OFFICIAL PUBLICATION MINNESOTA SOCIETY OF ARCHITECTS

SOCRATES taught Western Man how to think.
GREEK "broadcasters" were called sophists; they "knew everything and were ready to explain it". Socrates said he "knew nothing but was trying to find out". So he asked questions. Our principal story asks a question so far well answered by few: "How to be comfortable in winter for less money".

NORTHWEST ARCHITECT

JANUARY - FEBRUARY, 1955

IN THIS ISSUE:

VOLUME XIX NUMBER ONE

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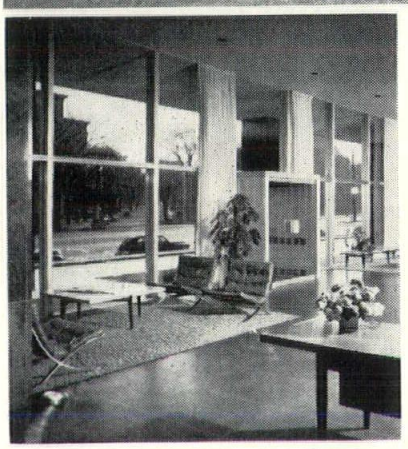

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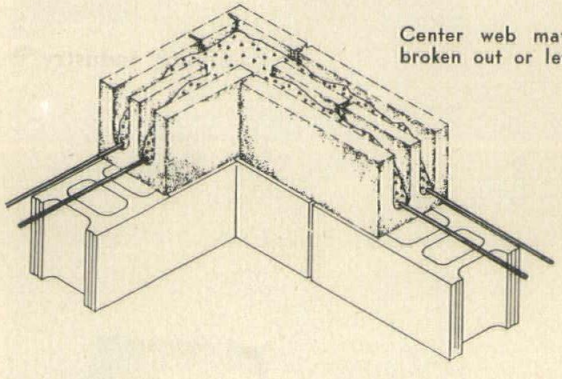

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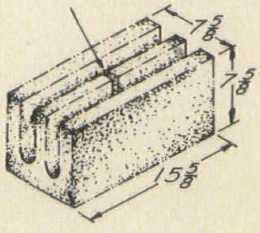

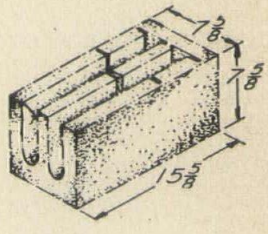

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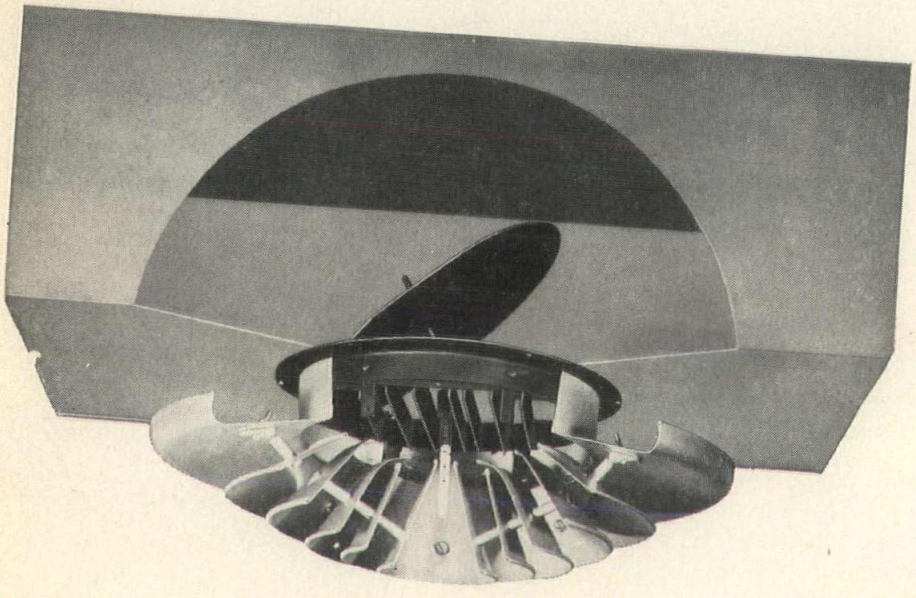

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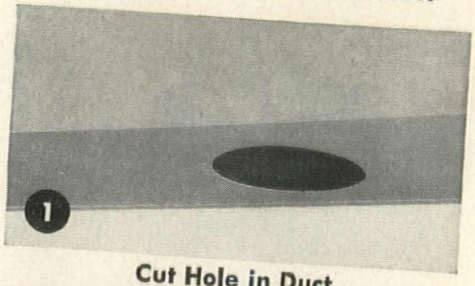

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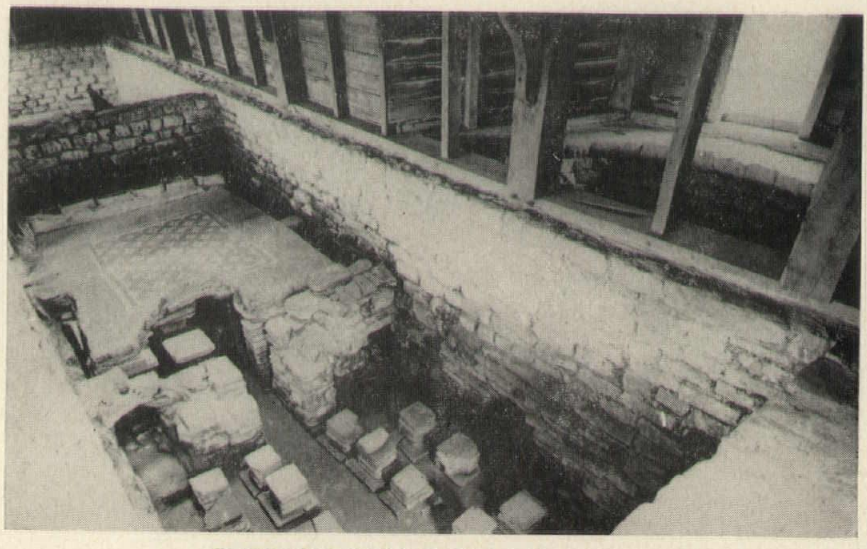
NORTHWEST ARCHITECT



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AN UNUSUALLY EFFECTIVE system of heating, which has remained unused for a couple of thousand years, has recently come into favor in the American Midwest as one answer to the present high cost of fuel and equipment. This is the heating of rooms by using the space under the entire house as a sort of oven into which gas heated warm air is driven by an electric fan, thereby heating the floors, which in turn heat the rooms. This is known as crawl-space heating.

Pictured above are the steam baths of extensive ancient Roman farm buildings recently uncovered in England. The details of their under-floor heating methods remain intact. The mosaic pavement of the hot room is preserved as new, and all around this floor may be seen the opening from the under-floor oven which leads up to flues formed by the finished inside room walls which have now disappeared.

For more about floor heating, ancient and modern, see our story on page 14, together with a description of this Roman country house to be found on page 66.

Official Publication Minnesota Society of Architects, George Darrell, St. Paul, President

Publication Office: 2642 University Ave., St. Paul 14, Minnesota

VOLUME XIX
NUMBER 1
1955

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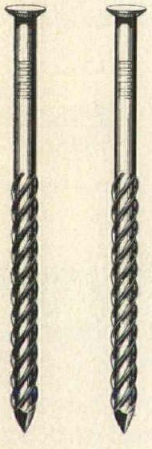

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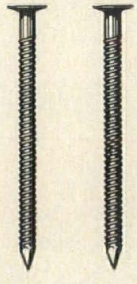

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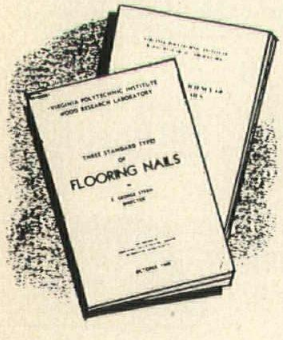

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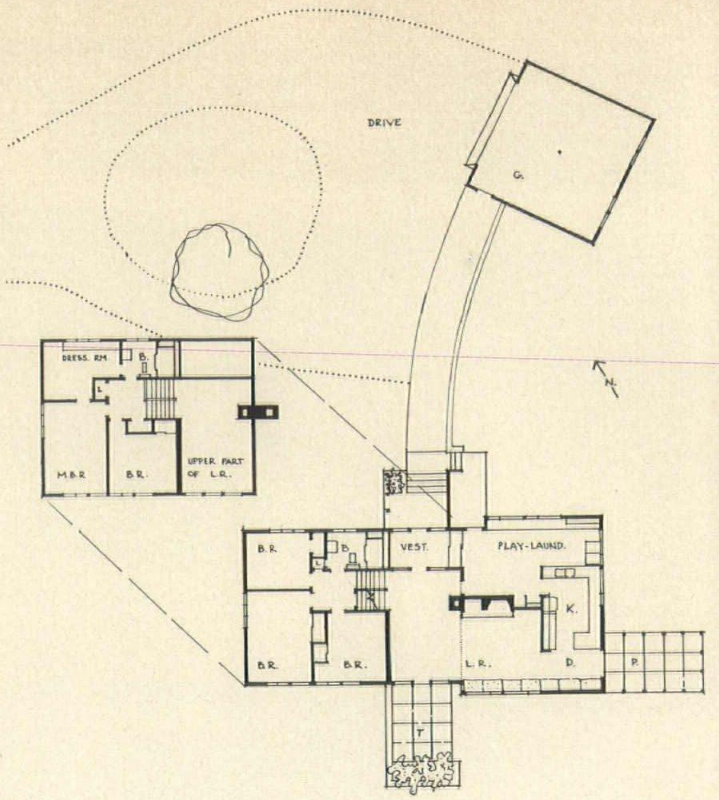

Designed for a family with four children with accommodations for servants quarters.

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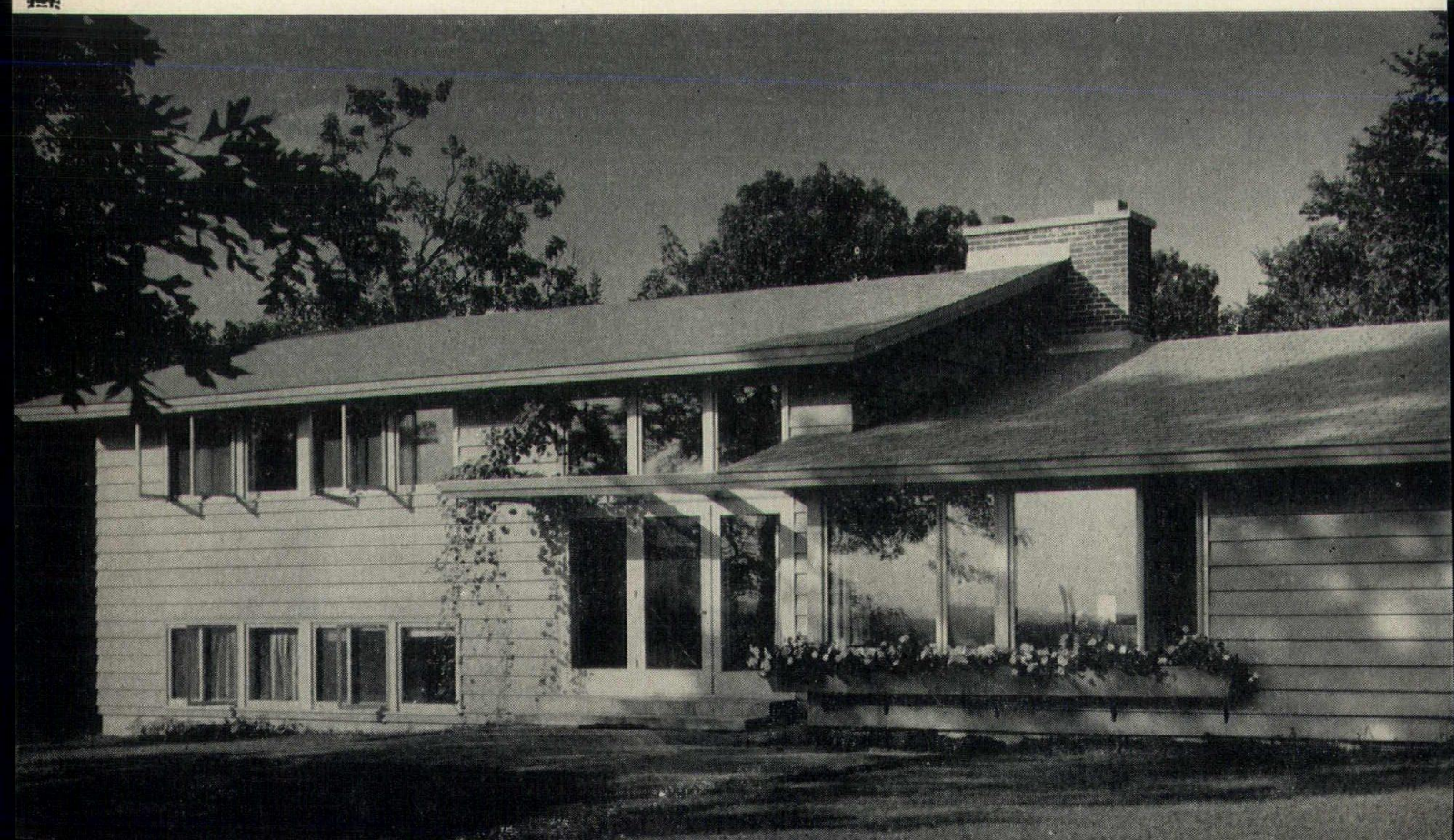

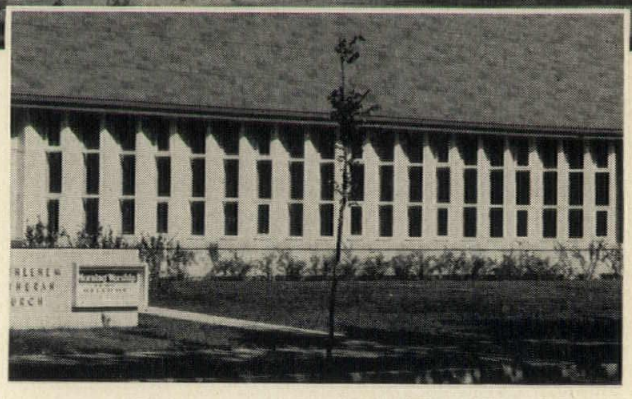

Davidson Architectural Porcelain is used on the Bethlehem Lutheran Church in St. Cloud, Minnesota for the attractive gable at the front and for the "baffle" design beween windows on both sides. Smaller picture shows "baffle" treatment from another angle. Architects: Traynor & Hermanson, St. Cloud, Minnesota.

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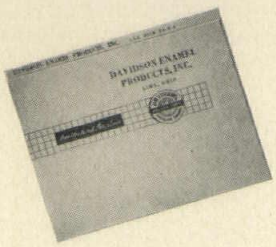

IDEAS FOR DESIGN

This complete architectural file on Davidson Architectural Porcelain contains illustrations, details of basic and special panel shapes and their installation. Write for your copy.

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Minneapolis Becomes Mecca for

A. I. A. CONVENTION JUNE 21-22-23-24

A golden opportunity to take part in a national convention of architects and those in allied fields of the industry will be given Northwest architects when the American Institute of Architects holds its 87th annual convention in Minneapolis, June 21-22-23-24.

Tentative commitments of program features indicate even this far in advance that the convention will be one of the outstanding events to occur in the building industry of this area. The headquarters for the four-plus-day event will be in the Radisson Hotel. Although the dates of June 21-24 are the official convention dates, there will be special events occurring several days in advance of normal registration.

Convention to Climax Year of Events

This holding of the national gathering of the A.I.A. in Minneapolis climaxes a year of outstanding architectural meetings in this part of the country. The state society and regional meetings, combined in Rochester last fall, were fitting cornerstones for the build-up to the national and the regular state convention to be held later this year will round out a picture jammed with important opportunities for those in the industry in the Northwest.

