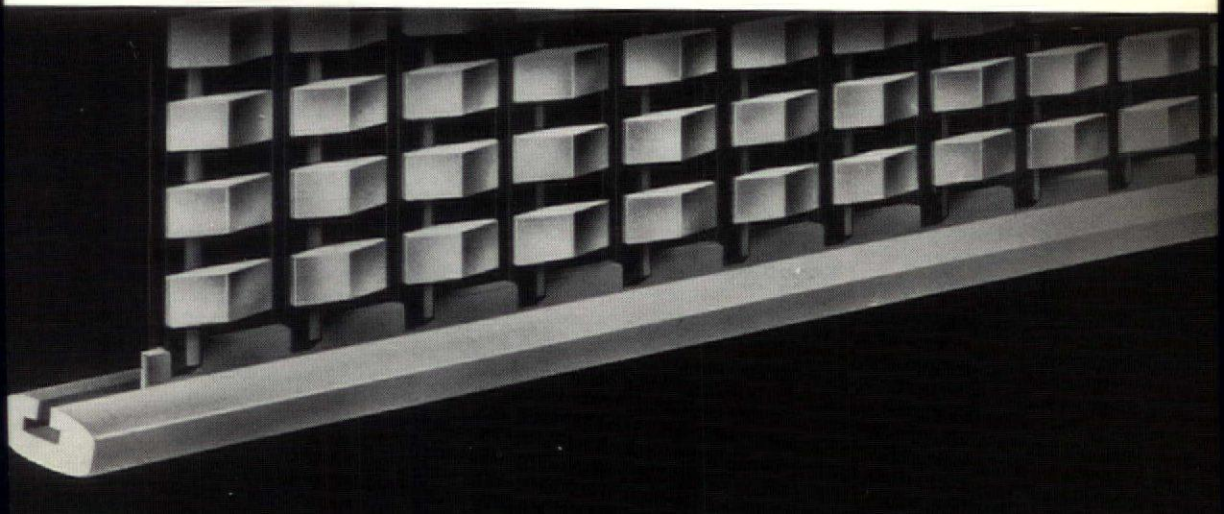
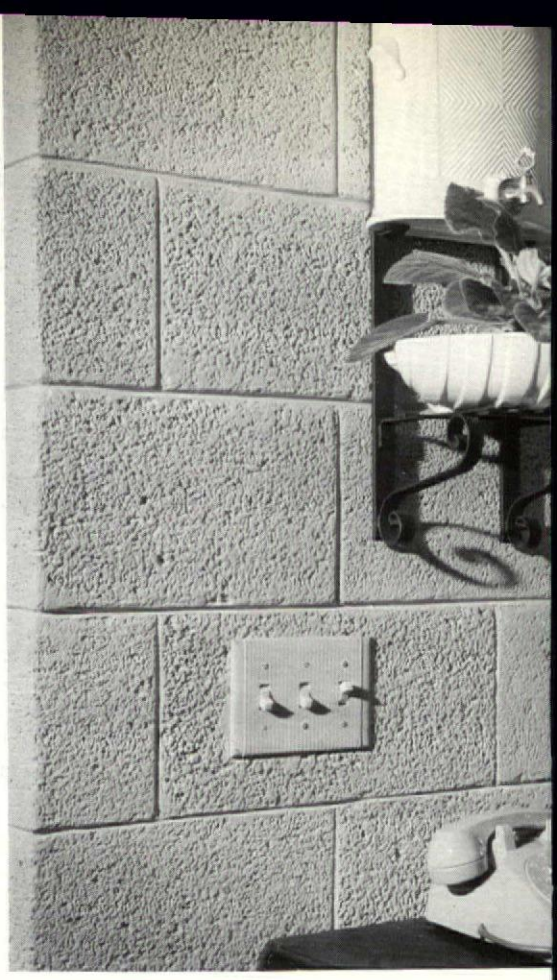
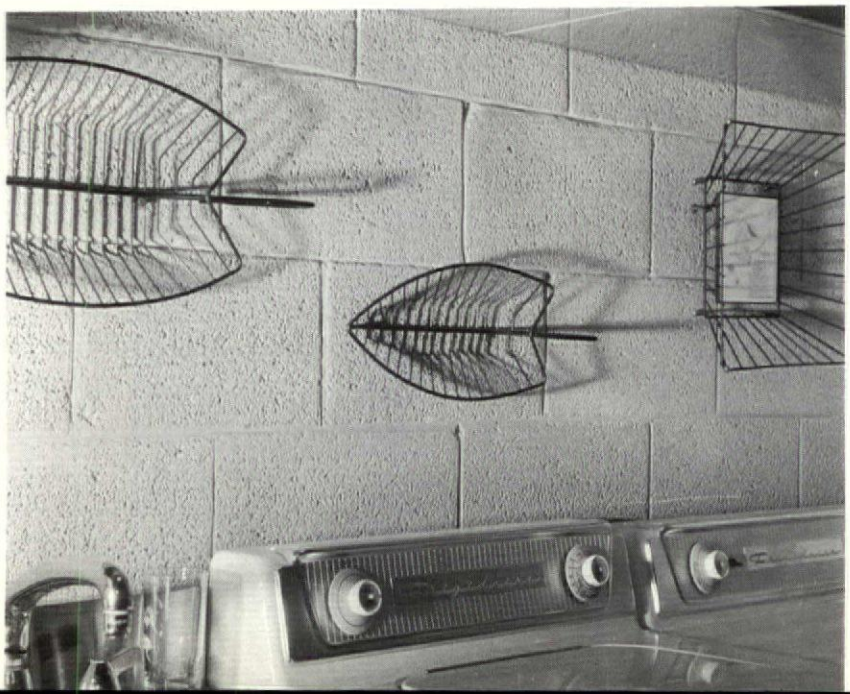




Lightweight Concrete Masonry for Walls of Elegance



HISTORY OF MASONRY

by the Staff of Duracrete Block Company, Inc.

Historians tell us that ten thousand years ago man lived in caves and up to about four thousand B. C. "Daub and wattle" was the prevailing shelter that protected man from the elements.

Egyptians began building in stone about this time and the building of the pyramids marks the development of cut stone to a high art. Rough stone was brought to the site of the pyramids and partly dressed prior to placement. The top and faces were dressed in place thus expediting construction. Imhotep, the royal physician and magician superintended the vast public works program under King Menes and is responsible for the construction of the largest unit masonry project ever built. In fact, he is referred to as the father of masonry.

The residents of the Mesopatamian Valley began using sun dried brick about 3000 B. C. and by 500 B. C. burning and enameling had been developed, and the Pyramid of Dashur and the Tower of Babel had been built. Elsewhere, around the Mediterranean shores sun dried brick were still in vogue.

Because of their sensitivity to moisture, walls built with these units were susceptible to fire but especially vulnerable to water. This required walls exceedingly thick and records indicate that the walls of some of these early structures were as much as thirty feet thick. Windows were omitted as they served no useful purpose and the roofs were left open to admit light.

Archaeologists have found that limestone was burned on the Island of Crete and transported to Greece where it was used in wall construction dry, to act as a bed for masonry units. History indicated that the burning of lime goes back to 100 B. C.

Events moved slowly on the Italian Peninsula where most masonry was of a cyclopean variety. Huge boulders were rolled down hill, into place, and openings around these large stones were filled with smaller units. Many of these walls were built massive for military purposes.

Metal tools of war were developed by the Romans and when peace came it was inevitable that metals were used for peaceful purposes. This led to the quarrying of harder stones and the development of polygonal masonry, wherein stones were cut to fit each other.

These stone facings were literally backed up with rubbish and broken pottery referred to as potsherds, now the happy hunting grounds of the archaeologists. It is of interest to note that weep holes were provided for drainage of moisture from these cores and that rustication and face dressing was practiced.

Later, isodomous masonry was introduced from Greece involving the use of equal heights and equal lengths. These were dressed perfectly to lay in a bed of dry lime. This led to hydraulic mortars.

The Romans used three sands in their construction. One was ocean sand, which containing salt had the effect of being very slow in setting. River sands they found made excellent stucco. Pit sand was a term they reserved for many of their volcanic deposits found in numerous places and in many colors. All of these were highly siliceous. However, some were found to be suffering from overly long exposures, while others were too new, being freshly erupted. Pit sand from the ancient City of Peutoli, later called Pouzoli, were found to have the proper age for combining with lime to produce hydraulic mortars, a type which would harden under water, in contrast with lime mixtures which are referred to as "air drying mortars."

These pozzolanic mortars expedited the construction of the now famous squared stone construction of Rome. Construction involving the use of headers, running bond, buttresses and leaded metal clamps set in the stone, was perfected.

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Vitruvius's specification for the proper pozzolan is of interest. These sands were found to be effective when not too old or too new. He prescribed that the materials should make a noise when rolled between the hands, and further, that it should not stain a white cloth. He also noted that unshaped stones with irregular joints cracked less and that the improved mortars were conducive to less cracking.

As Rome prospered, the city became more crowded and multiple story dwellings were required, which, made of sun dried brick, were impractical due to the thickness of the walls. Emperor Augustus boasted that he found Rome a City of Brick and left it a city of marble.

(When London burned, it changed in 1866 from a city of wood to one of brick).

Vitruvius, Palladius and Pliny recommended making brick at certain periods in order to avoid cracking due to too rapid hardening in the sun or freezing in the winter. Two years were recommended to thoroughly season a brick.

Masonry spread East to China and Westward to France, Spain, Morrocco, Holland and England and each country added its own touch to enhance its beauty.

About 1850 the bridge builders were busily engaged in constructing wood and steel trusses to carry the railroads over rivers and to extend them into the fast growing West. In doing this they were laying the ground work for new structural systems and establishing the structural steel market which was destined to change the sky-line of every major city in the world. Thus, the need for heavy bearing walls was considerably reduced. Later, the need for conserving our precious steel during periods of national conflicts militated to the development of concrete frames.

There were other developments. By 1900 the U. S. manufactured enough Portland Cement to be independent of foreign import to care for its own needs. Portland Cement had been introduced from England and its manufacture began some twenty years prior.

Harmon Palmer started working on the manufacture of blocks in 1890, and had patented a machine by 1900, for makin hollow units.

The Besser Company began the manu facture of their first machines for makin concrete masonry in 1904. Earliest unit made were twelve inches wide, eigh inches high and twenty four inches lon solid. These machines had a capacity c 200 units a day. Cored units were pr duced commercially in 1909 and sem automatic equipment for manufacture c concrete masonry was marketed in 1914.