A steering committee under the chairmanship of G. Clair Armstrong, A.I.A. of Minneapolis, has been hard at work on the basic local planning for the big meetings. Members of Mr. Armstrong's committee are Victor C. Gilbertson, David J. Griswold, Allan H. Meinecke, Roy N. Thorshov, George B. Townsend and Wilbur H. Tusler, all well known in this region's architectural work and the A.I.A. This basic steering committee's work has expanded so much recently that a larger group has been formed, with members being assigned to special phases of the much-ramified convention planning. The larger group's members are A. O. Larson, W. B. Cavin, E. H. Lundie, Ruth Armstrong, M. V. Bergstedt, C. H. Tammen, J. M. Leadholm, E. W. Krafft, L. B. Abbett, H. E. McClure, J. R. Magney, R. G. Cerny, W. Vivrett and G. W. Shifflet.

Complete arrangements for the convention and the tying together of the many aspects of such a gathering are cleared through National Convention Manager Arthur B. Holmes, whose headquarters are in Washington, D. C., home of the A.I.A. Liaison between national headquarters and the local planners is close. Regional A.I.A. Director Edgar H. Berners of Green Bay, Wis., also is very active in the planning.

Many famous architects will come to the Twin Cities for the meetings. President Clair W. Ditchy of the American Institute of Architects will preside. Other officers of the national group are Earl T. Heitschmidt, first vice-president, Howard Eichenbaum, second vice-president, George Bain Cummings, secretary, and Leon Chatelain, Jr., treasurer.

This national convention here in the Northwest will offer the region's architects a chance to take an active part in the events about which they have read—the presentation of the latest design and building ideas by leaders in the field, the discussion of problems which have caused them trouble in certain projects, the seeing of exhibits of all the late materials, equipment, etc., in building, the presentation of the A.I.A.'s top awards to the most brilliant person in the profession and its allied arts and crafts and many another.

Convention Pattern Promises Much

The pattern of previous conventions offers a definite suggestion as to what to expect in the extent of this 1955 gathering although committees working on the various individual divisions of the convention promise much that is new and much that can profit well those attending in their future work. Side trips and recreational activities will provide plenty of change of pace to the regular meetings to be held. All-in-all, it looks like another of those convention events in this area which none can afford to pass up without regret in the future.

The Northwest Architect will bring its readers the latest developments in progress of the convention as soon as possible. At this writing the information presented is all that is definite enough to be committed. For the next issue we hope there will be a tentative program, background of speakers and other details. Please watch for these things and meantime mark your calendars for this national event in the grassroots area!

President Darrell Names Minnesota Society's New Publication Group

The continuing growth of the NORTHWEST ARCHITECT in all its departments has brought about naming of a special committee by George Darrell of Ellerbe & Co., president of the Minnesota Society of Architects, to represent the society in the magazine's work and help foster its healthy development in the best interests of the profession.

The committee is made up of S. L. Stolte of Bettenburg, Townsend & Stolte, St. Paul, as chairman; Ralph Rapson, new head of the School of Architecture at the University of Minnesota, Minneapolis; and D. S. Haarstick of Haarstick-Lundgren Associates, St. Paul. H. W. Fridlund of Minneapolis was named technical adviser to the group. All are A.I.A.'s and Mr. Stolte is immediate past president of the state society.

The NORTHWEST ARCHITECT, which was born in the depression days of the 1930's and for many years went along as a thin publication, has had a healthy growth in recent years until it is recognized as one of the outstanding publications in its field. It is a joint-ownership property of the society.

The new editorial group will co-operate with the magazine's permanent publication staff in formulation of forward-looking policies, assist in expanding editorial coverage of the magazine and in similar ways help in making the publication an ever more useful instrument of information and service to architects, their associates and suppliers.

Growth of the magazine from its small beginnings to its present general acceptance has also taken it into wide fields of readership. In addition to its distribution to architects and other industry readers in the Northwest, it has an active group of regular readers outside this area and outside the United States. Letters from readers in other countries like Sweden, Union of South Africa, Belgium, England and Australia indicate it is read and followed there.

First meetings of the editorial committee brought forth many suggestions for changes and improvements in the publication as it seeks constantly to improve its service to its readers and advertisers. The changes and improvements decided upon by the committee will be incorporated into the magazine as the issues pass.

Charting a magazine's future are (left to right), seated, Messrs. Haarstick and Darrell, standing, Messrs. Fridlund, Stolte and Rapson.

Although the committee and the magazine's staff are responsible for developing stories of the outstanding architectural developments in the area, members pointed out that the aid of all architects, engineers and others in the building industry is sought to bring to the publication's readers all the news possible and suggestions for stories and features are solicited from all readers.

Religious Architecture Subject of Iowa State College Conference

A common meeting place for discussion of the latest problems in religious architecture was provided by Iowa State College, Ames, in its Conference on Religious Architecture, February 8 and 9. Present were architects, clergymen and others interested in this special phase of building.

The meetings were held under the auspices of the college's department of architecture and architectural engineering and brought leading members of the two professions from a wide area into Ames. Turpin Bannister, F.A.I.A., from the University of Illinois, whose subject was "From the Architect's Viewpoint—Historical Settings for Worship," and Paul Thiry, F.A.I.A., Seattle, Washington, whose topic was "Contemporary Church Architecture," spoke at the opening session.

Harold Spitznagel, well-known architect from Sioux Falls, S. D., and a 1954 award winner in church architecture, gave an informed presentation of color slides on which he commented. The natures of the civic community and the worshipping community were subjects for two panel discussions by groups of architects and clergymen.

President O. H. Thorson of the Iowa Chapter, A.I.A., of Waterloo, Iowa, talked on choosing an architect and the nature of his services. Leonard Wolf, the college's department of architecture head, Profs. Lawton M. Patton and R. D. McConnell and G. R. Henninger, assistant director of engineering extension, represented the college on the programs.

You, as an architect-reader of Northwest Architect, can help the magazine to grow. See the envelope inserted under the cover.

HALF YOUR FUEL FREE

Right under your own house

This piece is written in plain sociable language so that anyone can understand why he feels cold and how to get warm.

By William Gray Purcell, A.I.A.

OF COURSE, architects, and even heating engineers, also have to keep warm. They can read this at home and write me indignant letters to which I will later respond with the facts or alibis.

YOU LIVE in a house; want to be comfortable. You would like to buy your fuel at minimum cost and be free of bedtime and breakfast janitor duties. Well, Janus, you recall, was the tribal god to Rome's coldest month. Janus, January and necessity taught the Romans, and the Romans taught the ancient world how to keep cozy in all-masonry dwellings by heating the stone floors and walls. Everywhere from Baalbeck to Britain the pavements and marble mosaic salons were always warm. Slow fires burned beneath them. The hot fumes spread between the little brick piers which supported the floor slabs. These hot gases were then drawn up into flues within the four walls of their rooms. The hollow walls thus became continuous, warm chimneys wrapped around the living space, from floor to ceiling.

How did I get started writing this specialty piece about heat for homemakers, physics for physicians, and physiology for engineers? For one thing, half a dozen years ago we built some rental dwellings in South Pasadena. We built the copper hot water heating tubes right into the cement slab floors. The practical success of this arrangement was a great surprise. It pleasantly surprised the skeptical renters. Then too, one evening before Christmas, I was making some holiday Sound Scriber records for four Minnesota Scoutlets, reciting Hiawatha to them. We got to the part about that big northern bird who flies under water to catch fish. He is the forest clown, the loon who laughs in sunshine, sounds sad old calls in frosty moonlight. Then Winter comes to his lakes, and to his nest the cruel North Wind.

North Wind cold, Kibibonokka,
Came to loon's lodge, wild and wailing,
Heaped the snow in drifts about it,
Shouted down into the smoke flue,
Shook the lodge poles in his fury.
Shingebis, that diver, cared not.
By his blazing fire he sat there;
Warm and merry, eating, laughing;
Singing "O Kibibonokka,
You are but my fellow mortal."

That winter scene really spoke like Christmas. It reminded me how small a blaze, of bright twigs and pine cones, would warm our Lake Vermilion tepee on stormy days in 1928 when Andrew Toivola was helping build the log cabin.

Like the birds and the beasts of the Great North Woods the Chippeway Indians also knew good health. Outdoors or in, those wise men slept with their feet toward the fire. The Eskimos too were ingenius in dealing with the great cold or with wet moss in their moccasins at the time of spring melting. Their first thought was to protect their feet. And there was Grandma Gray, who knew all the pioneer home cures. She began every cure with getting our feet warm. When we came in from winter snow battles, numb feet must be toasted at the glowing coals of the open "grate" fire in the sitting room. Dry footwear was always handy. When hunting, Grampa Gray carried extra wool socks and moccasins tucked into his belt.

Long years later came 1944 with soaring building costs. Concrete slabs, with their gray, hard, cold cement surface, were used more and more in dwellings to serve both as foundation and floors. The architects and builders, on the receiving end of all the complaints from housewives whose feet hurt and tract developers who couldn't sell their houses, because of those awful cement floors, became convinced that they had made some sort of mistake in figuring to heat only the air content of the *buildings,* instead of attending to *the comfort of the people.* The people, trying to live in the houses, were all at a nice uniform temperature of 98.6° *inside themselves* (except those cold feet and legs) but they were radiating their own spare heat (with none to spare) to the heat hungry building material.

Through the years dozens of patent floor coverings had been offered by manufacturers, but these helped only the looks. We came upon this problem early. Back in 1924, for cement bedroom floors in a side hill dwelling, we tried covering the floors with six layers, three of criss-crossed waxed papers, two of eel-grass quilt between waterproof paper, and on top of all a heavy pile carpet wall-to-wall. It felt like walking on a mattress, cost a lot, and gave a cozy appearance. But the cold of the always damp concrete would at last get through anything. Or more accurately said, it wasn't the cold that was "coming through"; it was the heat that was going away. Heat, like a leak of water, has lots of patience; but water and heat both

arrive where not wanted, or depart from where wanted most, each in its own good time, but no good to us.

THIS REVIEW will give general readers some idea of what all chilly folks have had to put up with and what should be done for them. Now, let's have a look at one of the good answers for this need and how it works.

THE EARTH TEMPERATURE below the frost line, in either temperate or northern weather, remains about constant the year around. That stable temperature is about 45° or 50°. Thus any dwelling, even in zero weather, has, immediately below its entire area, a permanent radiator ready at all times to supply a third or more of the total house heating demand. How can we make available this bountiful reservoir of Mother Earth's ancient fires?

One method, for those houses which are built with concrete slab and cement floors, is to plan the floor slab so that it becomes a low temperature heating radiator the size of the whole house and serving every room, passage and closet, keeping the front walk and auto drive clear of snow.

This underground source of heat is ordinarily shut away almost unused, both in the conventional basement and in one-story, no-basement houses built on cold concrete slabs. There is a twelve story glass walled office building in Portland, Oregon, which is heated with free underground heat. No additional fuel whatever is purchased. The only expense is for the power required to run the pumps which bring up, concentrate and circulate the heat!

The cast iron radiator or air circulating heater in your dwelling has to make up for your unused free heat by the use of coal, oil or gas for which you have to pay. This stored body of heat which came with your building lot, and has been there since the beginning of time, is the heritage which carries up your house temperature from "ten below," or from —20°, or—30° outdoors, to a very *helpful* but not yet comfortable, far-above-freezing indoor temperature of 40° or 50°. This temperature lift from "ten below" or "thirty below" outdoors, to 40° or 50° on thermometer indoors, means 50° to 60° of heat absolutely free. From that free-fifty level on up to the normal 72° you now need pay for only 15° *more* heat to be warm and comfortable. This is because with floors and walls warm, 65° and not 72° will be the comfort mark on your thermometer. This was only one of the reasons why we decided to tell you something about heat-tubes-in-the-floor-slab which seems to be the simplest method of making available all this latent heat.

WE HAVE now seen how we got these cold concrete floors. How can we capture the 60° of free heat under them? Let's have a quick look at a new kind of heating plant and the details of its construction.

THE CEMENT SURFACED, concrete-slab house-foundation and floor rests on a thick layer of coarse crushed rock acting both as an insulator and as a seep layer to drain away occasional accumulations of water. The plumbing service waste pipes are placed in this rock layer. The coarse rock is topped with fine and the whole with sand. To avoid moisture in the soil being blotted up by the very absorptive concrete, the entire area is sheeted with a no-seam membrane of pliofilm. This is available in continuous sheets up to eighteen feet wide and any length. Pliofilm is tough but nevertheless must be handled with care to avoid punctures.

Above this sub-foundation sandwich is now placed a serpentine grid of small, flexible, copper tubes about the size of your little finger. These tubes make a regularly spaced pattern of straight sided loops over the entire area of the house. The tubes are spaced about 8″ to 12″ apart — 8″ in bathrooms and the margins of living spaces; 12″ under rugged areas, in halls, bedrooms, etc. Their carefully calculated locations rest on engineering experience in securing a balanced result. The spacing does not vary greatly with the climate, for a floor warmer than 72° is not desirable. In cold climates additional heat is secured by more continuous circulation of the hot water in the floor tubes, or by some added space warming radiation if needed for extra cold days.

Each embedded tube of the system is one of a series of unit loops preferably not more than one hundred fifty feet long. Each tube leaves the point where the heating unit (the "boiler") will be located, runs to its planned service area and directly back to the heater, one or several for each room as required by room area and use. At all points the hot water in the tube is delivering heat at about the temperature of a very hot bath to the cement surface of the concrete floor in which it is embedded about two inches below the surface. The concrete slab thus becomes storage for heat and its cement surface is the "radiator" which heats both the air in the rooms, and, by radiation, all the objects in the room including the people. The total result is that instead of a radiator of cast iron sections under your window at, say, 150° to 180°, you now have a radiator which is actually the size of the entire house which operates at half that temperature or less.

THERE YOU HAVE a brief outline of that part of this new type of "heating plant" which delivers the heat to the people living in the house. Now where are we to get this compensating heat and how much of it do we need?

THE BOILER or heat supply unit is a standard "domestic" automatic hot water tank heater such as is used everywhere, under a ten-year guarantee, for kitchen and bath supply. This heater meets the needs of this new under-floor tube heating system perfectly. It is trouble free. Its first cost and replacement are very much less than the heavy and expensive cast iron house-heating gas boilers. The three principal engineering demands upon such a unit are these:

First, this mild temperature heating does not make rugged demands beyond the durability of the metal and construction of such heaters, which are not designed for peak demand heating loads.

Second, in this slow build-up and stored heat-in-the-slab system, a heavy duty boiler to cover peak load demands in coldest weather is not necessary. In conventional heating plants with maximum demand boilers,

the boiler operates at an inefficient half capacity about 80% of the time, when nearly cool days or average winter temperatures are asking for only a nominal amount of heat.

Third, this positive pump-circulated tube plant meets its maximum loads by depending on the equalization factor of stored heat. When an in-the-floor tube system is first started it takes about three days to build up the basic fund of heat on which the normal functioning of the plant depends. This heat is never lost, but gives out to the house and is replaced according to the varying outdoor temperature and the day or night needs of the family. This floor slab radiation also transfers radiant heat directly through the air of the room and stores more latent heat in walls, ceilings and furniture. Thus the heater working for longer "on" routines, at its most efficient and an unforced rate, can take its own time to restore the heat to the floor slab, by increasing the periods of operation, instead of raising the temperature of the hot water in the pipes as is customarily necessary. In this way the small amount of commercial heat fed through the tubes to the mass of concrete slab, plus what is continually coming up from the earth night and day, summer and winter alike, act together as an equalizer against the "too warm — too cold" thermostatic sequences of rooms which are supplied by automatically controlled air circulating heaters.

The domestic water heater ideally meets these conditions. The size found in most rooms is the 30-gallon for three persons. With heating added we find an 80-gallon heater ample for both domestic and heating service in this Pasadena climate, which has a weather temperature minimum of about 30°, and that not often. Bath and kitchen hot water with house-heating cross-connected are all supplied from the one 80-gallon tank and the heating demand never encroaches on the full supply of 140° kitchen and bath needs.

To supply the sub-freezing demands of Minneapolis an added standby tank heater of proper capacity should be added. Such a unit could run 24 hours in coldest weather to maintain the full heat reserves in the slab.

In connecting this light weight, long run, medium temperature boiler to our floor heating system, the boiler supplies a constant flow at 140°. Cool water returning from the floor circuits is mixed into this hot supply so that the resulting average temperature of the hot water electrically pumped to the under-floor tubes will maintain a temperature of 74° on the surface of the floors throughout the house. Heat balance in the tubes is accomplished by adjusting the amount of water flowing through each pipe when the plant is first put into operation. This is done by means of control valves in each loop and in the return recirculating feed pipe. When once all pipes and resulting floor temperature in all rooms are brought into basic relation to produce the temperatures required for the various family needs — bath, bedrooms, work areas, passages, relaxation center — they are never again changed. The control of room-by-room temperatures and the over-all house temperatures is by the universal Honeywell clock thermostat.

SINCE PEOPLE are our primary concern, let's forget the heat engineering for a moment and look at the effects of cold and heat on the bodies of people as they live in houses.

MAKING THIS IDEA CLEAR for you has been helped by the unexpected comments of two people who appeared just as I had reached this point in my story. First, it occurred to me to call up the research engineer at the American Radiator Company. They have always been pioneering in new developments and it was their president who established and endowed the John Pierce Foundation at New Haven, Conn., which has made a wide range of contributions to the new day in good living.

To the young man I said, "Can you supply tables which will show how much *more* fuel it takes to raise room temperatures the 10° from a chilly 62° to a comfortable 72° *than* it takes to raise the same room temperature, the same distance on the thermometer, from 32° to 42°?" He could find out and would write me. I will report to you when he does.

I said to him, "This piece I'm writing assumes the view, not to my knowledge so far held in heating engineering, that your science should be first concerned with heating the people and only coincidentally with heating the building."

He said, "Hold it — you are absolutely right and that is exactly the objective in our business today. Heating engineers see it clear at long last and it's amazing that we have all been detouring the obvious."

Then George Elmslie's nephew, Walter Millar, a physicist from the University of Pittsburgh, and his wife, Becky, bounced in to have dessert with us as has been their custom for some years. Becky had on a coral frock and a wooly long coat of warm gray. She said,

"Brrr it's certainly cold!" (It was 50° outdoors). "And *is* our house like an ice box!"

"What's the matter with that new automatic, piped gas-furnace you just installed in the cellar?"

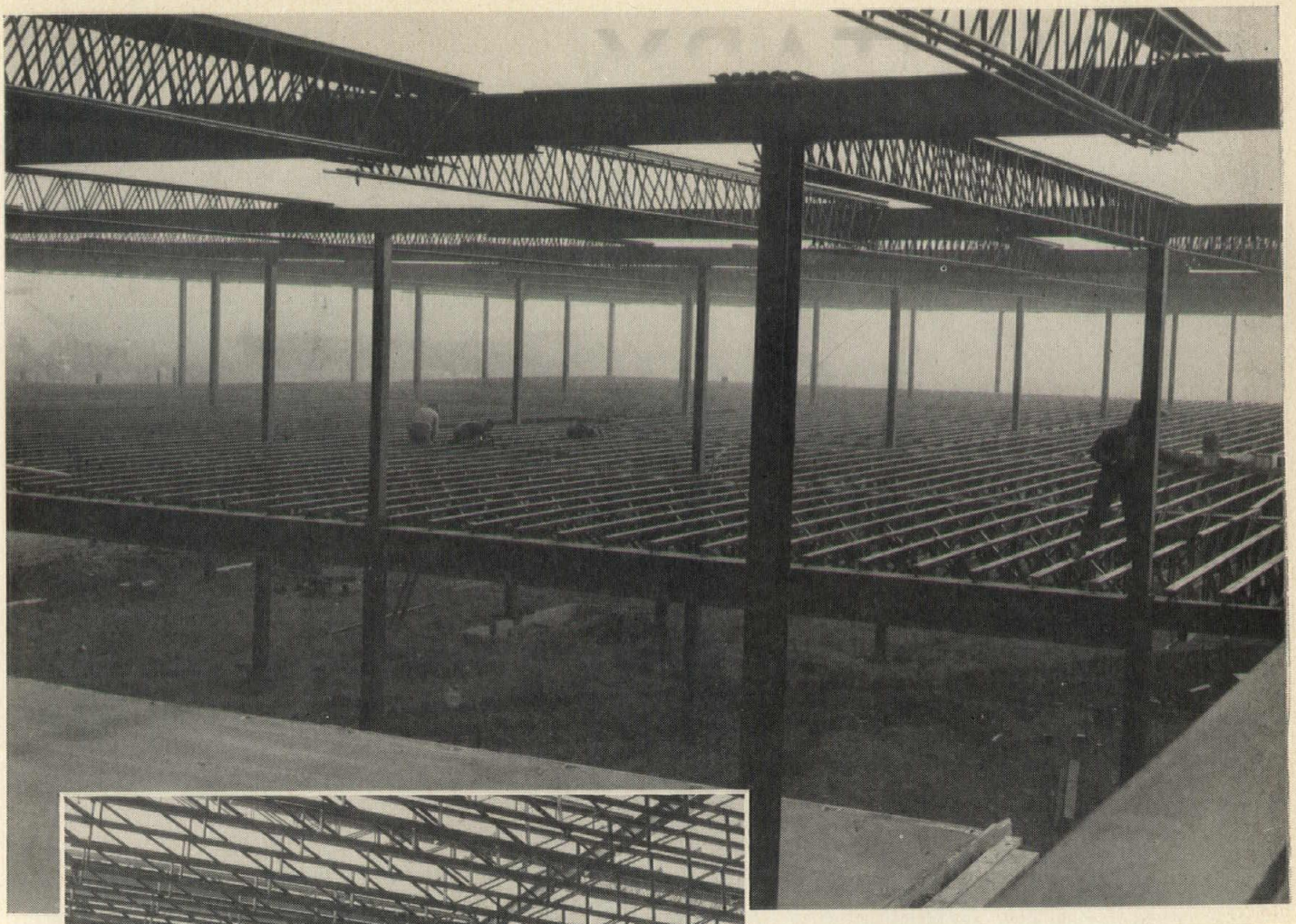
"Oh, it keeps the rooms warm all right — 72° and all that — but if you sit near a wall! . . . and those ice cold, hardwood floors — O! wow, just takes it right out of you!"

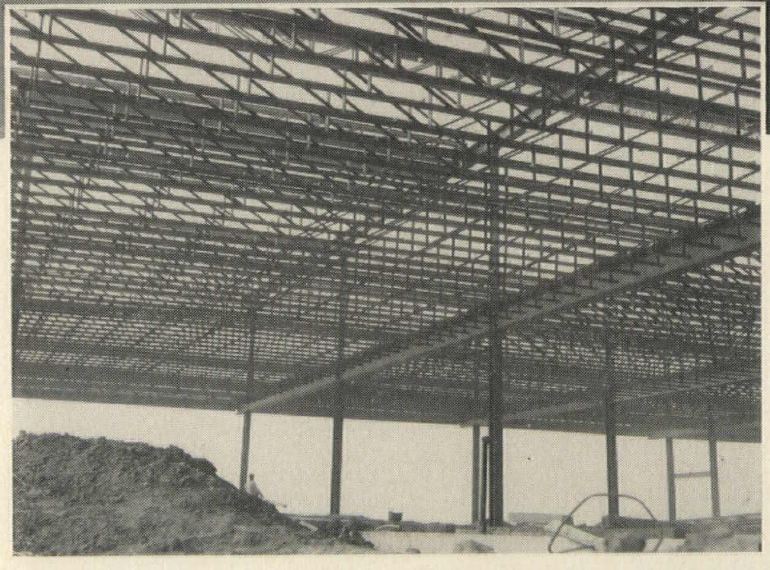
So there is the problem, said plain by an engineer and by a housewife, and you too will have experienced what they have.

WE MUST NOW find out why it is that buildings and the things in them persist in being cold while their "rooms" are warm.

TO BEGIN WITH, please distinguish between two kinds of heat, *radiant* heat and *convected* heat, RADIANT HEAT as from an open fire, from electric heating elements or from the iron radiators of circulating steam and hot water systems. CONVECTED HEAT is the warm air that swirls around in rooms and is gauged by thermometers. Convected heat is possible because of water vapor (a gas) which, however little there is of it, mixes itself evenly throughout every atom of air, and is found in widely varying amounts. In iron-radiator heated rooms in "twenty below"

(Continued on Page 65)





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A MILITARY SCIENCE ARMORY

for the University of Minnesota

An Undergraduate Thesis Submitted by David E. Miller to the School of Architecture, University of Minnesota Summer 1954

Purpose and Aims of Design

The need for a new building to serve the Army, Navy and Air Force in their teaching programs has been evident to University officials since 1940. At that time it was proposed to build a separate unit for the Navy; however, the university persuaded the government to keep its Naval R.O.T.C. program in the present armory, making use of an area which was a burden to the U. of M.

With the coming of the Korean conflict, the draft and deferment requirements, the services found themselves in a very bad space "squeeze-play." The freshman R.O.T.C. student becomes aware of the inadequacy of classrooms on his first arrival in the armory. The instructors suffer not only from lack of space, but poor lighting, ventilation and acoustics. The present supply rooms are cramped, poorly located and function through inconvenience to all concerned.

The purpose of this program, therefore, is to design a building or building group which will completely and adequately meet the demands of the Reserve Officer Training Corp program of the Armed Forces.

The economic factors involved in such a building are as follows: the federal government, with a small percentage of aid from the state government, will purchase the land required for construction of the new armory and will also pay for its entire cost. Maintenance is assumed by the University of Minnesota at the completion of construction. More will be discussed about final purchase and site selection later.

What should be the relationship of the new armory to the university? Must its design be of the traditional style of the campus or should it assume its own place in the world of changing social, economic and educational standards?

Approaching the problem academically, I propose to design this group as a self-existing unit free from the bonds of traditional architectural styles, expressing itself in a new and hopeful way—based on the idea of world peace through preparedness to suppress aggression.

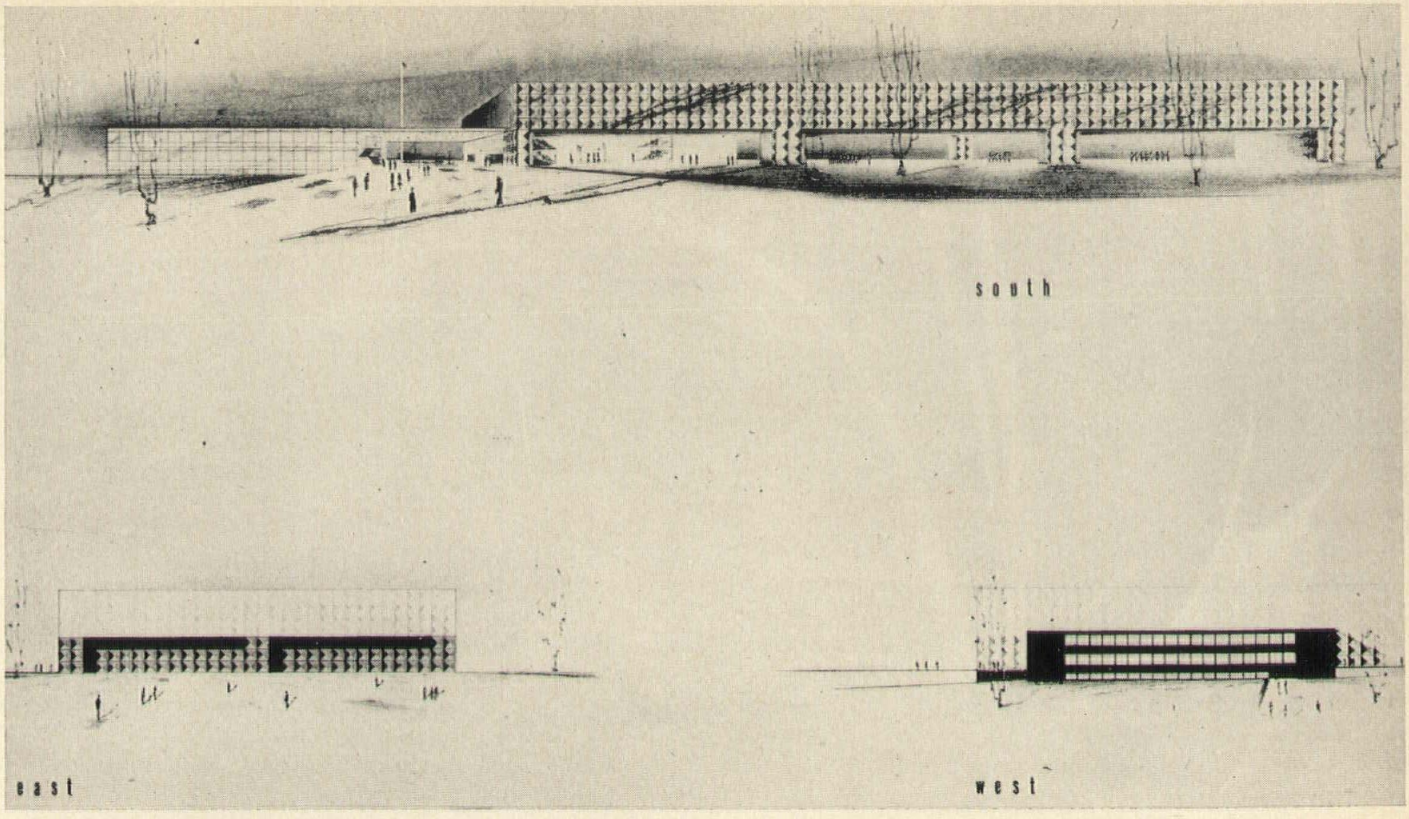
The eventual military training program may include a minimum of two years training to all youth in college. If universal military training is adapted by our government, larger facilities will be needed to teach and train these youths. Security measures may some day be taken to permit instruction in classified and secret information and weapons.

Training in civil defense, a program which would be opened for civilians of the metropolitan area, could set up its center in this unit in case of mobilization.

All these factors are mentioned to show the possible future development of this military group. The site selection will be discussed later, suffice it for this problem to say that land for expansion is needed but the solution of the problem is based on the needs of the services at the present time or the near future.