A number of plants started manufa turing cinder units during the period 191 to 1912. Cinder units were tested a Columbia University in 1909 by Professo Ira A. Woodson and were used that sam year in the Borough of Bronx. Unde writers Laboratories tested cinder bloc in 1915.

Francis J. Straub of New Kensingto Pennsylvania, obtained patents for use c cinders and licensed other manufacture to produce these units. Thus, there wa a wide spread use of cinders in the man facture of lightweight concrete masonr in the northeastern United States.

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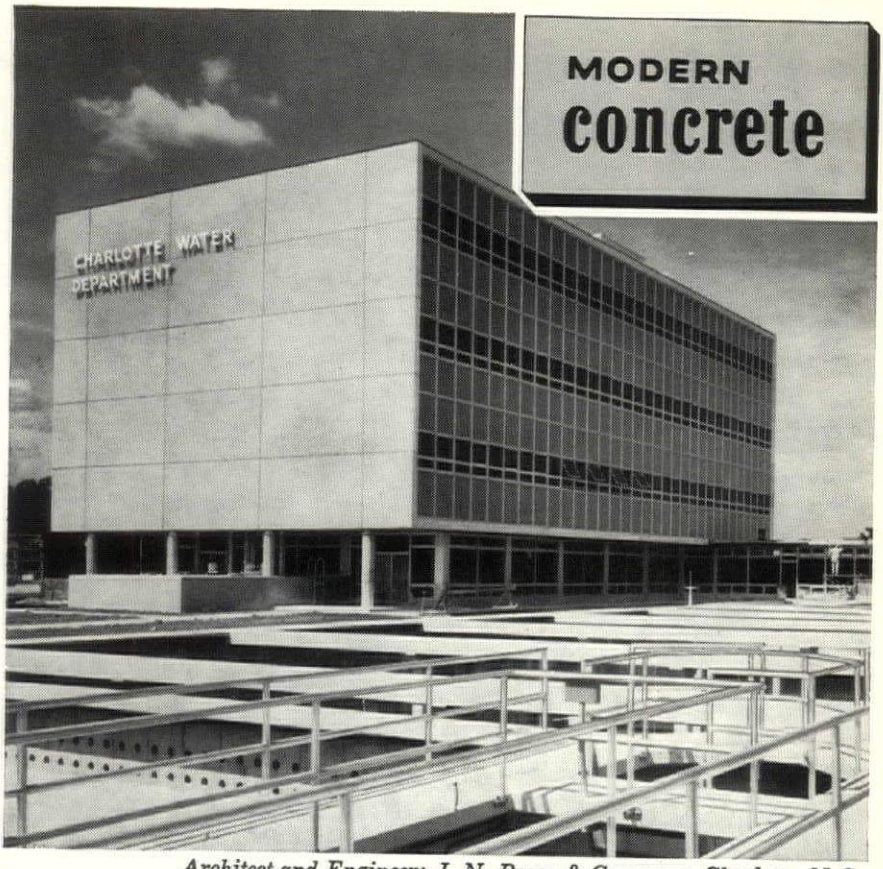

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PORTLAND CEMENT ASSOCIATION
20 Providence Street, Boston 16, Massachusetts
A national organization to improve and extend the uses of concrete

SUGGESTED SPECIFICATIONS for CONCRETE MASONRY

by the Staff of Duracrete Block Company, Inc.

1. **GENERAL**
The contractor shall be responsible for the construction of all walls, partitions, and other concrete masonry work indicated in the plans or the specifications to the lines and grades required, according to the requirements of prevailing codes and ordinances.

2. **HANDLING**
Units shall be ordered and stock piled under the makers shed 60 days or more prior to delivery. Delivery shall be by such means as to minimize damage to units. Units for exposed work shall be delivered by "Sidomatic," or equal and shall be stacked on pallets to protect them from contact with snow, water, ice, soil, or other foreign materials.

3. **WATER**
Water for use in mortars and the manufacture of block shall be clean and fit to drink.

4. **CEMENTITIOUS MATERIALS**
Portland cements shall be air entrained, meeting current requirements of A.S.T.M. C 175, types 1A, 2A, or 3A (tentative).
Masonry cement shall meet the requirements of A.S.T.M. C 91 type 2.
Hydrated lime for masonry shall meet the requirements of A.S.T.M. C 207 type S.

5. **AGGREGATE**
Aggregate for mortar shall consist of clean, hard, durable, natural or manufactured materials. All materials shall be washed and stock piled prior to use and graded to meet the following sieve requirements of ASM. C-144. Passing laboratory sieves having square openings.

No.	4 —		100%
No.	8 —	95 —	100%
No.	16 —	60 —	100%
No.	30 —	35 —	70%
No.	50 —	15 —	35%
No.	100 —	2 —	15%

6. **COLORS**
Mortar colors shall be pure substantially non-fading mineral pigments used as per manufacturers directions.

7. **MORTARS**
Mortars for concrete masonry shall be measured by volume in approximately the following proportions.

Ordinary Conditions

1 Masonry Cement—3 parts sand
or
1 Portland Cement
½ to 1 & ¼ parts
Hydrated Lime—4½ to 6 parts sand

Severe Exposures

1 Portland Cement
¼ Hydrated Lime—3 parts sand
or
1 Portland Cement
1 Masonry Cement—6 parts sand

Mortars shall not be used until they have been thoroughly and adequately mixed. Except for small jobs, power mixers shall be used and the mixing shall continue for a minimum of five minutes. No mortar shall be used which has been allowed to stand and harden for one hour or more.

8. **MATERIALS**
Concrete masonry units shall exceed the minimum requirements of A.S.T.M., C-90 "Hollow Load Bearing" with regard to face shell, thickness, strength, absorbtion and moisture content.
Aggregates for heavyweight units shall be properly graded and shall be washed clean.
Aggregates for lightweight units shall be an expanded shale such as manufactured by the Northern Lightweight Aggregate, Inc., Cohoes, N. Y., and sold under the trade name of "Norlite."
Cinders may be used for aggregate only in such special units as chimney block, or in other locations where the units are not to be exposed.
All units shall be cured to produce necessary strength and dimensional stability. Curing shall be accomplished by steam at atmospheric pressure, or above. Where units are to be used in basements, footings, or in unexposed work, curing shall be

Continued on Page 17)

Whatever you build... wherever you build it,

BATH HOUSE, Brewer, Maine

GORDON RESIDENCE, Portland, Maine

BENTON SCHOOL, Benton, Maine
Melvin Beck, Architect

BOWL-A-RAMA, South Portland, Maine
Engineers Engineering Services Inc.
Contractor Fred I. Merrill Co.

SENATOR MOTEL, Augusta, Maine
Consulting Architect Arnold Perriton
Masonry Contractors Grant Bros., Hermon, Maine

E. LIVERMORE TABERNACLE
E. Livermore, Maine
Masonry Contractor Frank Gilbert, Wilton, Maine

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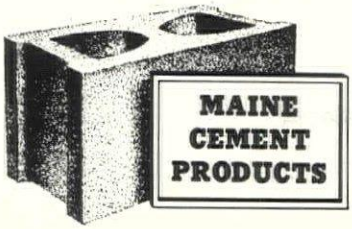

Division of Mecaw Industries

Portland Bangor

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followed by air drying. For all exposed work, units shall be mechanically dried to less than 25% moisture content.

Specials shall be made of aggregate similar to regulars to conform in texture and appearance.

Blocks shall be two core where ever possible to expedite utility work. Halves shall be preordered to reduce cutting costs.

Hollow Non Load Bearing block shall meet the requirements of load bearing block to minimize cracking and chipping. Units shall be protected on the job from adverse effects of moisture and temperature, both in storage and in the wall.

Only uniform dimensionally stable modular units will be acceptable. No dimension shall differ from the specified standard by more than 1/8".

The architect shall lift sufficient samples at the contractors expense to insure that the units proposed for use meet these specifications.

CONSTRUCTION

Units shall be laid by skilled masons in the bond pattern and joint treatment required according to the prevailing standard of good practice.

Sample panels 32 inches by 40 inches shall be constructed showing patterns and joining to be employed, as standards of acceptability of materials and workmanship. Only workmen sufficiently skilled to match the workmanship in the panel shall be employed. Blocks shall be cut dry, joints tooled, edges cleaned as work proceeds.

Where the minimum moisture content of the unit is exceeded, the contractor shall install canvas covers, heaters, and blowers, and shall operate these a minimum of 48 hours or to such time as tests indicate that moisture contents are satisfactory.

All concrete masonry exposed to weather shall be painted with a cement base paint or treated with silicon. Before commencement of work the contractor shall submit plans for location of all joint reinforcing and control joints, to the architect for approval.

Unless otherwise indicated, joints shall have metal reinforcement in every third joint and above and below every window and door.

Vertical control joints shall be raked out to a depth of 3/4 of an inch, and shall be shellacked or painted to seal the pores and then caulked with colored elastic caulking compound.

In cavity wall construction, No. 6 corrosion resistant ties shall be provided in every 3½ square feet of wall.

Mortar joints shall be face shell bedding. No furrowing of the mortar shall be allowed. Vertical joints shall be shoved tight. Free standing walls shall be braced until they become wall bearing.