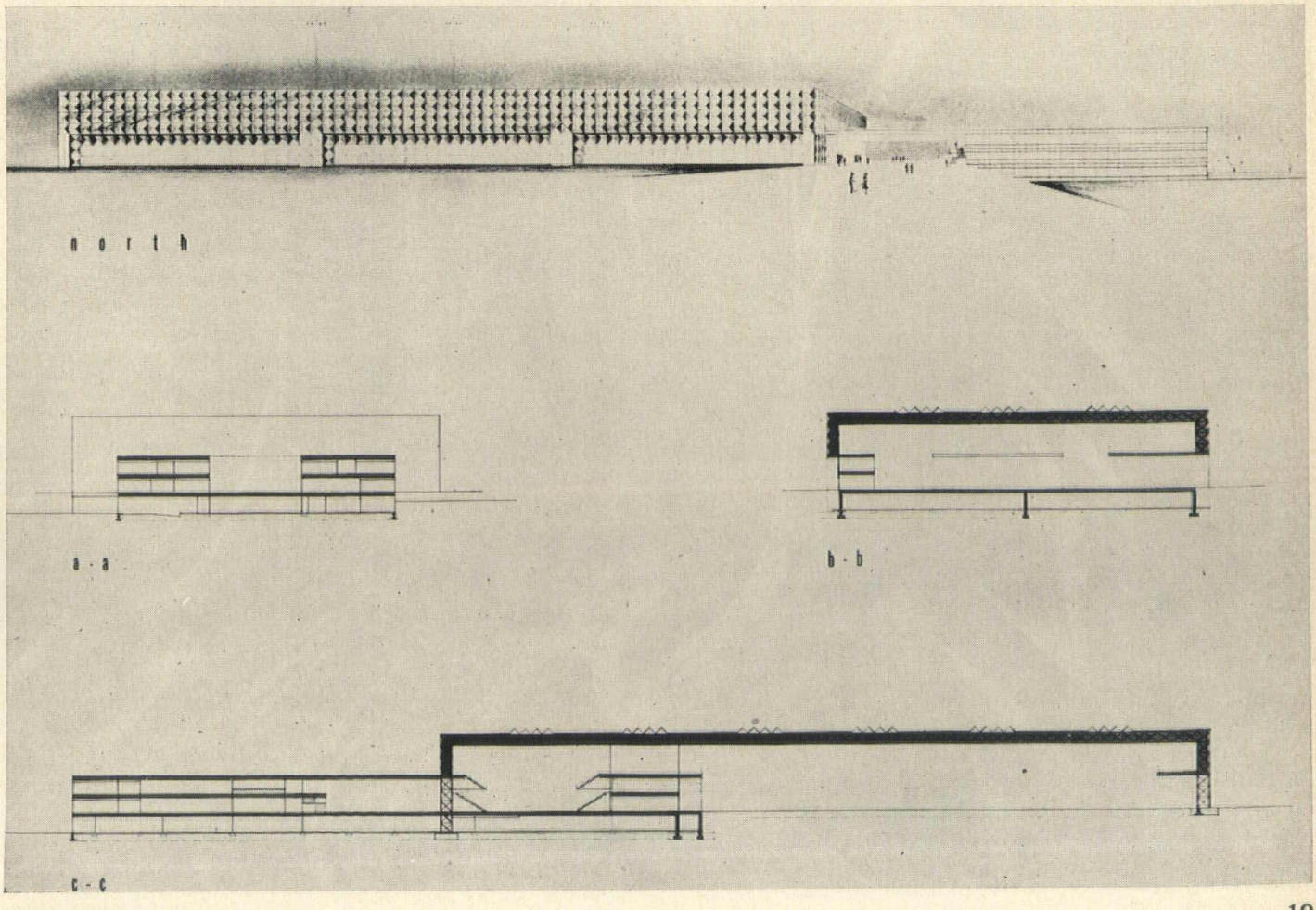
Army R.O.T.C. History at the University of Minnesota

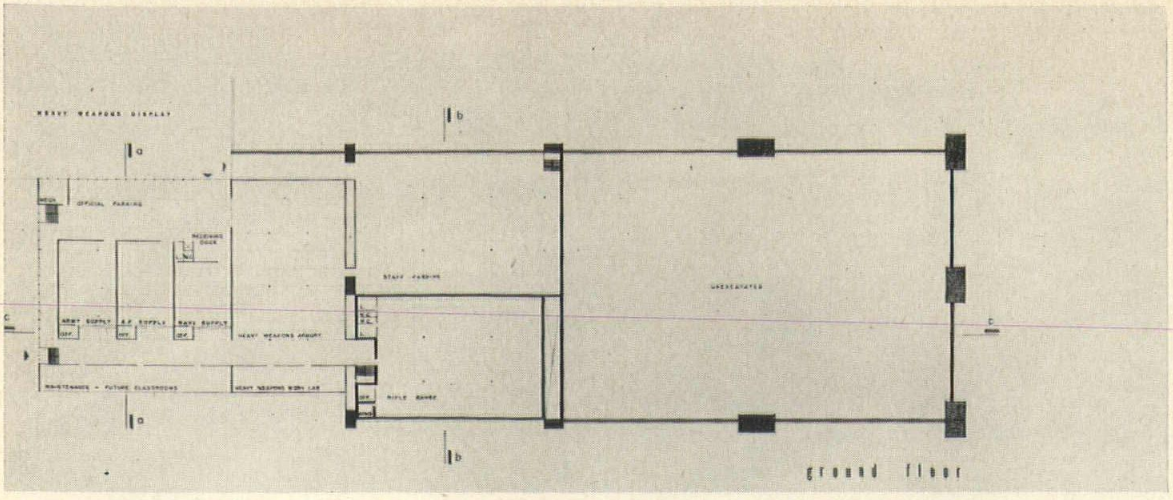
A Corps of Cadets was founded on the University of Minnesota campus in 1869; this was the forerunner of R.O.T.C. The first PMS & T was Major General Richard W. Johnson. In addition to teaching military science he was a professor of mathematics, history and



Armory Elevations—South, East and West

Armory North Elevation and Sections





Armory Ground Floor Plan

geography. Dr. Folwell was president, the first of the university, at that time.

Military training at civilian institutions was made possible by the Morrill Act of 1867. Passed by Congress late in the year the act constituted an epic in higher education in America. It marked the beginning of a system of education truly democratic in nature, designed to equalize and promote the educational opportunities and responsibilities of a growing nation. Under provisions of the Morrill Act the federal government donated large amounts of federal lands to state universities; in return these universities agreed to offer military science and tactics in their curricula.

The inclusion of military science and tactics in the act was no accident. One of the fundamental reasons for passing the land-grant act was to promote national defense. Indian uprisings and the war with the confederate states made defense as important then as now. Congress realized then as now that any nation to be truly strong must maintain a strong reserve of well trained officers.

During the years 1873 to 1875 the training was limited to infantry drill, for which 150 breech loading muskets were furnished along with infantry equipment. There was no armory at this time and drill was restricted by the weather. The enrollment in the university at this time was 386, 109 of which were registered for drill. An artillery section was formed in 1876 by the new PMS & T, Lt. Lundeen. Several pieces were used in practice and mock battles near the river bluffs.

During the period of 1879 to 1884 training was sporadic due to the absence of a PMS & T. This was a matter of grave concern to the regents, who feared the university might be penalized for failure to comply with the terms of the Morrill Act. This fear was alleviated in 1884 when Dr. Northrop, president of the University, secured Rev. Alaus J. Breda to take over as PMS & T. Enrollment and enthusiasm was built up under his direction.

In 1889 Lt. Edwin Glen took over the duty and organized the first large student-run cadet corps. Also initiated at this time was a ladies' drill company. Lt. G. H. Morgan was responsible for several advancements in the cadet program. Taking over in 1903, he organized a drill squad on the St. Paul farm campus, built a new drill hall there, initiated formations and mock wars at Fort Snelling and started the first cadet band.

In 1894 a fire destroyed the coliseum which was being used by the cadet corps. The board of regents failed to request a new armory, so Lt. Morgan enlisted the aid of Charles L. Aldrich, professor of Architecture at Minnesota. The present armory was designed by Prof. Aldrich and completed in 1896 at a cost of $67,000.

The Spanish-American War of 1898 brought to a temporary halt military training under supervision of regular army officers. In the absence of these officers, the cadets took charge of military training, and records show they did a magnificent job. After the war, the cadet program was back under officer control. In 1905 Scabbard and Blade, a military fraternity, was organized. New rifles with bayonets replaced the muskets in 1906. The next important event occurred in 1910 when the first summer training camp was held at Fort Snelling.

In 1914 the enrollment in the cadet corps was 1,000 men. At this time a cadet hospital corps was formed, later to become the R.O.T.C. medical detachment which had been active until its elimination in 1953.

On June 24, 1916, the National Defense Act was passed by Congress. Under provisions of this act the cadet corps was replaced by R.O.T.C.—Reserve Officer Training Corps. Under this act students received credits for military science courses and the advanced students were subsidized by federal funds. This is the same system, with slight variations, that exists today.

During the First World War the campus was populated mostly by military men in training. The S.A.T.C. —Student Training Corps—replaced the R.O.T.C. for about four months during the "all-out" drive. After the war, enrollment and enthusiasm in R.O.T.C. slowly declined until it reached a plateau which continued until World War II. In 1930 the Pershing Rifles fraternity was organized. This fraternity and Scabbard and Blade exist strongly today on this campus.

In 1933 compulsory military training at the University of Minnesota was abolished by the state legislature and the regents. To prevent stoppage of federal funds under the land grant act one unit remained at the University, although students' participation was optional. Enrollment dropped very low in the following years, until 1939 when it was evident that a second world

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Philadelphia, Pennsylvania

Robert Montgomery Brown
Architect

KASOTA STONE®

The Babcock Company

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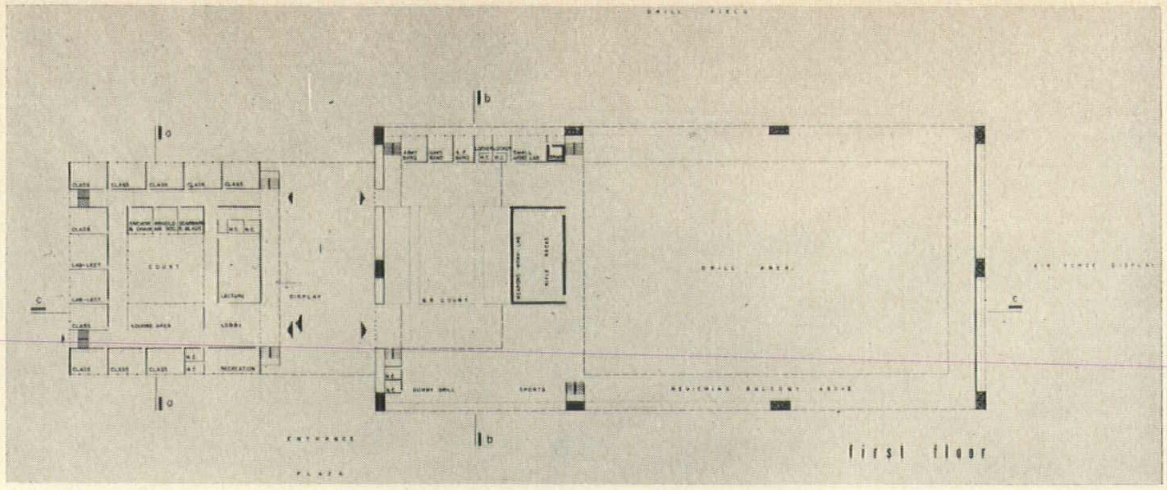


Armory First Floor Plan

conflagration was imminent. The R.O.T.C. trained many officers who were so desperately needed after December 7, 1941.

During the war R.O.T.C. was supplemented by the Army Specialized Training Program—ASTP. At the end of the conflict R.O.T.C. was again reorganized. Training was offered in six specific branches of the Army—each student to be trained in one branch for three years after his first general course year. This branch training in TC, QM, AAA, ORD, ENG. SIGNAL, MSC continued until June of this year.

Beginning with the fall quarter, 1954, under the supervision of Colonel Connor as PMS & T, a new general military science curriculum was followed The Pharmacy and Medical Science Corps will no longer exist on this campus.

N.R.O.T.C. History

The U. S. Navy and Marine Corps obtain most of their officers from two sources, the Naval Academy at Annapolis, and the Naval Reserve Officers Training Corps units which are established in many of the leading colleges and universities of the U. S. N.R.O.T.C. students study naval science subjects and participate in drills and summer cruises.

The N.R.O.T.C. was established in 1926 for the purpose of offering to certain college students the necessary naval science courses required to qualify them for commissions in the Naval Reserve upon graduation. The mission of the N.R.O.T.C. was greatly expanded in 1946 to include training for careers as officers in the regular Navy. There are now two programs offered, regular and contract.

The regular N.R.O.T.C. program, founded in 1946, established a system for procuring well trained junior officers to augment the output of the U. S. Naval Academy. The students enrolled in this plan are given all college text books, uniforms and tuition. In return for these benefits the student spends each summer on a naval cruise and serves a minimum of three years active duty upon graduation.

Contract N.R.O.T.C. students receive the same training as regulars, except they are required to go on only one summer cruise. They do not receive any financial assistance when in school and are not required to serve in the regular Navy. Reserve commissions are given these men and upon service in the Navy may be made regular commissions.

(The curricula included in the thesis here have been deleted as not pertinent to the design . . . Editor.)

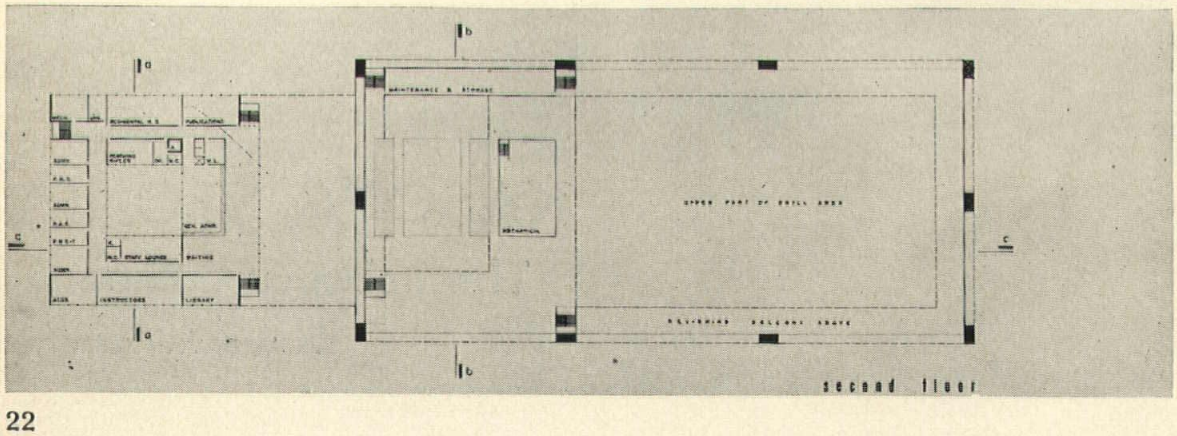
Curriculum—Scheduling Conclusions

The number of classrooms needed for the Army, Navy and Air Force R.O.T.C. programs at the present time is determined by the scheduling of classes of the three services. The curriculum and classroom-laboratory scheduling shows a need for a minimum of ten classrooms and two laboratory-lecture type rooms during the peak load hours. Future expansion of the Army and Air Force R.O.T.C. programs must be considered and space provided for approximately five additional classrooms in the near future.

Site Considerations

I. Present Location of the Armory—17th Avenue S.E. and University Avenue S.E.—This site has the advantage of being most centrally located for the students of the colleges of SLA, I.T., Education, Law and Medicine. The medical school is located the farthest

(Continued on Page 58)



Armory Second Floor Plan

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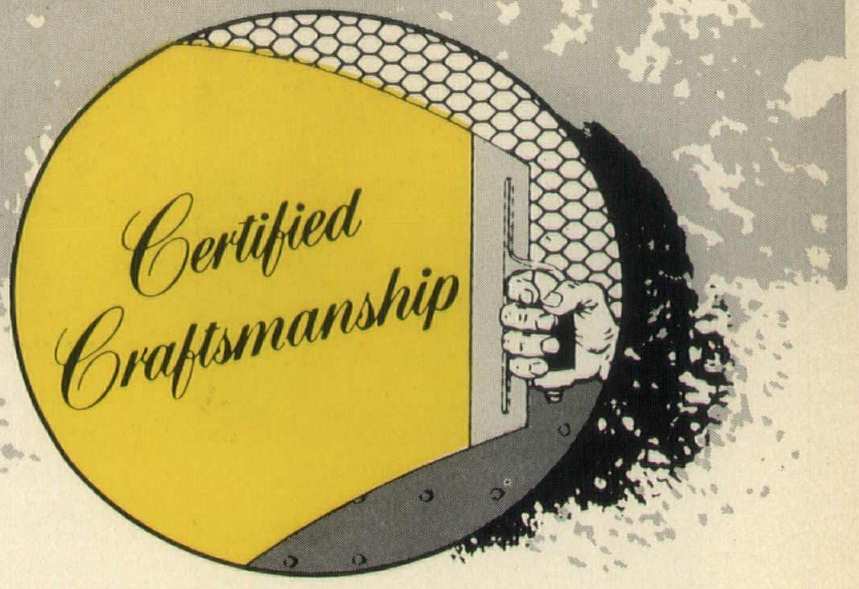

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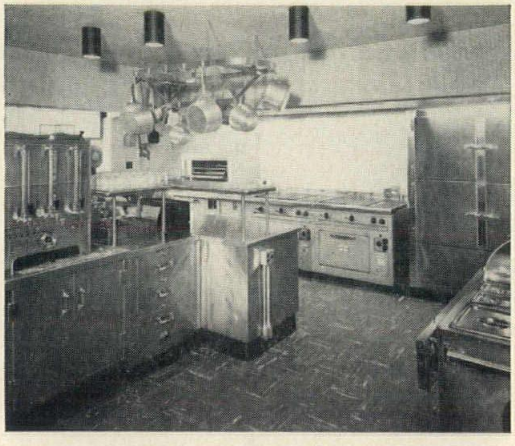
ELKS CLUB EXTERIOR



DOWNSTAIRS KITCHEN

UPSTAIRS KITCHEN

ELKS CLUB

MINOT, NORTH DAKOTA

DESIGNER:

KIRK ASSOCIATES

Architects and Engineers, Fargo, North Dakota

Excellent food . . . prepared on the finest cooking equipment, is the story which best describes the new Elks Club at Minot.

The club has *two complete kitchens:*

The downstairs kitchen includes two heavy-duty ranges, one fryer, and one broiler with an oven base—all compactly arranged and fully capable of handling luncheons and dinners for all occasions.

The upstairs kitchen is complete with ovens and ranges and was designed to handle large dinners and banquets. Already, over 1,500 dinners have been served at one time.

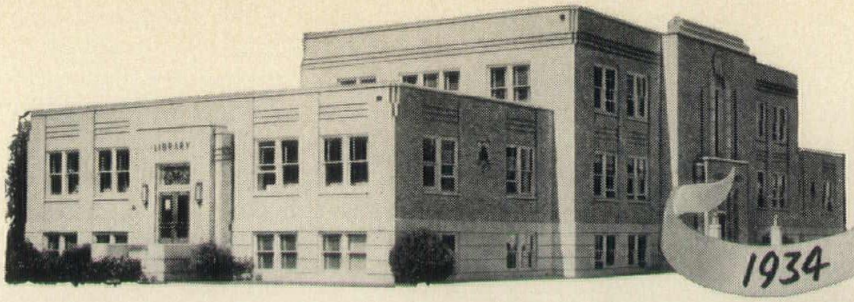
Both kitchens are easy to keep clean because All-Electric, Stainless Steel, Commercial Cooking Equipment was installed.

Electric Cooking Equipment is *clean, cool, efficient*—and, above all, it's *Modern!*

The Minot Elks like Electric Cooking—You will, too!

Northern States Power Company

ELECTRIC COMMERCIAL COOKING AND HEATING SECTION



1934

Lincoln County Library, Libby, Montana: Zonolite Plaster Fireproofing. The *first* commercial building in America to use *light aggregate* for plastering. Recent check shows plaster *still* in A-1 condition.

1938

Time Tells The Story...

...Positive Proof That In America's Most Important Buildings

ZONOLITE® PLASTER STANDS THE TEST OF TIME!

Zonolite Plaster is *more* than a construction time-saver...*more* than a dead-weight saver...*more* than a fire-proofing material earning the highest attainable fire ratings. Zonolite Plaster is the lightweight champion that defies time. A recent check on the Zonolite plaster in a group of blue ribbon buildings (some of them constructed more than 20 years ago) shows the original plaster in A-1 condition! No wonder, today's building teams look to Zonolite, *the time-tested lightweight champion!*

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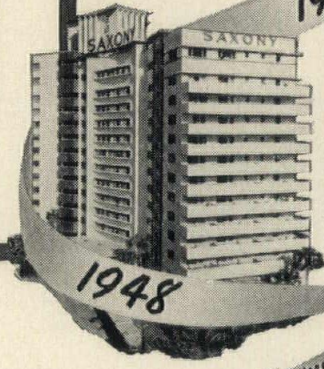
Com'l Nat'l Bank, Shreveport, La.: Zonolite Plaster Fireproofing. The *first* use of Zonolite in Shreveport.

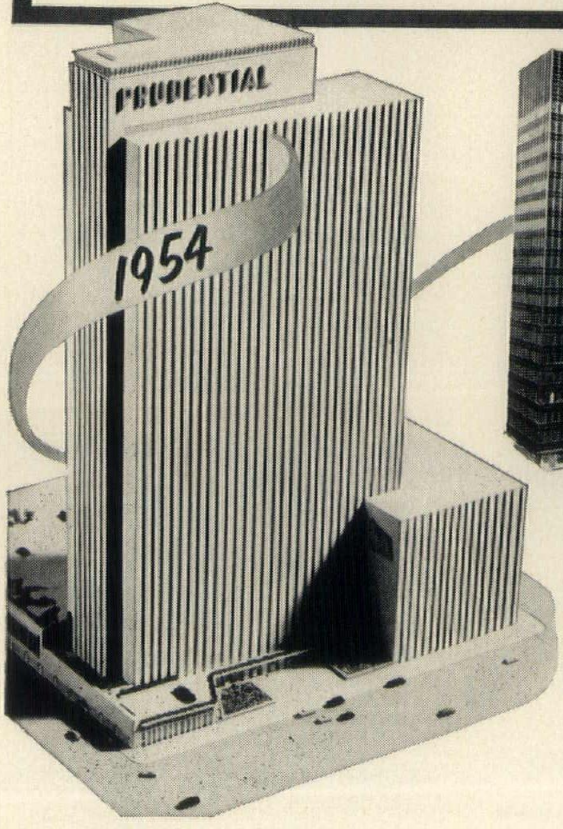
Mercantile Nat'l Bank, Dallas, Tex.: Another grand-daddy in the Zonolite family of famous buildings. Saved 1880 tons of steel worth $230,000.00. Weights of fireproofing materials slashed 94%.

1943



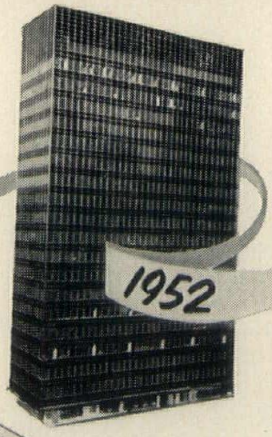
1948

Saxony Hotel, Miami Beach, Florida: Zonolite Plaster throughout. Use of Zonolite in plaster slashed weight 3 million lbs.; helped make possible construction speed record of 8 months.



1954

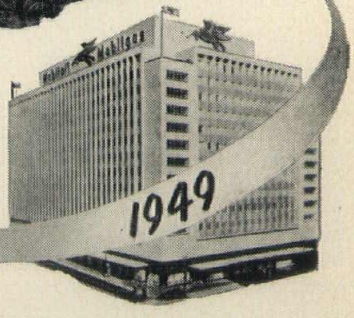
Prudential Bldg., Chicago, Illinois: Newest of the new on Chicago's skyline, another monument to Zonolite. Fireproofed with plaster-placing equipment.



1952

Gen'l Petroleum Bldg., Los Angeles: Beam fireproofing with Zonolite saved $1.70 a sq. ft.

Lever House, New York City: Winner of the AIA Gold Medal Award, this widely publicized building is fireproofed with Zonolite plaster.



1949

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CO-OPERATION AND P. R. VITAL NEED

More intra-industry co-operation and better public relations are needed in the building industry, according to Douglas Whitlock, chairman of the board and general counsel of the Structural Clay Products Institute.

In a speech before the Connecticut Building Congress recently, Mr. Whitlock urged architects, contractors, the construction unions and materials manufacturers and dealers to work more closely to improve construction, and to better inform the public.

"The construction industry has learned what co-operation can do to increase efficiency, lower costs, and improve the quality of buildings," Mr. Whitlock said. "Now, it must improve public understanding of how the industry works and what it has done."

The Washington executive pointed to such promising developments as modular co-ordination, new building products and better labor-management relations as indications that the once disjointed building industry has become a cohesive force for good in the nation's economy.

WIRING HANDBOOK MODERNIZED

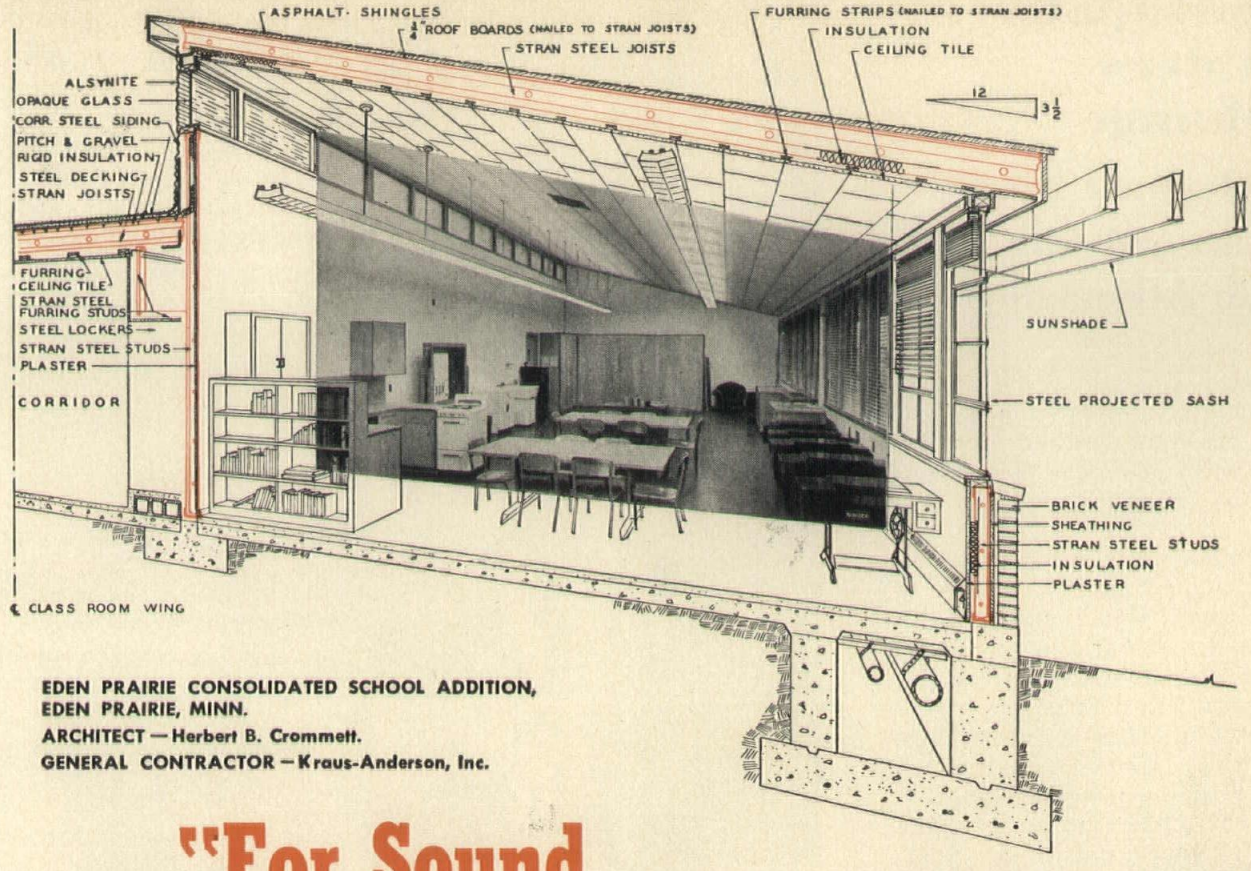
Publication of a new edition of the Residential Wiring Handbook has been announced by the Industry Committee on Interior Wiring Design.

Completely revised by the committee, the new handbook supersedes the 1946 edition and raises the standard for wiring adequacy to a minimum of 100 amperes for service entrance capacity in all residential housing of 3,000 square feet of floor area or less. In addition to individual equipment circuits, at least one 3-wire general appliance circuit appears as a standard and 3-wire branch circuits with split-wired receptacles are recommended for living room and bedrooms.

The revisions of the new handbook represent the first change since 1946 in adequacy standards which are advocated nationally by the National Adequate Wiring Bureau and by 75 local bureaus which certify the wiring in new housing and its appearance closely follows a decision of the National Association of Home Builders to adopt on a voluntary basis the 100-ampere service entrance.

Changes in the design of today's new homes and in the living habits of their buyers are reflected in the new standards. The handbook premises its wiring design standards and recommendations on the one-story, open floor plan house with multi-purpose rooms. The standards are applicable equally, however, to the two-story or multiple-family dwelling and in the rewiring of older homes.

Summarizing the latest authoritative experience of the electrical and building industries on wiring systems adequate for present and future needs in the home, the new handbook, like its predecessor, should be of substantial aid to architects, engineers, builders, contractors, lending institutions, and other organizations concerned with home building and planning.



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GENERAL CONTRACTOR — Kraus-Anderson, Inc.

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HARRY E. HULS, *Supt.*
Eden Prairie Consolidated School

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Stran-Steel Framing permits substantial savings in building costs in several ways. For instance with conventional materials it is necessary to hold up construction at various stages to permit plumbers and electricians to get their pipe and conduit in. With Stran-Steel members the entire building can be framed and closed in without delay. The various trades may then start and complete their work inside without costly interruptions.

We will welcome an opportunity to discuss Stran-Steel Framing and its application in your building plans.

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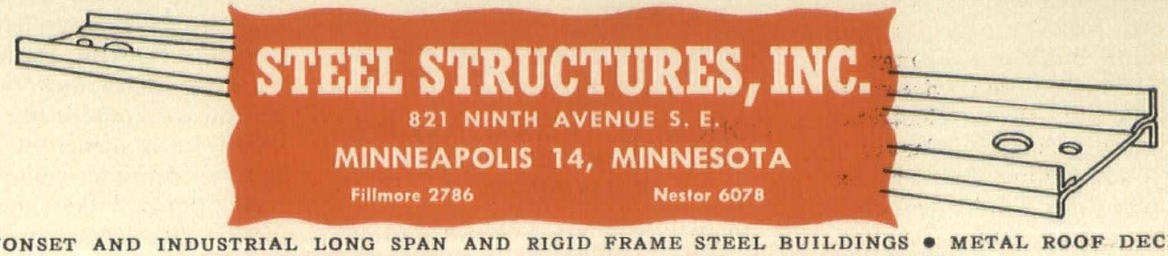

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Minneapolis Builders Exchange

Banquet Sets Record with 600 in Attendance

A record was set by the attendance at the recent 66th annual banquet of the Minneapolis Builders Exchange when just under 600 persons from the industry attended the event.

Officialdom was well represented at the banquet with 32 officers of various agencies in attendance.

John R. McFarlane, president-elect of the group, presented his predecessor, Lloyd Engelsma, with a wristwatch in behalf of the exchange membership. The committee which arranged the outstanding event was under the chairmanship of John Ganley. Other members were S. M. Olson, Walter Buckholz, Vern Larson and Berard Nelson.

Our pictures above show some of the many who were there. In each picture the persons are identified left to right and our identifications start at the top and go down in the series of two. Shown are:

Bill Meyer, Ray Thibodeau and Eugene Lambert, secretaries of Minneapolis, St. Paul and Duluth Builders' Exchanges, with John McFarlane, president of the Minneapolis exchange.

Vern Larson and Jack Davies of the Producers' Council with Vic Brick.

Kerm Johnson and Harold Anderson of Crown Iron Works with Bob Cerny Minneapolis A.I.A.

Ted Hidding, Al Hammerstrom, Milt Nordstrom and Doug Dunsheath, directors of the Minneapolis exchange.

Doug Dunsheath, R. V. McCann, vice-president, Minneapolis Chapter, A.I.A., and Joe Veranth, president of the Duluth Builders Exchange

S. M. "Mag" Olson, vice-president of M.B.E., Evar Cedarleaf, Lloyd Engelsma and John Ganley.

Rod Hood, Duluth Builders Exchange director, Emil Beckstrom W. E. Neal and Henry Lambert, Minneapolis exchange directors.

Lawrence Nelson, Minneapolis Home Builders Association, Gene Griswold, treasurer of M.B.E., Ray Thibodeau and Bob Olsen, president of the Producers' Council.

Don Erickson, Minneapolis building inspector, Herb Klippen, Duluth contractor, Roy Howard, assistant manager of the Duluth exchange, Joe Veranth, president of the Duluth exchange, and Roy Bertelsen, director of Minneapolis exchange.

W. E. Neal, Don Erickson, Henry Lambert, Bob Hendershott and Carl Carlson.

W. C. Gilger, M.B.E. director, O. J. Rohde, St. Paul District, Corps of Engineers, M. E. Nordstrom and R. V. Johnson, A.G.C.