NEW HAMPSHIRE STATE CONFERENCE of the BRICKLAYERS, MASONS and PLASTERERS INTERNATIONAL UNION of AMERICA

HOTEL ROGERS—LEBANON, N. H.
MAY 16, 1959

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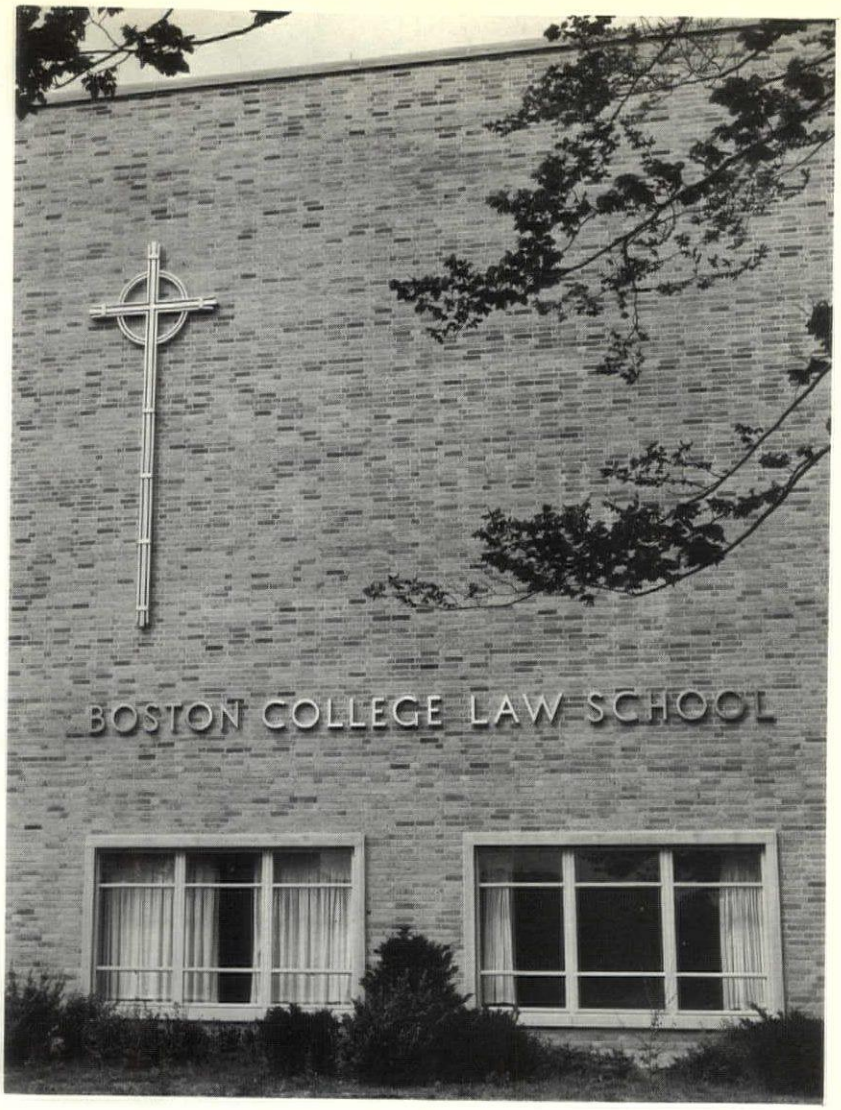
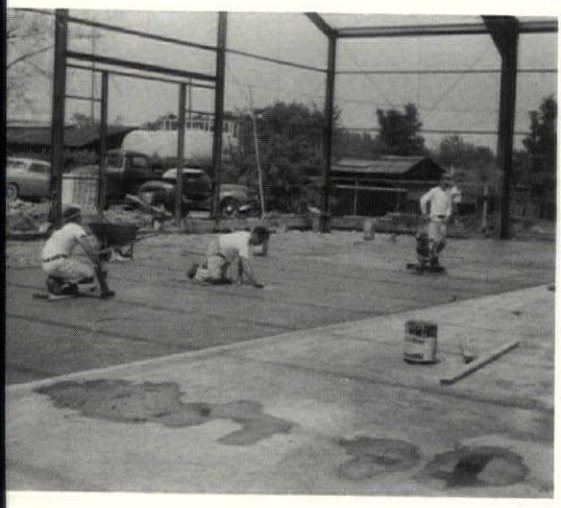


Brick by Spaulding Brick Co., Somerville, Mass.

Structural Slab at Stock Warehouse, Rumford Press Concord, N. H. by Connie's Cement Floor Co.



Structural Slab at Telephone Bldg., Laconia, N. H. by Connie's Cement Floor Co.

"HOW TO BUILD LEAKY WALLS WITH GOOD MATERIALS"

By A. B. McMillan
Formerly Vice-President
Aberthaw Co., Boston, Mass.

No attempt will be made here to describe how to produce good brick walls. The problem after all is reasonably simple, and therefore capable of solution. However, judging from examples on every hand, much effort has gone into the production of leaky walls, even though carefully specified and selected materials were used. Up to the present time, in so far as the writer knows, there has been no concerted effort to educate the public to understand exactly how poor walls may be produced at will. There are a number of steps in the process; for some the owner and designer are responsible, and for some the builder may take all credit.

Without attempting to place the responsibility for any of the steps individually on either of the several participants, let us consider what these steps are.

First, there is compatibility of materials. Just as incompatibility in marriage leads to divorce, so in building materials it leads to separation. Each material used has characteristics peculiarly its own. For instance, the co-efficient of expansion of brick masonry is approximately 0.0000031; that of limestone 0.0000044; and that of concrete 0.0000067. This simply means that in length of 100 ft. with a temperature change of 100 deg., neglecting the effect of moisture, brick masonry if unrestrained would expand or contract 3/8 in.; limestone 9/16; and concrete 13/16 in.

PLAIN ARITHMETIC

It is evident then that if artificial stone (concrete) coping is placed on top of a brick wall and the end joints between adjacent stones are filled with a hard mortar, the stone in its endeavor to move twice as far as the supporting brickwork, in response to temperature changes, must either be restrained and prevented from moving by the brickwork or else will crack the brickwork or slide on the brickwork; in either case openings will be made through which water can enter the wall. Obviously if limestone were used for the coping, the movement would be much less, and the marriage might prove successful.

Having thus insured the formation of fissures, the next step is to try to prevent the water going any further. This can be done with flashings. Naturally if the flashing is laid on a smooth bed of dry mortar with elastic cement at the outer edge; if the outside edge of the flashing is turned down ½ or ¾ in. to form a drip; if the edge on the inside is turned down two courses for a cap flashing, or up if required as a cutoff elsewhere in the wall; if the joints in the copper are made by first tinning the edges of the sheets, then locking them together and soldering the seams so that the joints are thoroughly filled and covered with solder; if all these things are done penetration of water will be stopped at this point.

But as this is not what we want to accomplish, let us lay our flashing on the top of the rough brickwork, keeping the edge ½ in. or more back from the surface of the wall so that it will not mar the appearance of the outside face.

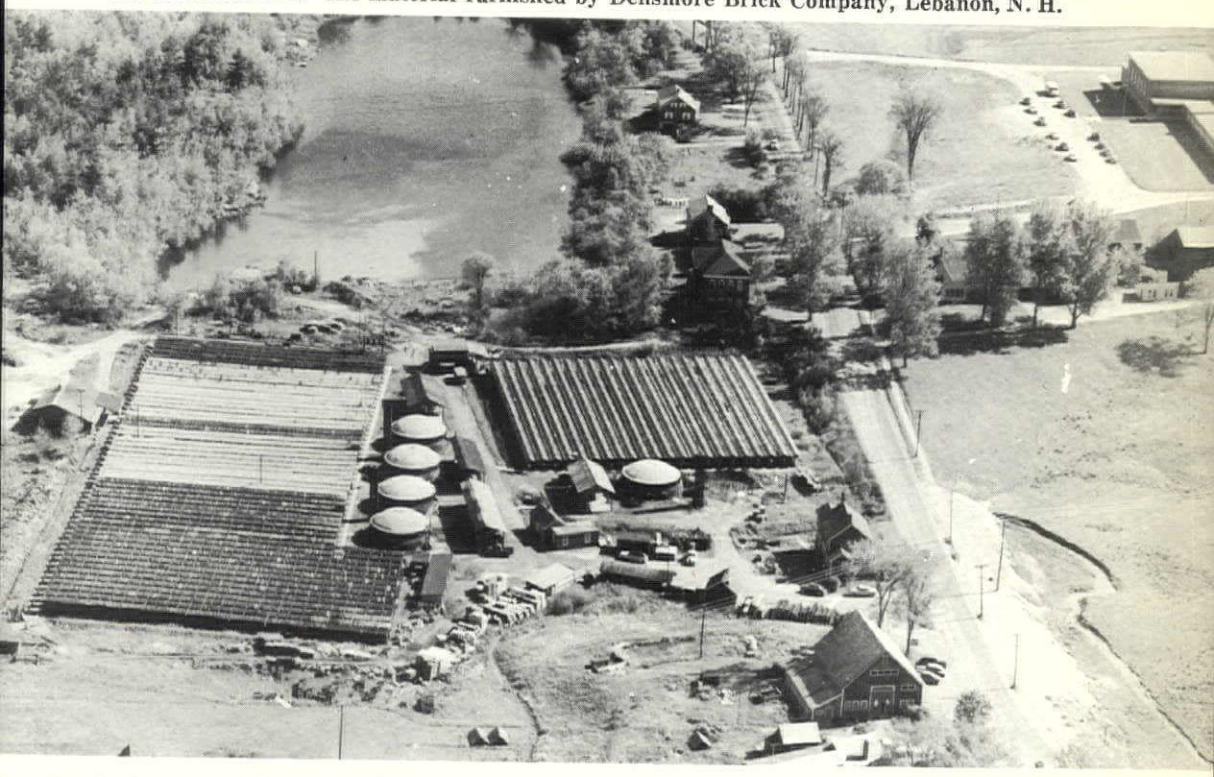
Next, let us simply lap or, at most, form lock seams without tinning and soldering the copper sheets when they lap. This will insure that any water which penetrates to the copper can readily go through the several joints or, if by any chance they happen to resist the flow of water, it can find its way to the outer edge of the flashing and thence down into the irregularities in the masonry below.

Another excellent way to assure a leaky wall is never to seal the copper flashings around and against the wall columns. This is particularly effective in the case of steel columns where the space between the flanges is usually filled very roughly with brick bats, mortar, and empty pockets so as to form a natural channel for the passage of moisture.

(Continued on Page 24)

THE BEAUTY OF MASONRY IS CRAFTSMANSHIP

Residence of Mr. Leet Ware, Norwich, Vermont. An all Masonry home built by Mr. Ware who is a Mason Contractor. Roman Brick exterior, Glazed Tile, Unglazed Tile and Brick interior. All material furnished by Densmore Brick Company, Lebanon, N. H.



Aerial view of Densmore Brick Co., Lebanon, New Hampshire. Upper right corner of picture shows New Lebanon School, built with Densmore Brick.

Plant of Richard D. Brew & Co., Inc., Concord, N. H., Natco Buff Unglazed Dri-Speedwall Tile, With Natco Roman Brick used as a decoration on front wall. All Material furnished by Densmore Brick Co., Lebanon, N. H.