Q. A. Collins, Minneapolis contractor, W. N. Gibson, attorney for the Concrete Contractor Association.

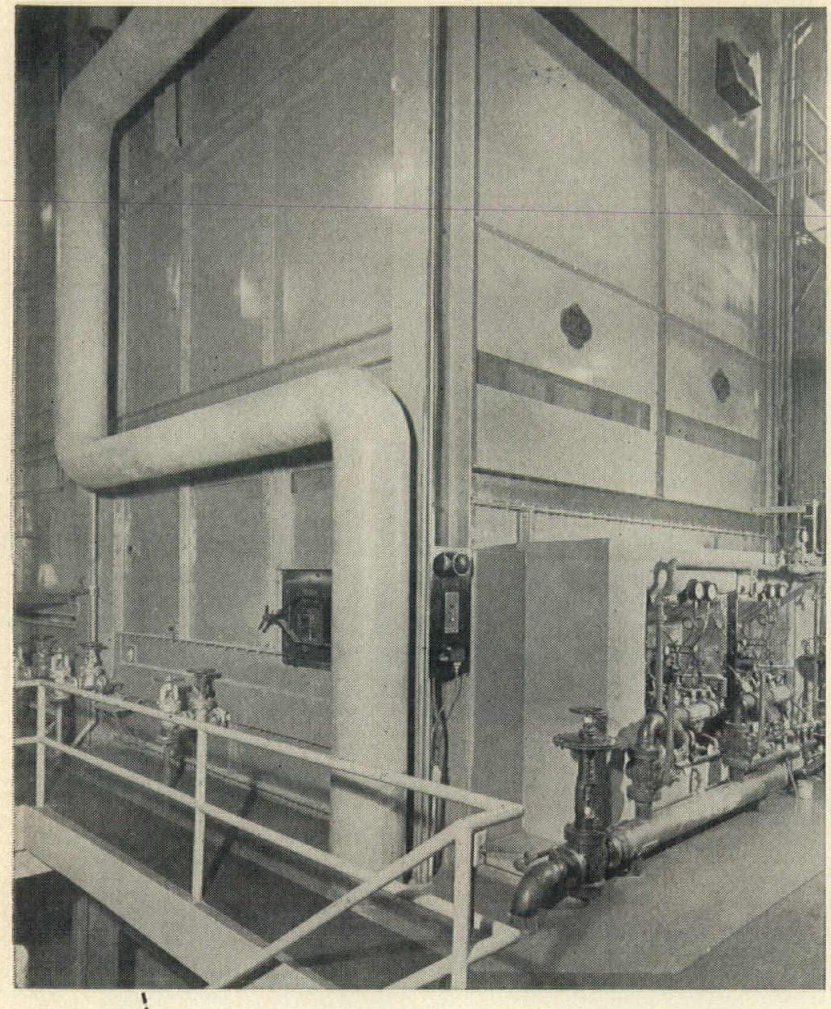
CONCRETE BLOCK COMPANIES INTRODUCE DUAL-PURPOSE UNIT

A concrete block which can be used as a bond beam and as a lintel block is the new product of two Twin City companies, Anchor Block Co., St. Paul, and Glacier Sand and Gravel Co., Minneapolis.

The dual-purpose unit is made in two sizes—8x8x16 and 12x8x16, modular dimensions. It is produced with Waylite and with sand and gravel, whichever is desired by the user. When used as either a lintel or bond beam block the 8x16 pattern need not be interrupted. When used in lintel construction the center web can be knocked out, giving greater concrete area to the beam and thus permitting somewhat greater spans.

In stacked bond construction where wall reinforcing is necessary, this block can be used very effectively, its makers reported. In large industrial construction where a bond beam or continuous beam around the top is required, this block again affords convenience of construction and still maintains the wall pattern.

Additional details and answers to specific problems can be obtained from the companies.



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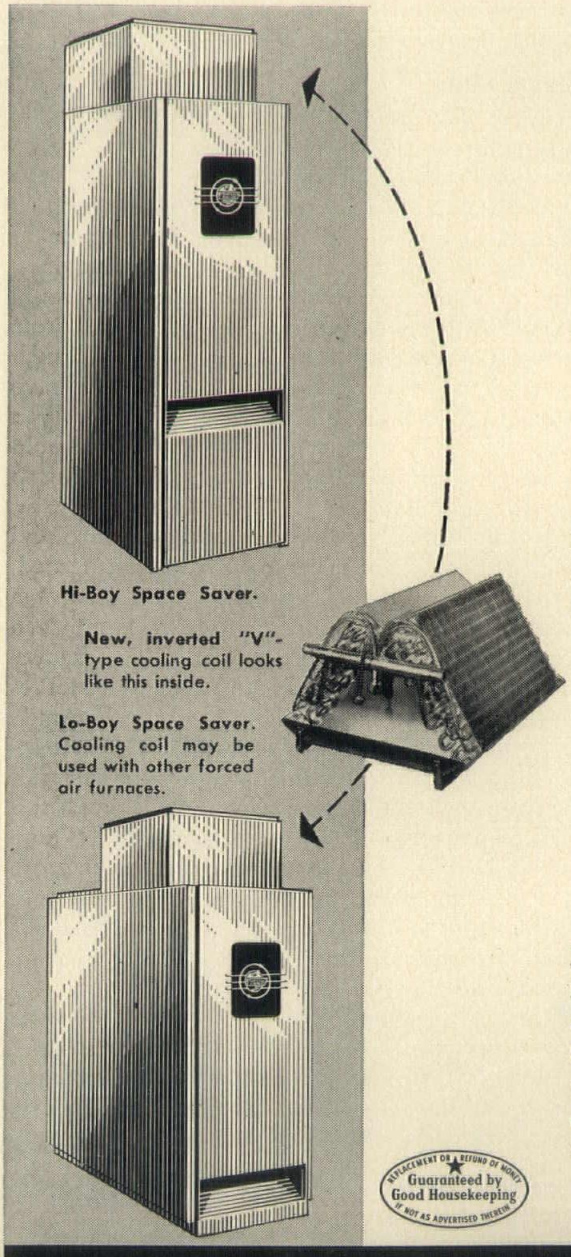

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Airtemp Engineers have developed a Year 'Round Air Conditioner requiring only a few inches of floor space!

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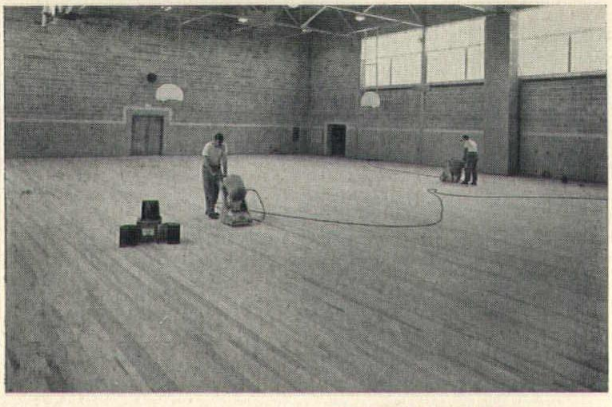
Proper Installation Important In Hardwood Floor Use

By W. A. Gerrard
W. A. Gerrard Co., Minneapolis

Little, if anything, has been written on the proper installation of wood floors for quite a few years. Practically all of the specifications that are being used today are "hand-me-downs" from an old building boom after World War I when so many schools were being built. For this reason there has been a need for data on the present day installation of wood floors. This data has been taken from 1946 through 1954, which has been proved to be most successful for installing floors over sleepers or over sub-floors; later we will take up laying and installing floors in mastic.

Laying a hardwood floor



Careful sanding pays

Finishing and polishing

The Concrete Slab

The concrete slab may be below grade, above grade or directly on grade. There are several factors to be taken into consideration when specifying a wood floor to be installed over a concrete slab. One is the terrain; proper drainage, proper ventilation, etc. It is an established fact that in low areas where the water table is high there is a considerable amount of hydrostatic pressure which will cause breaking up of the concrete floor. In areas where the hydrostatic pressure is such it is very wise to design a floor so that it will have plenty of drainage and a fill of gravel should be put in place before the concrete slab is poured. There should be plenty of good drainage tile and a pump to pump this water up continually.

However, where there is no hydrostatic pressure and only capillary action, then of course, this is not needed. All that is necessary then is proper drainage and a sound membrane to waterproof the slab. There is a product on the market now put out by W. R. Meadows, Inc., of Elgin, Illinois. The product is Seal Tight Premolded Membrane and this membrane is very versatile and is to be used under your concrete slab. When installed to manufacturer's specifications it definitely seals out all moisture that would ordinarily come through this slab. Our company can supply further details. Quite often builders have used vapor beariers under the slab which have punctured during the pouring of the concrete and the vapor seal was broken. This material will not do that. It eliminates any use of waterproofing on top of the slab after or the use of felt papers cemented to the slab above in asphalt. This latter has been proved unsatisfactory because, in asphalt, impregnated felt will definitely not hold out moisture. It will draw moisture and retain it and give it off to the finished floor above, causing a considerable amount of trouble.

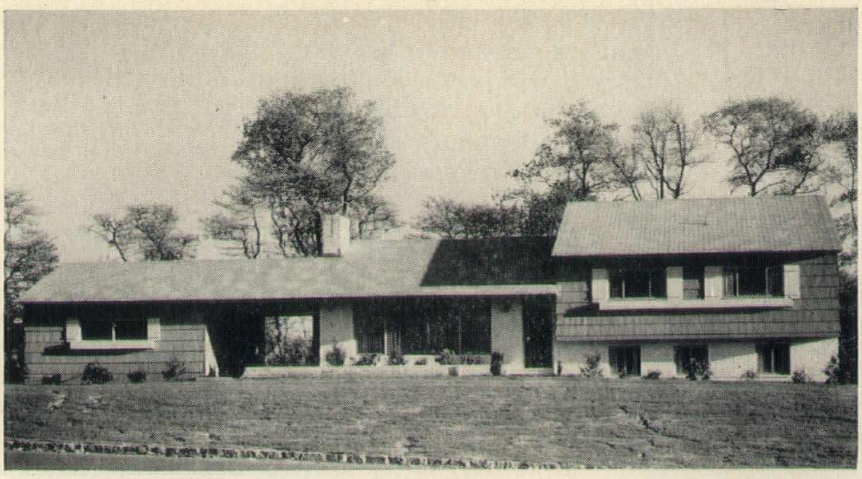
Fastening Floor Sleepers or Screeds

There are various ways of fastening the floor sleepers to the concrete slab, but one of the most practical ways is to use floor clips of 20 gauge annealed metal. These clips can be installed in the concrete when it is being poured. They can be installed 16 inches on center but preferably 12 inches on center.

Sleepers or Screeds

These should be 2 x 2, or 2 x 4, pine or fir stock. The sleepers should be dip-treated in an approved wood preservative. This precaution is needed to retard moisture absorption during curing of the concrete grout and also to guard against deterioration, termites, etc. The sleepers are to be brought to a dead level with wooden wedges driven under the sleepers and the clips bent up

Here's Why Leading Architects Say



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and nailed into place so the sleepers will be held in a steady position, ready for the grout to be poured. It is very important while pouring the grout that it be well tamped and poured under and around each sleeper. Be sure to allow at least one-half inch from the top of the screed to the top of the grout.

Sub-Floor (Optional)

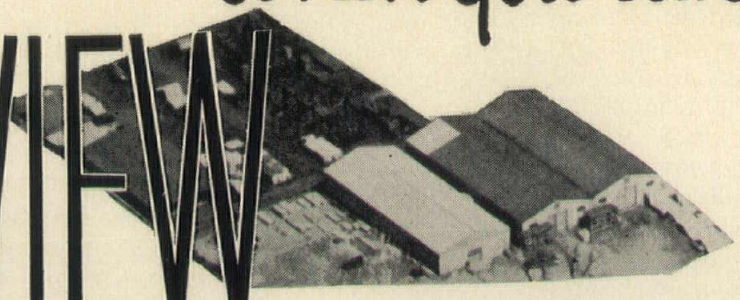
When a sub-floor is to be used it should be 1 x 4, or 1 x 6, clean dry pine or fir, free from any debris, such as concrete droppings, etc. Shiplap should not be used! The floor should be laid diagonally across the sleepers, providing a space of at least one eighth of an inch between boards. This space is to guard against excessive moisture that is present in the building during the construction period. The sub-floor should be nailed with an 8-penny Stronghold or Screw-Tite common nail. These nails will hold from six to eight times more than any other nail. They will eliminate any popping, warping and cupping of the material. They will give you a sound sub-floor to lay your finished floor on. Remember, the top floor is only as good as the sub-floor! By using the Premolded Membrane under your concrete slab, it will definitely eliminate the use of any vapor bearier paper which normally would be used; it is not necessary to put any paper over the sub-floor either.

Finished Flooring

In some sections of our country the architects are specifying more second grade than first grade flooring because they have realized the economy in this grade of flooring. Third grade flooring is a thrifty grade. Rules and regulations say it must lay well and give a serviceable floor. It contains all imperfections common to maple but the wood must be sound. It gives excellent satisfaction in factories, mills, shops, storage spaces, motels, cottages and military projects. It works out wonderfully in homes, in dens and recreation rooms. It brings out the true and beautiful color. The MEMA grading rules state that for first grade maple flooring, as to the lengths, standard length and all widths in this grade shall be trimmed from two to sixteen feet as stock will produce. Proportion of length, two to three and one-half feet exclusive, shall be what the stock will produce up to 25%. Second grade standard lengths and all widths in this grade shall be permitted two to sixteen feet as stock will produce. Portions of two to three and one-half feet exclusive shall be what the stock will produce up to 40%. Third grade standard length all widths in this grade shall be trimmed one to sixteen feet, what the stock will produce in portion of lengths of one to three and one-half feet shall be what the stock will produce up to 60%.

Now, in using second grade and better, you get the same portion of lengths as you do in the first grade, often less than 20% under three feet. By using second grade and better you are not sacrificing on your lengths but are getting a uniform color with a first and second grade all in one piece instead of being cut out and held separately. When installing maple flooring, it has been proved that the Screw-Tite nail, either 8-penny, or 7-penny, can be used. The 7-penny is suggested when using 25/32nds x 1½" flooring. When using 2¼" flooring it is wise to use the 8-penny nail. Or when using 33/32nds, either 1½" or 2¼" width, it is wise to use

When you take the LONG VIEW



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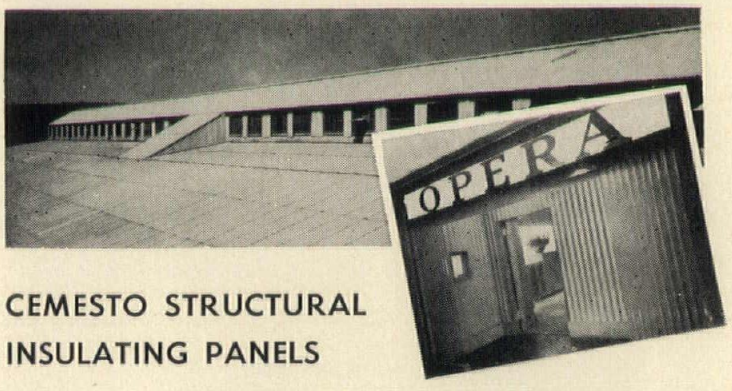

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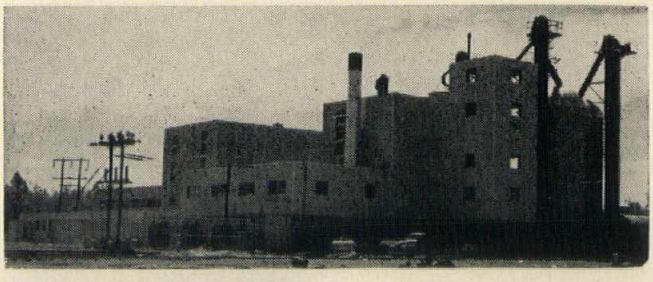

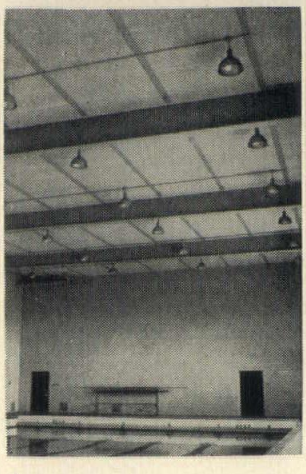

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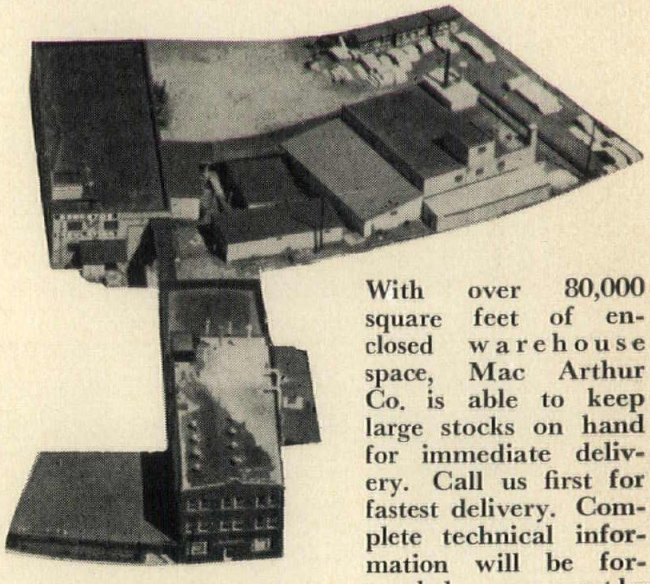

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the 8-penny Screw-Tite nail. The flooring should be nailed on each sleeper, preferably twelve inches on center, keeping the breaks approximately six inches apart. If no sub-floor is used the breaks should run up to eight inches apart. There should be at least one board, preferably two boards, between exceeding breaks in the same line. This will definitely give a sound floor and create less breaking out of any end boards. When specifying an installation of a floor, it should be put in a separate section, to be installed by a reliable flooring contractor, experienced in complete installation of wood floors from the furnishing of the flooring through to the finishing of the flooring. When specifying maple flooring make sure that it is an MFMA mill that is manufacturing maple flooring. The Maple Floor Manufacturers Association requires its members to mill uniform flooring that will match up with other mills of the same association. Their grading rules are standard and it is all made from northern hard maple. The standard millings are 25/32nds x 1½" or 2¼", which is standard for classrooms, gymnasiums, warehouses, etc. Wherever there is a 33/32nds x 1½" or 2¼", this particular flooring is employed where you may not be using a sub-floor and in heavy traffic areas such as warehouses, some classrooms and some gymnasiums, where they are used excessively and require sanding quite regularly. Very often 25/32nds flooring is sufficient and will last more than sixty years, even being sanded on an average of once every eight years. Of course today, with the better types of finishes that we have on the market, it will be quite possible that we will not have to sand the floors quite as often as we did in the past. Now, in specifying the various grade of flooring, the first grade flooring is commonly used in dance floors where a particularly white floor is required. Second grade and better, or Gym Grade flooring, is used in schools and gymnasiums where a uniform floor is required, giving little variation in color. Of course, the third grade flooring is used in factories, industrial areas and the like.

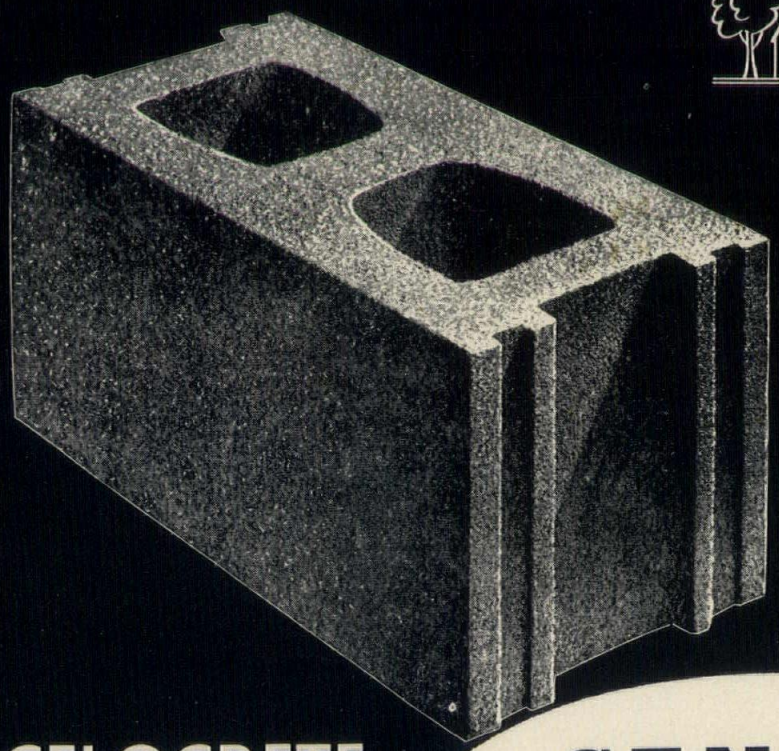
Acclimation of Maple Flooring

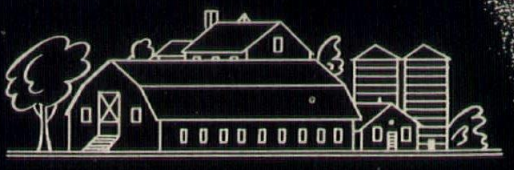
All rooms where maple flooring is to be installed should be heated to not less than 70 degrees and maintained at that temperature throughout the installation and at least five days prior to the installation. All plastering and concrete should be thoroughly dry. The flooring should be delivered to the respective areas three or four days prior to the installation. In the summer time, during excessive humidity periods, the flooring from the mill comes to the job site with from six to eight per cent moisture content. If allowed to stand from five to seven days you will find it will be up to ten or twelve per cent.

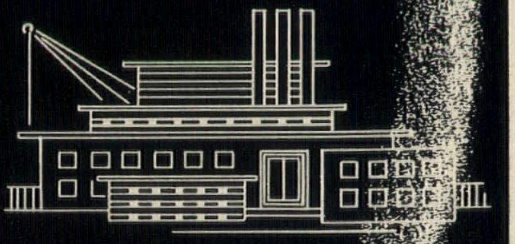
It is not alarming at all to be installing floors during the summer at around twelve per cent moisture content, especially when the sycometer reading will give you a reading of some eighty to ninety per cent day after day. Now of course in winter months, when the heat is turned on and the floor is dried down to around four or five per cent, you will find a few cracks developing. This is not alarming either, as they will go back together

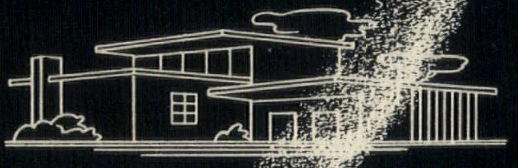
(Continued on Page 40)

40 DIFFERENT STYLES OF BETTER BUILDING BLOCKS









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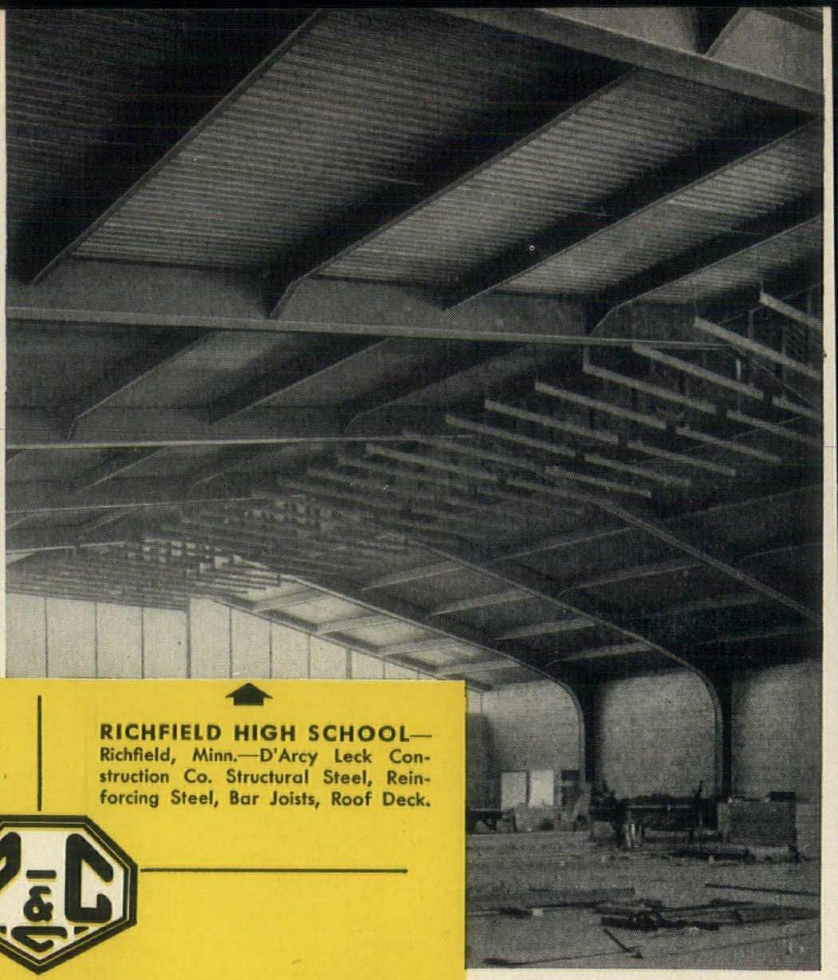
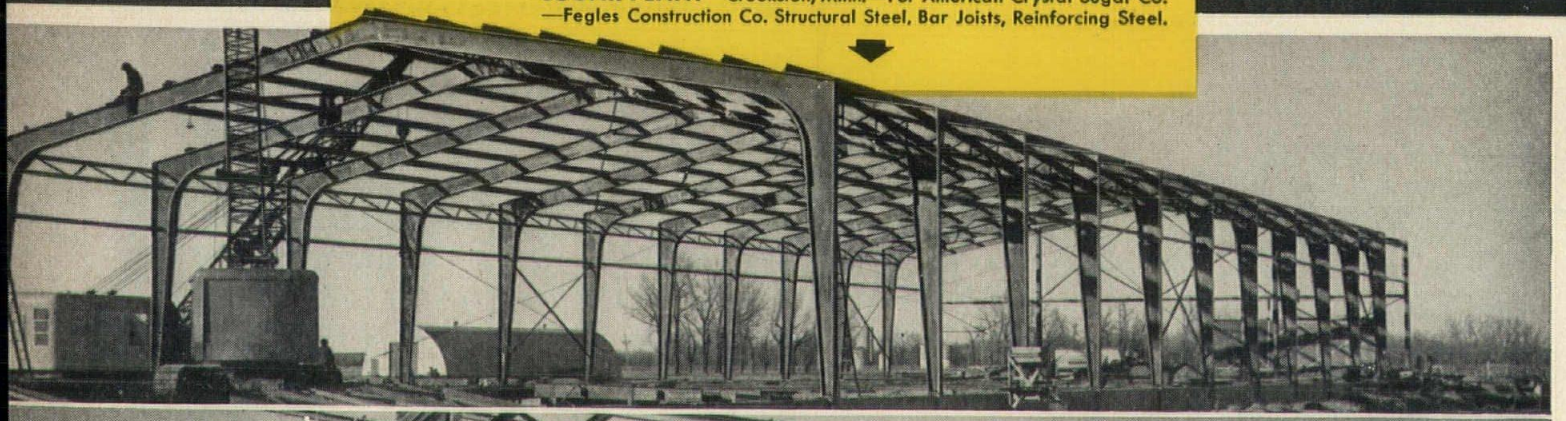


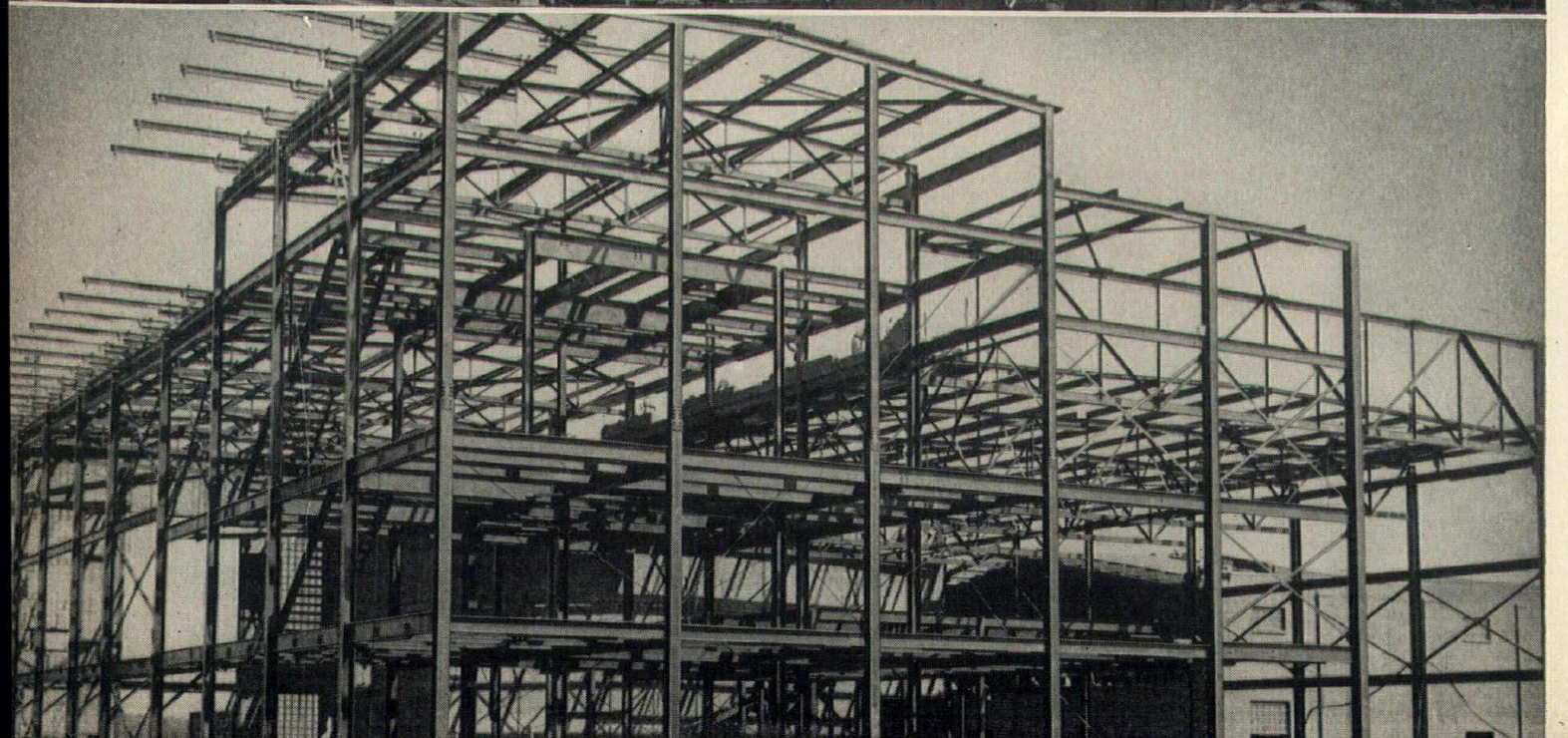
GRANDSTAND—Central High School, St. Paul, Minn.—M. E. Souther Construction Co. Structural Steel.

RICHFIELD HIGH SCHOOL—Richfield, Minn.—D'Arcy Leck Construction Co. Structural Steel, Reinforcing Steel, Bar Joists, Roof Deck.

P&C

SUGAR PLANT—Crookston, Minn.—For American Crystal Sugar Co. —Fegles Construction Co. Structural Steel, Bar Joists, Reinforcing Steel.





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again when the humidity gets higher in the summer time. When installing floors in the winter, it is wise to make sure that the flooring is not laid too tightly, that there is plenty of expansion space allowed. In the summer, the floor can be laid quite tightly to try to compensate for some of the shrinkage in the winter.