(Continued from Page 22)

In laying up the brickwork, after the mason gets his line stretched and mortar bed laid, simply butter the outer edge of the brick to be placed and tap it into place. This will appear to give a full joint on the outside and if the owner happens to notice that it is not full all the way back just tell him that this is common practice and that when the next bed of mortar is laid it will be squeezed down and fill the joint. Never admit to him or anyone else that the pocket air will prevent this filling, because if all joints were thoroughly filled it might hinder getting what we are striving for — a poor wall with good materials. To insure further that the wall will be poor, lay up several coures of brick without changing the line or plumbing the face, then rack the wall until it is plumb and true. Doing this will guarantee that joints will be opened; also it saves money in laying.

There are still a few more precautions that should not be forgotten. Don't parge the back of the face brick; this might act as a barrier and stop some leaks. In laying the back-up bricks simply slap them into place on the mortar bed when no one is watching, without buttering the ends or sides, and cover the top face with more mortar as fast as possible so that the inspector can't see that the joints are not filled. Naturally, a little mortar must be used at vertical joints on the inside face of the wall because if these were left entirely open someone might notice it.

These notes could be further amplified to cover the use of membrane flashings, how to treat windows, doors, etc., but sufficient hints have been given so that any careless or unscrupulous builder who follows them can be sure to produce a poor wall with high maintenance cost at will, however excellent the materials used may be.

(Reprinted by permission of the author)

CRAFTSMANSHIP IS THE PRICELESS INGREDIENT WHICH INSPIRES DESIGN

RESEARCH ACCELERATES MASONRY DEMANDS

Increased productive capacity is responsible for the tremendous growth in the use of concrete masonry. Laid end to end this unprecedented construction would stretch a half million miles, some 20 times around the earth. Semi-automatic machines are rated at 10,000 eight inch equivalent daily capacity. Complete automation will no doubt develop in the near future. This increased production has been sufficiently effective to balance the increased costs of labor and material thru the years, and is responsible for the growth in the demand and the economy of the product. This has required an accelerated program of research.

Because of the more intimate contact of the masonry unit with the mortar, bearing walls have been found to be more water tight and more stable than non-bearing walls. Thus in the construction of the thinner non-load bearing walls craftsmanship has been found to be of increasingly greater importance. Thinner walls have required greater ingenuity on the part of the architect. The structural engineer is called upon to build additional safety from the forces of man and nature, into the project because of the lightness of the thinner walls. Shrinkage and water tightness has required consideration of jointing and reinforcing. Large window openings, now in vogue, requires that increased attention be paid to developing better flexural bond and tensile strengths in mortars.

Today, walls are often laid complete in one operation including a glaze finish on each face. This requires that manufacturers produce units which will best answer the needs of the building industry with respect to strength, dimensional stability, (shrinkage and tolerance), insulation, acoustics, fire resistance, absorption and aesthetics in order to maintain the high standards of quality established long ago, economically.

For this purpose research has been carried on in the laboratories of the colleges of our country, by the American Society of Testing Materials, The National Bureau of Standards, the Fire Under-

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writers and in the laboratories of the cement, lime, brick and clay tile industries.

These studies involve tests of masonry exposed to high temperature. Investigation of water tightness and stability of walls led to a study of mortar. Acoustical tests are now in progress.

Research in the field of strength are quite complete. One thousand pounds per square inch required for Grade A block is equivalent to approximately sixty four tons per block and this can easily be exceeded with lightweight or heavyweight concrete masonry.

One may well ask why so much strength in block when allowable stresses in walls run around 80 pounds per square inch. There are probably a number of reasons for this, not the least of which is durability. However, sufficient strength to facilitate handling and reduce chipping is also important.

Finer grinding, use of high early strength cement, use of well graded washed aggregate, use of vibration and high intensities of pressure in manufacture and accelerated curing contribute to the high strength of block available today.

Numerous fire tests indicate that a standard eight inch heavyweight block is adequate for a two hour fire resistance. This is established by exposure of a wall to a temperature of 1700 degrees. The time required for the temperature to rise 250 degrees on the unexposed side determine the rating earned. Four hour ratings can be achieved by thickening the face units to about 1 and ¾ inches and using lightweight aggregates which have superior thermal characteristics, or by using solids. Due to inert character of lightweight aggregate temperature changes have less effect on these units. They have better extensibility indicating that they yield slightly to tensile force, reducing the tendency to crack.

Thinner walls have required that insulation be incorporated as a separate material. Much research has been done and it has been established that the lightweight aggregate block has about half the heat loss of the heavyweight. Filling the cores of the latter with a granular insulating material will reduce this about fifty percent. With two coats of Portland Cement base paint this construction will provide walls with less heat loss than in standard frame construction.

Recent studies have clarified our knowledge of acoustics, and two units of measure have been used. If the listener is in the same room as the source of the sound, reduction could be achieved by use of sound absorbing materials. In this case, unpainted lightweight concrete masonry of the expanded shale variety has a high noise reduction coefficient (NRC) (0.45). Two coats of casein alkyd resin paint would reduce its efficiency about half. Sound absorbtive materials are used to reduce reflective sounds.

If the listener is in an adjoining room sound transmission losses are important in determining how objectionable noises made in one room are to the users of the next. A reduction of about fifty decibels is considered desirable for most exposures. Four inch solid, six inch hollow and eight inch hollow heavyweight concrete masonry units, surfaced with cement base paint will provide this loss.

Walls have been the object of much study, and have led to a better understanding of the unit in place. Workmanship classified as excellent laid in class A mortars showed no leakage in rain penetration tests. In structural tests wallettes have been found to develop about half the strength of the units in place. The value of cement base paint in promoting watertightness of these walls was also clearly demonstrated.

Interesting to note was the fact that there was more shrinkage in walls than in individual units. This it is felt may be due to the masonry unit absorbing moisture from the mortar.

Very extensive and intensive work has been done on shrinkage. These tests indicate that rich mixes shrink more than lean and that wet block shrink more than dry. Also it has been found that an additional factor called carbonation, contributes to block shortening due to free lime combining with carbon dioxide in the atmosphere.

IN the City of Bagdad lived Hakeem, the Wise One, and many people went to him for counsel, which he freely gave to all, asking nothing in return.

There came to him a young man, who had spent much but got little, and said: "Tell me, Wise One, what shall I do to receive the most for that which I spend?"

Hakeem answered, "A thing that is bought or sold has no value unless it contains that which cannot be bought or sold. Look for the Priceless Ingredient."

"But, what is this Priceless Ingredient?" asked the young man.

Spoke then the Wise One: "My son, the Priceless Ingredient of every product in the market place is the Honor and Integrity of him who makes it. Consider his name before you buy."

duracrete block co.

Box 217A **Manchester, N. H.**

For Blocks with that Priceless Ingredient

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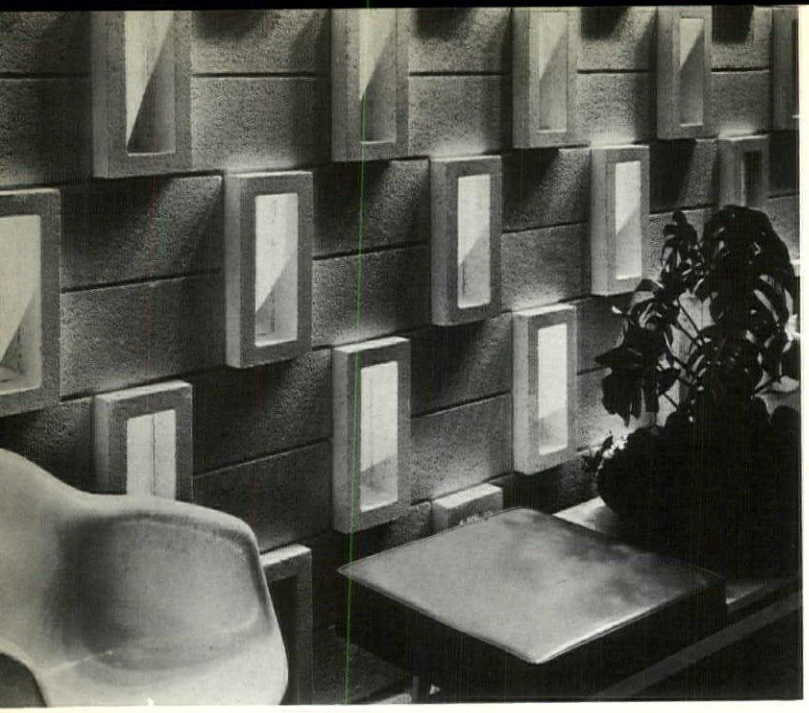
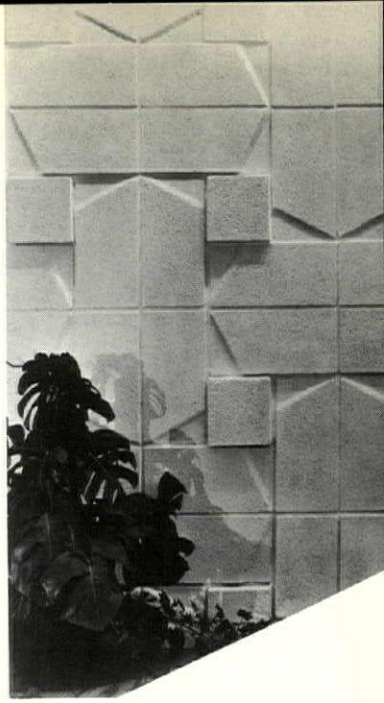
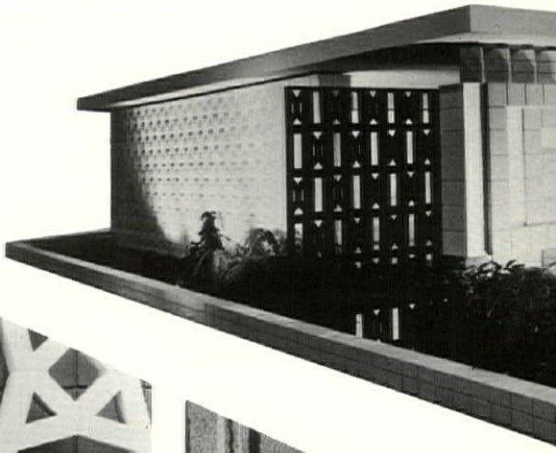
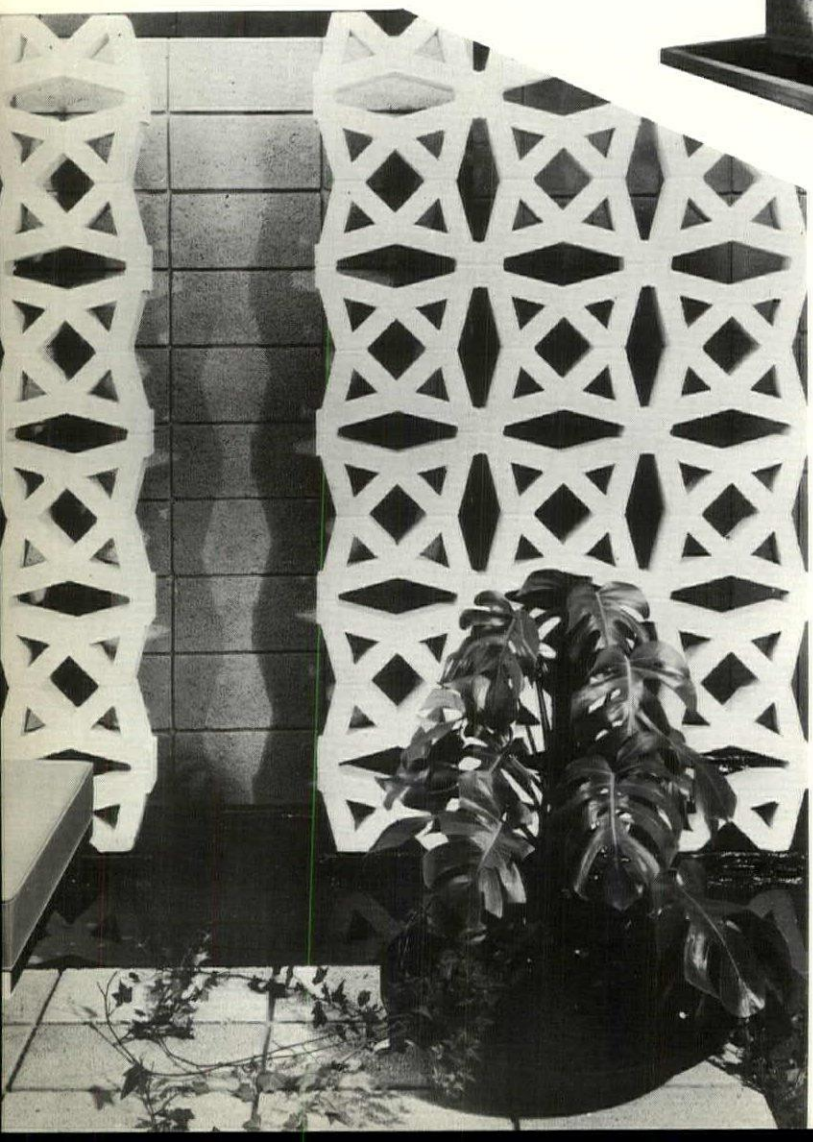
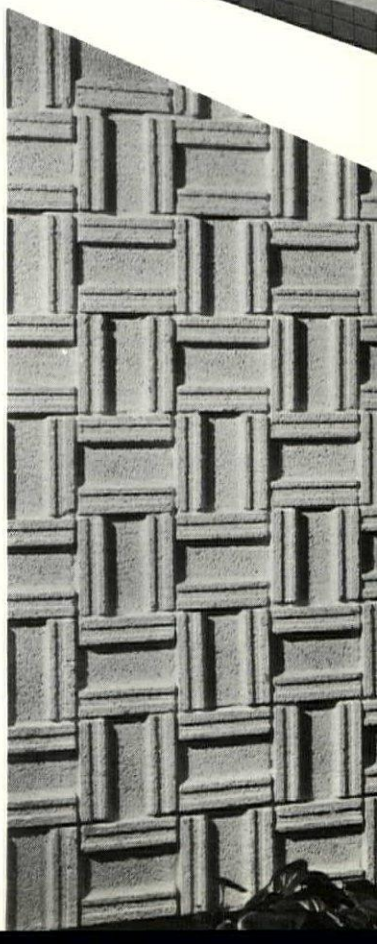


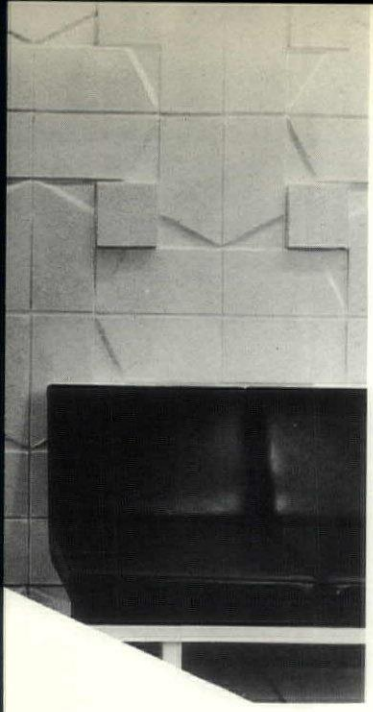


WALLS OF *Distinction*









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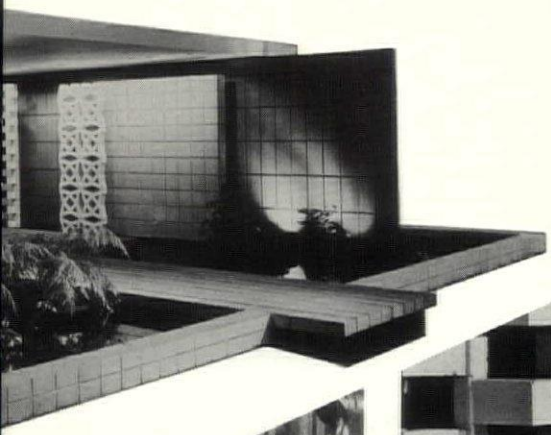
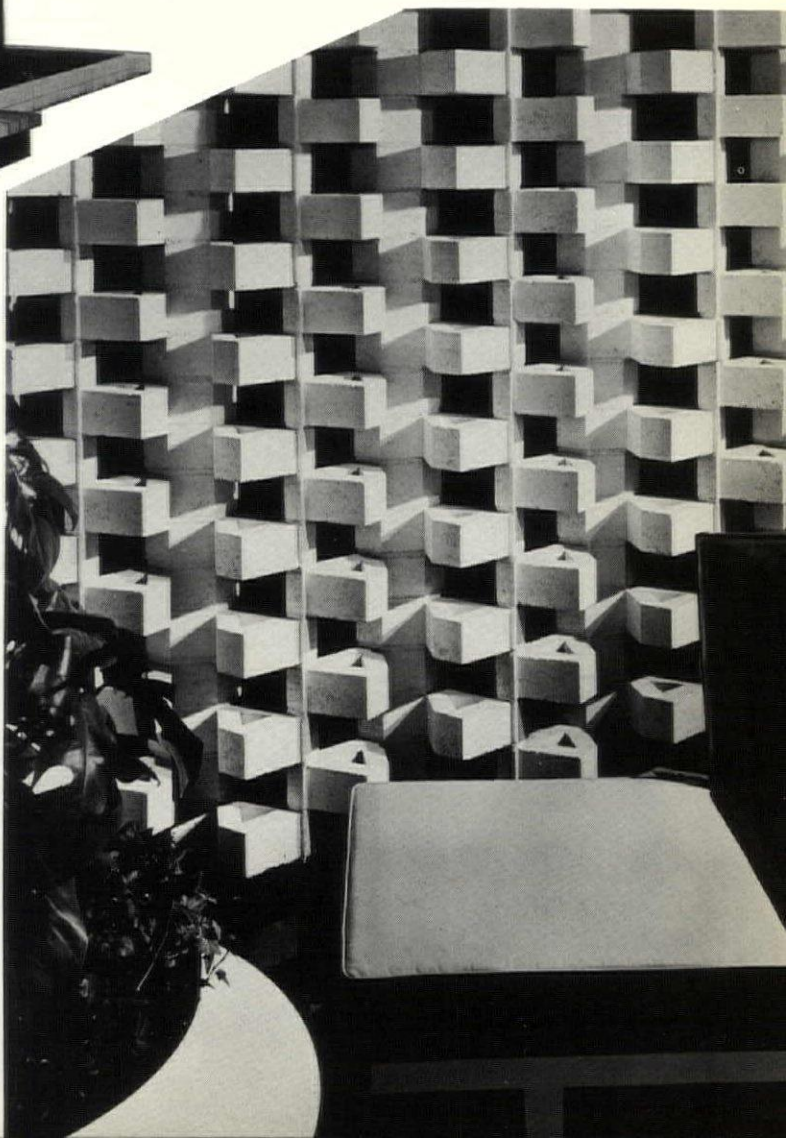
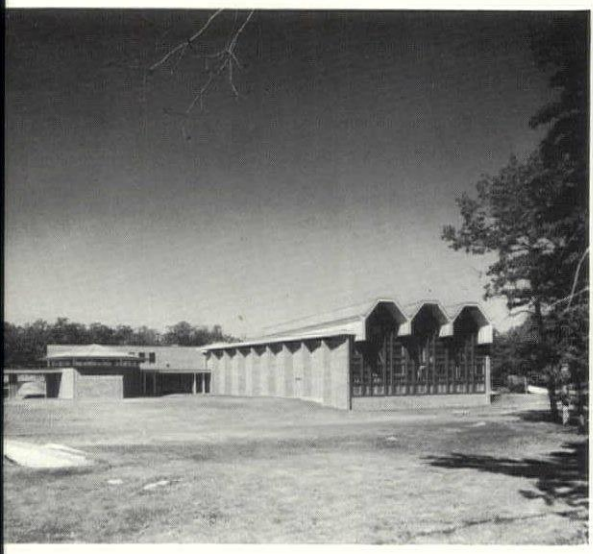
CLEVELAND





Columbia Point Housing Project, Boston, Mass.

Block for Projects on This Page Furnished by Mass. Cement Block Co., Medford, Mass.



Temple Mishkan Tefila, Newton, Mass.

Shadowall Block — West Roxbury Lutheran Church.

MASONRY USED FOR FINEST STRUCTURES

Whether you are building a home, a school, a business plant, or an office building, you want beauty, quality, and durability at a reasonable cost. Continuously from the time civilization began masonry has been used for the finest structures and the most enduring. At first baked clay and stone were used, then brick and stone held together with mortar. In more recent years concrete products have been developed. Down through the centuries masonry construction has been improved as new concepts of building have been introduced, but it has never been supplanted for lasting practicability and pleasing design. Now made in a wide range of sizes, colors, and shapes, masonry units are used more extensively than ever for homes, both exterior and interior, garden walls, patios, walks, and piers, as well as for municipal and commercial buildings.

Structural Clay Products Institute is a national organization sponsored by the brick manufacturers throughout the country with headquarters in Washington, D. C., and about twenty regional offices. Its objective is the advancement of the clay products industry, which is accomplished by (1) stimulating the production of the best possible product, (2) encouraging the training of competent bricklayers and masons, and (3) promoting a widening of the market for the use of brick by calling to the attention of the consuming public the importance of the brick and tile industry in our modern economic life; in other words, to bring together a good product, good mechanics, and pleased consumers. To carry out these aims requires activity in a number of fields. In the interests of improving the basic product Structural Clay Products Institute maintains the Structural Clay Research Foundation in Geneva, Illinois, which is devoted to bettering the quality of brick, developing newer types of clay masonry units, and reducing the cost of masonry construction. The Institute contributes toward the maintenance of high standards and specifications for the manufacture,

sale, and delivery of clay products. It encourages and assists in the training of apprentice masons to become expert mechanics in coordination with local, state, and Federal agencies. It issues much excellent literature (including Technical Notes on Brick and Tile Construction, published monthly) designed to demonstrate to architects and builders the many possibilities of building with brick and its unquestioned advantages, and how to carry out masonry construction properly for best results.

Working with Structural Clay Products in the New England area is the New England Concrete Masonry Association, an organization of the manufacturers of concrete masonry units. These are made up in an endless variety of finishes, colors, sizes, and shapes as dictated by their designated uses, such as lintels, beams, roof slabs, etc., as well as the more conventional block shapes. This Association also distributes much valuable literature.

The Regional Director for the New England area for thesee organizations is Thomas Crane of Watertown, Massachusetts. For many years a bricklayer and construction supervisor, he has first-hand knwoledge of the many problems that may arise in masonry construction, whether in the building of small homes or multiple story commercial buildings. In connection with his capacity as Regional Director he travels throughout the area giving assistance whenever and wherever it may be useful. To keep up to date on current ideas he attends meetings of manufacturers, architects, specifications experts, bricklayers and masons. He has assisted in the formation and continuance of schools for foremen and for apprentices and in the putting on of apprentice contests in Connecticut, Massachusetts, and Rhode Island. He has instructed classes of prospective architects in several schools and colleges and introduced textbooks on masonry where none had previously been used. He has given workmanship demonstrations before a number of interested groups, and he is only too glad to offer his services to any person, committee, or organization interested in doing any type of building in the New England area.

Walls of Fashion

Longspan Precast Concrete Floor Units Installed at New Hampshire Savings Bank, Concord, N. H. by Durastone Flexicore Corp., Arlington, Mass.

A Home on Bodwell Rd., Manchester, N. H. Built of Bevel-Siding Concrete Block, Manufactured by N. H. Concrete Products Co., Manchester, N. H.

A Wall Pattern of Del-Stone Split-Crete Block, Manufactured by N. H. Concrete Products Co., Manchester, N. H.

Bricklayers, Masons and Plasterers International Union of America

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WASHINGTON 5, D. C.

Formbloc, Inc.
12 Centre Street
Concord, New Hampshire

31 December 1958

Dear Mr. Perreton:

This is to advise that we are in receipt of a report from our Vice President Tracy, together with pamphlets showing the type of construction to erect a formbloc wall.

An examination of the information contained therein certainly indicates that this product is properly the work of the members of this International Union. The installation of the reinforced steel rods is a common occurrence wherevery they are used in masonry construction, and they are installed by the bricklayer engaged in the construction of the walls.

The laying of concrete blocks with mortar or laid dry in the wall, setting and installation of anchor bolts, steel lintels, vertical and horizontal steel reinforcing rods installed in the interior of the concrete block walls is the work of the bricklayer; and the pouring of the concrete interior fill is to be done under the supervision of the bricklayer with the assistance of the laborer.

The cleaning, pointing of the formbloc of all joints with mortar or substitute material, cement parging, stucco, and plastering of all formbloc walls on interior and exterior walls is the work of the members of the Bricklayers, Masons and Plasterers International Union.

We trust the information, and decision as rendered herein, will be of service in determining the trade who has jurisdiction over the installation of this material.

With best wishes.

Very truly yours,

John J. Murphy

John J. Murphy
Secretary
By Order of the Executive Board

JJM:plr

FORMBLOC

Helps Masons

It's a lighter block, faster construction, expands Mason's work, safeguards buildings, and is low cost.

FORMBLOC HAS ACCEPTANCE AND FAVORABLE RULING BY BRICKLAYERS, MASONS AND PLASTERERS INTERNATIONAL UNION OF AMERICA. (See their letter on opposite page).

Formbloc, Inc. welcomes Mason's cooperation to provide Formbloc Sub-contract service. Write for specific details to Formbloc, Inc., 12 Center Street, Concord, N. H.

FORMBLOC IS MANUFACTURED AND SUPPLIED IN THE NORTHERN NEW ENGLAND AREA BY:

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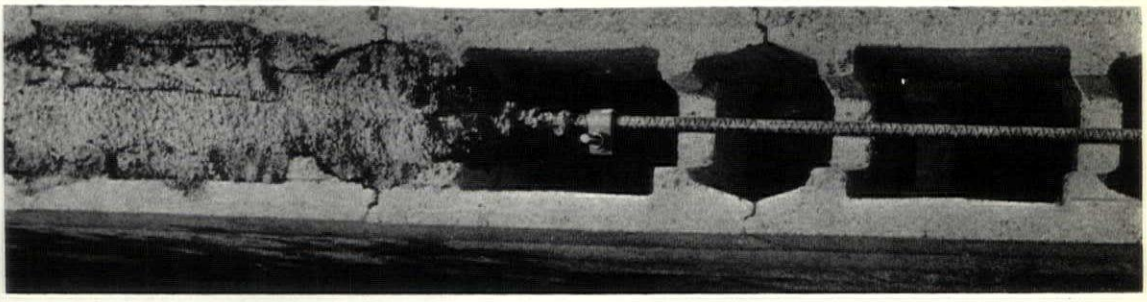
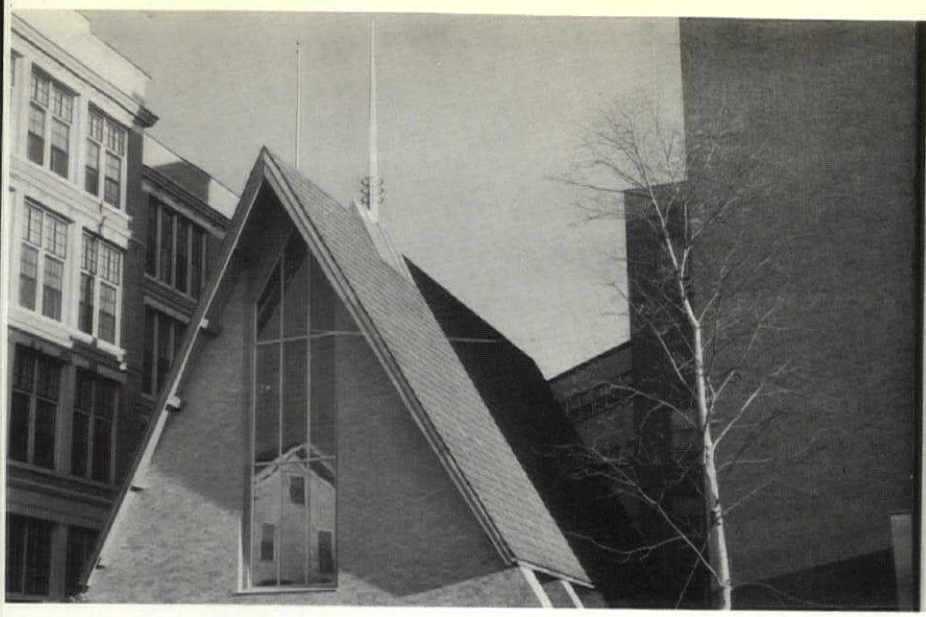
DURACRETE BLOCK CO., INC.
Manchester, New Hampshire

ARTHUR WHITCOMB, INC.
Keene, N. H. and Brattleboro, Vt.

Get in on the Ground Floor (and upper floors too!)

WITH TESTED AND APPROVED FORMBLOC CONSTRUCTION





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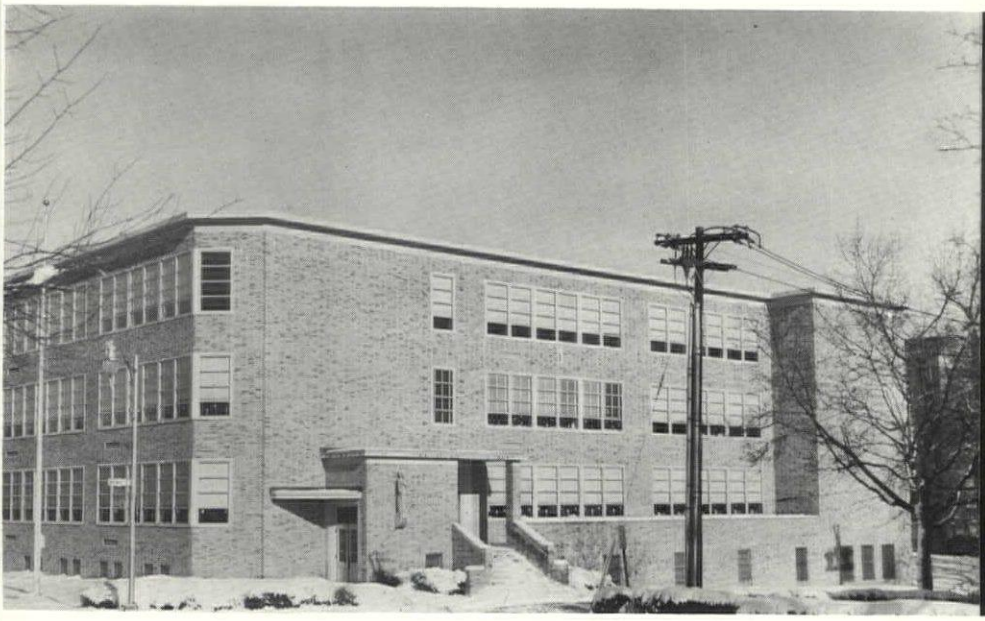

SAINT
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SCHOOL

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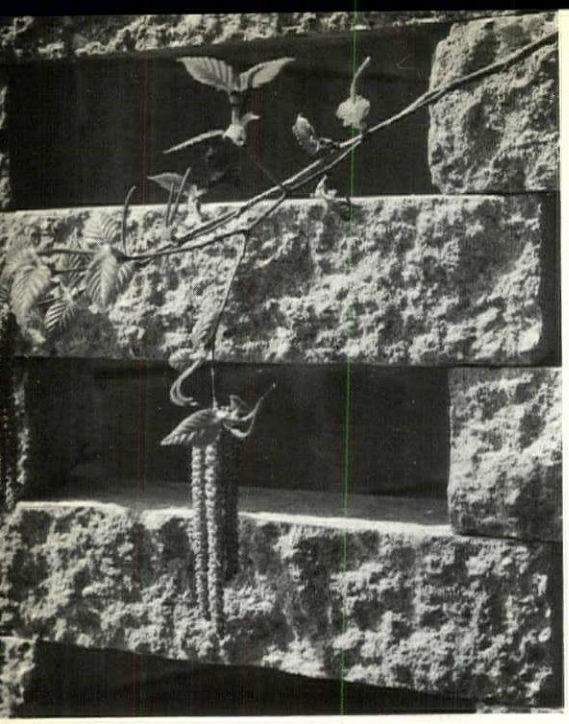
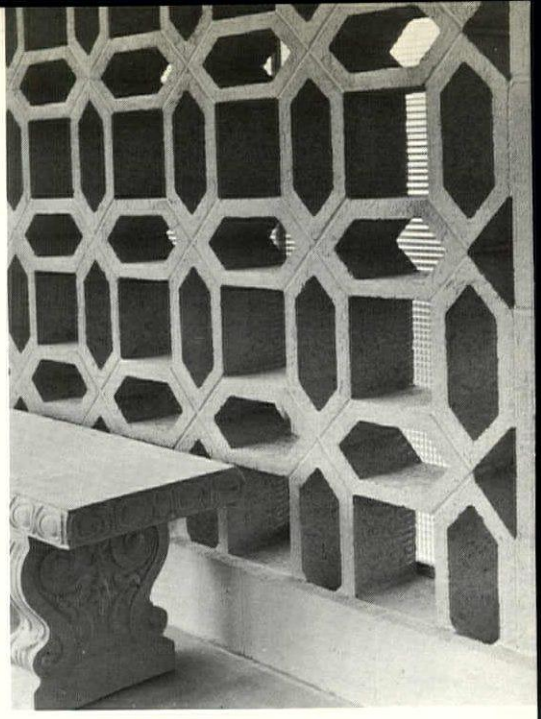
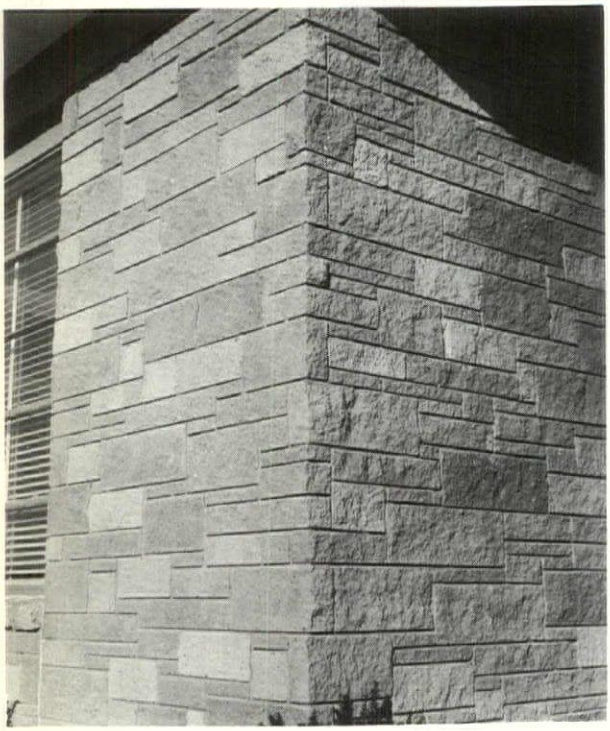
WHELAN
AND
WESTMAN
ARCHITECTS

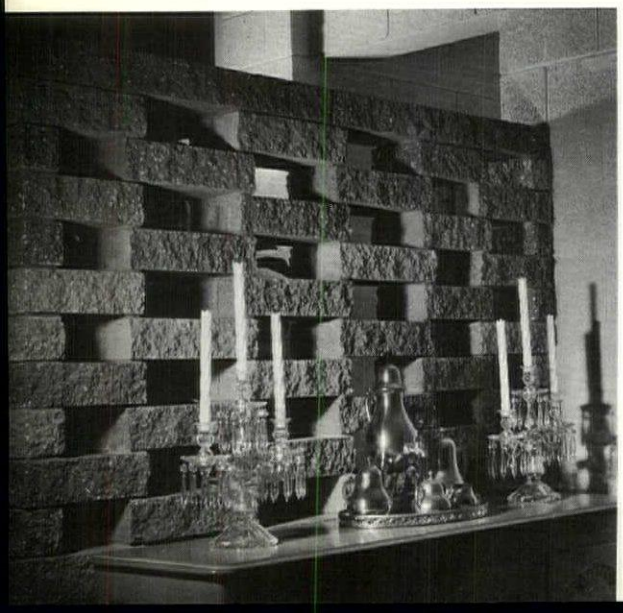
Bricks for above Buildings furnished by Spaulding Brick Co., Inc., Somerville, Mass.

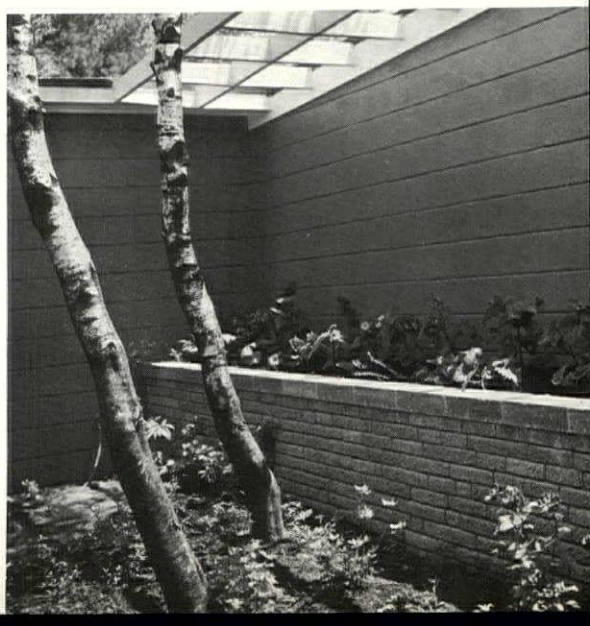






Walls of Fashion





Formbloc Wall Construction on Super Market at Billerica, Mass.

Formbloc Construction

New way to build structural and insulated concrete walls easily and quickly without use of wood or metal forms.

By ARNOLD PERRETON, AIA
Architectural Consultant for
Formbloc, Inc., Concord, N. H.

In line with today's urgent need to cut building costs, speed up, and at the same time provide better masonry wall construction for all types of buildings, "Formbloc" was invented. A brief description follows:

The Objectives—Formbloc was designed to accomplish two things, namely: 1) to eliminate the waste of materials, labor and time so prevalent in concrete wall construction, and to improve the thermal insulation of concrete walls; and 2) to improve concrete block walls for exterior use by preventing wall cracks, dampness, and inadequate thermal and sound insulation. Formbloc was developed particularly to provide an economical insulated 8" exterior masonry wall that could be left exposed, plastered direct to the inner surface of the wall, painted or otherwise coated with thin finishes on the inner and outer surfaces, in keeping with the trend toward the use of thinner walls; and to accomplish this without danger of cracking or the development of other wall imperfections due to structural inadequacies.

Nature of Construction—Formbloc construction is essentially a new way to build concrete walls without the use of wood or metal form work. It combines the best features of the concrete block wall and the poured concrete wall. Formbloc is a conventional-sized, modular, interlocking, and 70% hollow concrete block, shaped to provide a continuous horizontal and vertical void in the wall. Formbloc is laid up in a wall with or without mortar and stabilized with reinforcing steel. It serves as a shell or form which is filled with structural or insulating concrete — hence the name "Formbloc." In this type of construction the Formbloc units, reinforcing steel, and the concrete core become an integral part of a reinforced concrete wall.

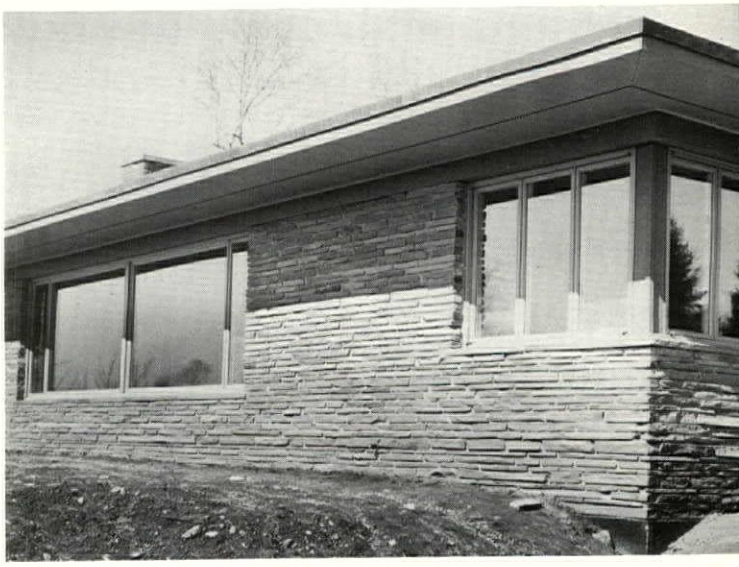
Production and Metal Accessories — Formblocs are made and sold by concrete block plants franchised by Formbloc, Inc. They are made on the "Besser Vibra-pac" machines in accordance with approved standards for concrete mix, height control

(Continued on Page 50)

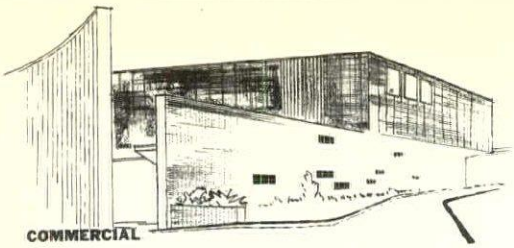
Arrow Needle Factory, Manchester, Blanchard Stebbins, Inc., General Contractors. Brick by Corriveau-Routhier, Inc.

Gossler School, Manchester, Dirsa & Lampron, A.I.A. Architects, Blanchard Stebbins, Inc., General Contractor; Brick by Corriveau-Routhier, Inc.

Garvin Home, Manchester, Alexander J. Majeski, A.I.A. Architect, Andre Courchesne, General Contractor; Blue Stone by Corriveau-Routhier, Inc.



Manchester Boys Club, Manchester, Koehler & Isaac, A.I.A. Architects, Davison Construction Co., General Contractor; Brick by Corriveau-Routhier, Inc.



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A.G. GARNEAU CO.

(Continued from Page 12)

A British patent by W. J. Stewart in 917 and an American patent by Stephen . Hayde mark the beginning of specially repared aggregate for concrete and conrete masonry. Ships were built during Vorld War I and II with these expanded hales. They gave good service and some re still in use.

Twentieth Century developments were apid and accelerated by world conflicts, he national economy sky rocketed to nbelievable heights.

The construction of buildings with rames eliminated the need for thick earing walls and building enclosures beame little more than screens. Due to piralling labor and material costs, furing was eliminated, plaster being applied irect, later, block was left entirely exosed. Cavity wall was introduced from ngland to improve the insulation qualies of conventional walls. Then a less xpensive backup was introduced to reuce wall costs further and finally the eneer was eliminated.

Thus, in half a century we find masonry tanding alone on the architectural orizon. For manufacturers of concrete nasonry it has developed into a challenge lmost too big to surmont.

Walls of antiquity by virtue of their nmensity were durable, strong, stable, atertight and had good acoustical qualies. Modern concrete masonry walls can nly supply the same benefits provided y the walls of antiquity if it is better nade, better designed and better built.

THE APPEAL OF CONCRETE MASONRY IS SIMPLICITY

QUALITY MASONRY REQUIRES COOPERATION

Masonry can survive much abuse. However, only with the good will and ingenuity of all segments of the construction industry, including the landscape gardner, the interior decorator and the client, can it flourish.

The manufacturer must selflessly devote himself to the client, the mason must to the best of his ability resist those few contractors and builders, if indeed there are any who are only interested in "a buck."

The contractor must be reinculcated, if need be, with the understanding that ingenuity, rather than shoddy construction is the best "out" for a job taken too cheaply.

Finally, the architect must extricate himself from the myriad of business details he has not been trained to handle, and must devote himself to a more intensive practice of architecture.

Only in this way can he and all the other segments of the building industry each make their unique contribution to better building.

Perhaps, then, our work will be studied by the archaeologists of posterity.

Bessie C. Rowell Elem. School, Franklin; Blocks by Albert G. Garneau Co. Inc., Franklin, N. H. Alfred T. Granger Associates, Architects; Swanburg Construction Corp., Contractor.

(Continued from Page 45)

and curing, to test 1000 psi gross area, or more. Formblocs are stored and delivered to jobs on pallets. Automatic loading and unloading equipment is used. Formblocs, 8" x 8" x 16" and 8" x 12" x 16", complete with stretchers, corners, halves and jamb blocks, are available in varied design. Formbloc metal accessories, including ⅜" anchor bolts 12" long, ½" horizontal reinforcing rods 20' long, ⅜" vertical tie rods in modular lengths, complete with clamps and nuts, are supplied by the block plant.

Simple to Erect — The self-spacing interlocking Formbloc which requires a minimum of cutting assures easy and quick erection of the Formbloc shell. Either dry, semi-mortar, or full mortar joints can be used. Formbloc is easily adapted to fit all sizes of walls and openings. The Formbloc shell with its large continuous void can be filled quickly with moderately "soupy" concrete in wall sections up to 8' or 12' in height, using structural or insulating concrete fill, respectively. The filler can be structural, insulating, or semi-structural-semi-insulating concrete of any variety of mix and aggregate, such as gravel, cinder, vermic ulite, etc. The Formbloc wall can be lef exposed or finished directly on the interio and exterior surfaces of the wall. A variety of attractive coatings such a paints, plastic finishes, plaster, stucc ceramic tile and other glazing material can provide a thin, durable finish withou danger of cracking or other structura faults. Formbloc wall can also be used a a back-up for brick, stone or marble, t provide a stronger and better insulate wall than is possible with conventiona blocks.

Many Structural Advantages — Thes include: 1) Immediate loading and equa strength because the Formbloc shell i load bearing and yet assures long-tim curing of the concrete core to provide plain or reinforced concrete wall that i equal in strength to the conventional co crete wall of the same thickness an comparable strength. The Formbloc wa filled with insulating concrete is 20% stronger than conventional hollow bloc walls. Formbloc wall construction meet the requirements of the National Boar of Fire Underwriters and has been ac cepted under various building codes i cities and towns of New England.

2) Formbloc is resistant to crackin because the insulating core resists th accumulation of expansion and contrac tion movement in the wall. Control joint are provided by each horizontal and vert cal block joint in the dry wall, and by eac vertical joint in the semi-mortar wal The completely embedded stabilizing ste also resists movement which might caus wall cracks, and also prevents wall stains

3) Wall dampness is eliminated becaus the water-repellent agent in the concret core resists moisture penetration an migration. The insulating core resist and slows down temperature changes i the core and cross-webs of the Formbloc which prevents condensation; and th Formbloc wall can breathe through it dry or semi-mortar joints to evaporat any moisture that might be confined i the wall after erection.

4) Excellent insulation is provided be cause all air infiltration is stopped by th concrete core which blocks all joints

(Continued on Page 52)

14″ x 4′ Double Tee Slabs Showing Cantilevered Overhang for Walk Way. Double Tee Slabs Exposed and Painted Make Interesting Interior Ceilings.

18″ x 5′ x 45′ Double Tee Slabs Showing 18′ Cantilevered Overhang.

(Continued from Page 50)

Moisture penetration and migration is prevented by the water-repellent core which keeps the insulation dry and effective. Thermal conduction is prevented by the non-conducting vermiculite aggregate and by the myriads of non-connecting dead air cells formed in the vermiculite core. The 8" Formbloc wall with a concrete core of 1 part cement and 8 parts vermiculite aggregate has a U-factor of .12, compared to .34 for the 10" cavity block wall, .41 for the cinder block wall, .50 for solid brick, .55 for gravel concrete block, and .70 for the solid concrete wall of 8" thickness.

5) Formbloc is fast and economical construction. A Formbloc shell can be erected and a cement finish coat applied in about the same time required for just erecting the forms; consequently, the time needed for stripping and cleaning forms, pulling or cutting form ties, patching and rubbing down the conventional concrete wall is saved. Likewise Formbloc walls have been erected by masons and others 60%, 40% and 20% faster than conventional block walls, depending on whether dry, semi-mortar or full mortar joints were used. Also, no furring is needed, which is another saving. Formbloc walls have proven to be no more in cost than the average masonry or frame construction.

Construction Has Many Applications — It can be used for retaining walls, foundation, bearing and fire walls, beams, panels, slabs, and exterior superstructure walls. The use of structural or insulated dry Formbloc walls instead of conventional concrete walls for foundation walls in basements and for slab-on-grade buildings will save not only material, labor and time, but also provide the necessary perimeter insulation for basements and floor slabs. Exterior superstructure walls in housing, schools, factories and many other buildings where controlled temperature and low fuel-cost are important, can be built easily, quickly and economically with insulated dry, semi-mortar, or full mortar Formbloc construction. It is likewise a "natural" for air-conditioned buildings where protection against thermal conduction, air infiltration, moisture penetration and migration are important factors along with fire-proof, strong and durable construction. The use of Formbloc for retaining walls and swimming pools presents another application. It is also recognized by architects, engineers and contractors that both insulated and structural Formbloc walls and panels can be designed and built to be practically proof against earthquakes, hurricanes, tornadoes, and other conditions of shock and strain often encountered in building construction. In case of atomic attack Formbloc construction would protect humans against radiation and severe shock. It is also ideal for atomic reactor plants, since both blocks and fill can be made of radiation-resistant material.

Laboratory and Field Tested—Formbloc has been laboratory tested and meets the requirements of the American Society for Testing Materials. Periodic inspection of Formbloc walls in numerous existing buildings, such as housing, motels, commercial institutional and industrial buildings, has revealed that they are highly resistant to cracking, moisture penetration and migration, condensation and general dampness. They are warm in winter and cool in summer.

CONCLUSION: Formbloc construction provides excellent strength, thermal and sound insulation; is highly resistant to air infiltration, wall dampness and cracking; is fireproof, shockproof, rot proof and termite proof. It saves material, labor and time, and assures low construction and maintenance cost. It has been generally liked by architects, engineers, contractors, masons and others who have used it. In all, Formbloc construction is a new, and yet time-tested, improved method of masonry construction that meets the urgent need for today's construction requirements.

(Reprint from Concrete Masonry Review)

HOLBROOK ASSOCIATES IN EXPANDED QUARTERS

John R. Holbrook Associates, A.I.A., announce the removal of their offices from Main Street to 36 Carpenter Street, Keene, N. H.

In announcing the change of location, Mr. Holbrook stated his new offices would be occupying expanded quarters on the ground floor level, with adequate private parking facilities.

R. E. BEAN CONSTRUCTION COMPANY MOVES TO LARGER HEADQUARTERS

Formerly located at 29 Island Street, Keene, N. H., the R. E. Bean Construction Company has taken new office and work space in the former Miniature Precision Bearing plant.

New offices for the Bean Company are on Carpenter Street, and afford the firm more work space, pleasant surroundings and an ample parking area.

CONCANNON CONSTRUCTION COMPANY HAS NEW OFFICE FACILITIES

Due to business expansion, Concannon Construction Company has taken temporary facilities at 360 Maple Street, Manchester. The company's telephone number remains the same, NA 3-0550.

Mr. Concannon plans to construct a new office building for his business in the near future.

AS LONG AS QUALITY IS APPRECIATED THE CRAFTSMANSHIP OF MASONRY WILL SURVIVE

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