Expansion Space and Ventilation

One cannot say too much on the proper expansion allowance and ventilation of floors. In the beginning of the installation of a gymnasium floor one should leave at least one inch or one and one-half inches of space in large areas and in small areas, such as classrooms, closets, etc., the thickness of your flooring is ample for proper expansion. Argument has arisen many times as to why a person should leave an inch, one inch and one-half or two inches for the proper expansion in floors. Actually this does not act wholly as an expansion space but is used for ventilation for the floor underneath, as compared with the mastic type floor which is cemented directly to a concrete slab and which requires expansion space only but no ventilation. Your regular strip floor, which is nailed in place by screeds or by a sub-floor, require both. Where you have a dead air space between the underside of your floor and a concrete slab you have a condition which can be very dangerous if the following precautions are not met. In humid weather the warm air in your room will condense on your concrete floor, causing moisture to rise and penetrate your floor, causing considerable cupping and eventually buckling in your finished floor. Now, capillary action can cause excessive amounts of moisture to arise in your room area, again causing the same condition.

However, these hazards can be met with some safety measures that will practically eliminate any such catastrophies. As we mentioned before, when pouring your grout between the sleepers make sure to dish out the center, so you will have an air passage and, by leaving the proper allowances at your walls, you will have air circulating through the floor. This causes a drying action instead of an excessive moisture trap to cause this trouble. Also, as the floor expands you will have a tendency to cup the board first. When the board has cupped as far as it can it will start to expand if it is laid tight against doorways, marble threshholds, or steel door casings. This creates a pressure and this pressure can cause a swelling or buckling down the center of the floor or where the weakest point may be. This is why we take the precaution of using the expansion space at all projections, including all doorways and including all door casings. It is wise not to fill these with a compound or cork or any other such material. But better to use a threshhold that will go over the void in the doorways, and will slide freely as the floor may expand or move, and still allow air to pass under from the sides.

Another problem exists where footlights are used. It has been proved that in laying stage floors where footlights are involved, in order to keep the floor from expanding into the footlights, causing the footlights to swell so that they will not operate properly, it is wise to run the flooring at right angles to the footlights instead of parallel.

Angle Iron or Wood Base

We mentioned that it is advisable to provide proper ventilation of floors. In order to create this ventilation and still have a base, two different types of base have been used satisfactorily. One, a three-by-four inch angle iron base fixed so the underside of the horizontal leg is one-quarter inch above the floor line. This angle iron is very practical in large areas. However, where the angle iron is not available, one can use a regular two and one-half to three-inch wood base, routed out on the back side to permit air to pass down under the floor. In average classrooms, storage areas, etc., it is not necessary to put this type of base on, just your ordinary two-member base is all that is necessary for you do not have the excessive expansion in a small area that you do in a large gymnasium or playroom.

Sanding

The sanding of your floor is very important because the customer looks at the finished product with pride and a poor sanding job can ruin a gymnasium floor. We have found that a twelve-inch drum type sander should be used. All cuts are made with the grain of the wood, beginning with a #2 or #2½ paper, graduating down to a finished paper, #0 or #00, making sure to cut all boards down evenly, leaving no sanding marks. The old way of cutting diagonally across the floor generally resulted in a poor job because after the finish was applied, one could see where the diagonal cuts were made. Even thought it felt smooth to the touch, the eye would show defects across the highly polished floor.

Finishing Wood Floor

Floors that are to be waxed should be finished in the following manner. One or two coats of an approved penetrating floor sealer should be applied freely with a lambs wool applicator, using approximately one gallon to cover 300 to 400 square feet. Buff to a smooth finish with a steel wool machine, preferably while the sealer is wet or, if this cannot be done, then buff real smooth when dry. Then one coat of a spirit type wax is used to polish to a fine luster. This type of finish is very easy to maintain because all that is necessary for recleaning the floor is to apply more wax and buff with your steel wool machine. All dirt and scuff marks will be removed. To finish a gymnasium floor it is wise to use the same procedure that was used in the preceding paragraph, two coats of a penetrating floor finish, paint on the lines, and then an approved gym finish applied on top.

In concluding the suggested installation of wood floors upon sleepers, it is strongly recommended that wherever possible, when specifying wood floors, it be put under special classification from the furnishing of the wood floor through the finishing of the wood floor. In this way it would give the general contractor a sufficient opportunity to let the sub-contract to a reliable floor contractor, who will be able to give him a complete, one-package deal, affordingly better workmanship and lower cost. The flooring contractor will then be able to direct the flooring from the factory to the job site and install the flooring in the proper manner according to specifications, using nails and paper necessary, sand and finish the floor completely in one operation. This will also save time and labor on every project.

BAUMEISTER OF AGC SEES $300,000,000 NON-RESIDENTIAL CONSTRUCTION YEAR

The upward trend of recent years in non-residential construction in Minnesota may well result in 1955's becoming a $300,000,000 year, according to A. H. Baumeister, president of the Associated General Contractors of Minnesota, Inc.

Typical of the multi-million-dollar construction jobs expected to boost the year's level is the $43,000,000 expenditure plan of the state highway department, he said.

Estimated total dollar value of construction work in the state for 1954, the president said, was 16% more than 1953, which was a record year in its own right with a total of $228,000,000. The year 1954 was estimated at $264,000,000.

"A recent survey was conducted among the governing and advisory boards of AGC on the national level," Mr. Baumeister's report said. "Minnesota contractors showed a greater degree of optimism for the future of the construction business in this state than was reflected in the national figures. For instance, 70% of the Minnesota contractors look for an increase in non-residential building as compared to the national average of 43% looking for an increase.

"A similar degree of optimism resulted among highway contractors in the state, with 80% predicting an increase in highway construction compared with 59% nationally. Only a slight increase is foreseen among heavy constructors both locally and nationally."

Several interesting footnotes appeared in the Baumeister report. One said that Minnesota is a center for worldwide construction operations and the Twin Cities area is the home location for more international construction firms than any area of comparable size and population. Seven companies in this area did nearly $500,000,000 in volume last year, which is about 9% of the total national construction work done.

On-site construction provided jobs for about 40,000 workers a month, he said, and construction workers were the second highest wage earner group in the state with a yearly average of $4,382.

DESIGN WITH PORCELAIN PANELS DETAILED IN NEW BROCHURE

Design of structures utilizing the new porcelain enamel wall panel systems by architects, engineers and others in the building industry is given detailed background by a new brochure available from Davidson Enamel Products, Inc., Lima, Ohio.

Architects' detailed drawings show the fine points of using the company's facia and double-wall panels in walls, sills and copings. The publication is jammed with ideas on how to apply these new materials to the design of buildings of many kinds of uses and specifications are complete.

Unique features of Davidson panels are brought out and large, cutaway drawings give prospective users an accurate idea of exactly how they are made and how best they can be applied to an architectural problem in hand.

Copies of the brochure can be obtained by writing the company at 1109 E. Kibby St., Lima, Ohio.

NEWHOUSE TAKES OVER NEW NSP COMMERCIAL SALES POST

J. C. Newhouse has been named to the newly created post of manager of commercial sales for Northern States Power Co., Minne-

Mr. Newhouse

apolis. In his new position he will supervise development and coordination of all sales promotion activities directed toward commercial and institutional customers.

Mr. Newhouse formerly was supervisor of industrial sales for NSP, with whom he has been employed for more than 20 years. He is a graduate in electrical engineering from the University of Minnesota.

NEW TAPE STOPS FIN/BEAD FORMATION IN CONCRETE

Formation of a fin or bead on poured concrete where form boards meet can now be prevented by use of a new pressure sensitive tape which will hold back tons of poured concrete, the product of Minnesota Mining and Manufacturing Co., St. Paul.

Latest use of the new material for sealing the joints between form boards was in the 18-story Statler Hilton Hotel in Dallas, where the 4x8 plywood boards were sealed. Elimination of the beads here obviated the costly grinding operation which would be required to remove them after the forms were taken away.

The contractor, according to 3-M, also found that use of the tape (MMM's "Scotch" brand plastic tape No. 471) prevented moisture from seeping into the edges of the plywood forms and breaking them down, thus prolonging their useful lives.

The tape was applied by hand over each joint prior to the pour. On removal there was no discoloration of the concrete by the yellow tape and the surface in most instances was smooth enough for immediate painting.

The tape is available through regular suppliers, the company said, and additional information on its special uses can be obtained from 3-M at St. Paul 6, Minn.

GILLETT SUCCEEDS SPRATT AS NATIONAL HEAD OF PRODUCERS' COUNCIL

William Gillett, vice president and a director of Detroit Steel Products Co., has taken over the presidency of the national Producers' Council from E. C. Spratt of St. Joseph, Mo.

Elected unanimously at the annual meeting of PC, Mr. Gillett is also active in a number of other industry groups. He is a member of the Building Officials Conference of

America, the construction and civic development committee of the United States Chamber of Commerce and is a member of the 14-man Industry Advisory Committee which makes recommendations to the Federal Housing Commissioner.

MMM ISSUES "SCOTCH" ELECTRICAL BOOKLET

A new specification guide for architects and engineers covering "Scotch" brand electrical products for construction and maintenance work is now available from Minnesota Mining and Manufacturing Co., Dept. E5-26, St. Paul, Minn.

The 12-page, two-color, illustrated guide describes applications, lists physical and electrical properties and provides representative specifications for each of the "Scotch" brand products used in the electrical construction and maintenance field. In addition, a handy two-page "selector guide" shows representative applications for the various products in a typical industrial construction job.

McFARLANE RE-ELECTED TO HEAD BUILDING STONE INSTITUTE

John R. McFarlane, president of Rich-McFarlane Cut Stone Company, Minneapolis, has been re-elected president of the Building Stone Institute. He was chosen during the annual convention of the group in Las Vegas, Nevada.

The Building Stone Institute is the new name for what formerly was the International Cut Stone Contractors' and Quarrymen's Association, which represents every major producer and finisher of stone in the United States and Canada. The institute has 120 members from 29 states and two provinces.

FIRESAFE CHURCHES DISCUSSED IN NEW BOOKLET

Safer and more comfortaole churches are discussed in a booklet issued recently by the Zonolite Co., Chicago, vermiculite producer.

Titled "Firesafe Churches," the booklet describes applications aimed at increasing safety from fire, providing for good insulation, enhancement of beauty and improvement of acoustics. Details of church construction and ways in which vermiculite fits into the designs are considered in the booklet, which can be obtained by writing for Form G-93 to the company at 135 S. LaSalle St., Chicago 3, Ill.

WEED CONTROL UNDER PAVING DISCUSSED BY TECHNICAL BULLETIN

Permanent sterilization of soil beneath paved surfaces, of value to architects designing parking areas for shopping centers, school playgrounds, airport service areas and the like, is the subject of a new publication which deals with Tronabor, product of the American Potash & Chemical Corporation.

Tronabor is a borate weed killer, non-poisonous and non-corrosive. Its many uses under paved areas are pointed up in the new issue, a companion to an earlier publication on its uses in oil fields, railroad areas, fence lines, etc. Either or both pamphlets can be had for the asking from the corporation's office at 3030 W. Sixth St., Los Angeles 54.

LAYNE-MINNESOTA MOVES INTO NEW BUILDING

The Layne-Minnesota Company, Minneapolis water development firm, has moved into new quarters on two acres of land in the northeastern section of the city. The site provides plenty of storage and handling area for the pipe, turbine pumps and well drilling equipment and trucks used by the company.

Lee Rogers is president of the Minnesota organization, which is one of 16 associated groups with headquarters in Memphis, Tenn. The companies started from the first well drilling operations of M. E. Layne in South Dakota in 1882.

Layne's new building provides 2,000 square feet of office, 3,000 square feet of shop and 4,000 square feet of storage space. In addition to well drilling, the company operates laboratory facilities for the exploration and development of ground water supplies. It also installs water conditioning equipment in the industrial, rural, municipal, state and national fields.

A basic idea in the organization is the handling of the whole water supply operation from first surveys, through installation to continued maintenance. Mr. Rogers said that all the unit companies work on a policy of "undivided responsibility, with emphasis on quality and service."

The entire organization will observe its 75th anniversary next year.

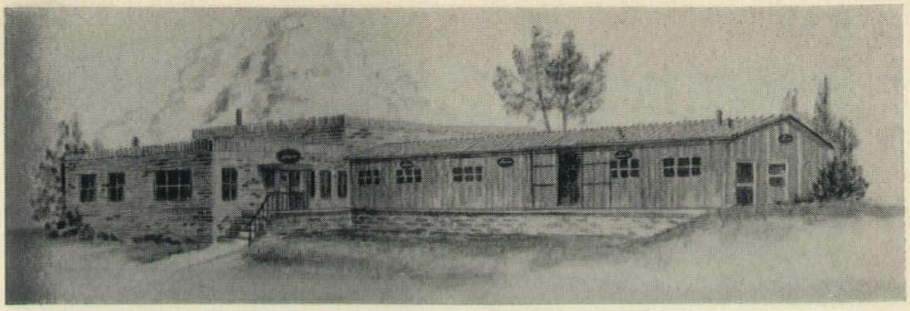
The Minneapolis office's address is 3147 California St., N.E.

PERLITE AND STEEL ROOF SLAB RATES ONE-HOUR CLASSIFICATION

A one-hour fire rating has been achieved by an unprotected 24-gauge corrugated steel roof deck topped with an insulating slab of perlite concrete 2⅞ inches thick, according to Underwriters' Laboratories.

The deck withstood an hour of flames reaching temperatures as high as 1700 degrees F., while the top of the perlite layer reached only 187 degrees. The test was sponsored by the Perlite Institute and Granco Steel Products Co.

This type deck, the sponsors reported, is adapted particularly to industrial and light commercial construction since it can be installed to span 7 feet and the underside of the steel can be left exposed.



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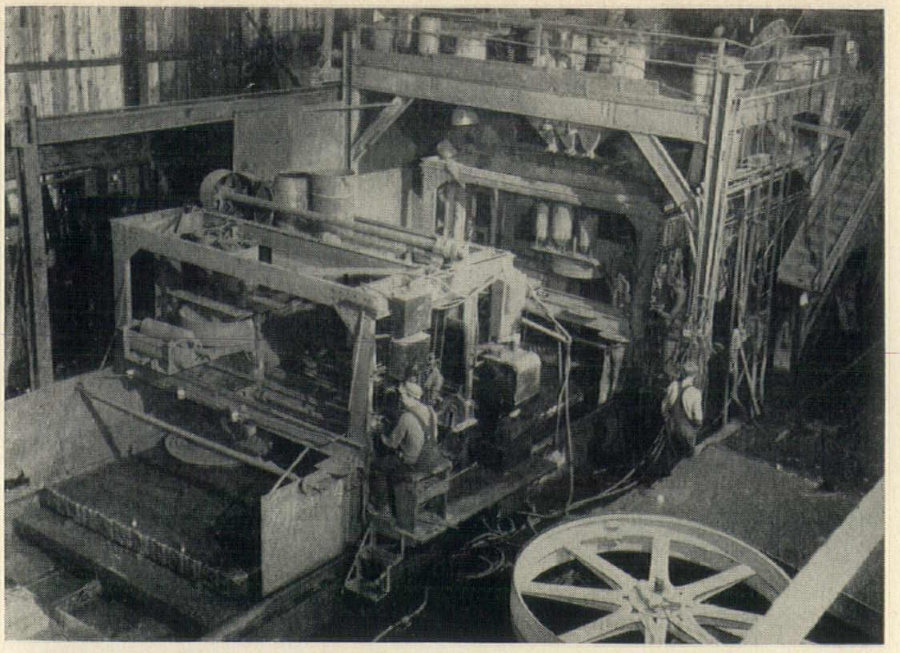


Modern continuous-line equipment for granite polishing; an example of the mass production machinery and methods which have been developed for granite fabrication and which have produced lower prices and greater demand for the stone.

Granite, one of the oldest and certainly the toughest of all building stones, is currently staging a comeback, according to Northwest granite producers. Despite the heavy use of glass, light metals and other new materials and in the face of continued strong competition from its old rivals—brick, steel and concrete—granite is enjoying a return to popularity among American architects and builders.

This situation is reportedly the result of successful efforts on the part of the granite industry to reduce production costs and price factors, which have long limited the stone's use

Because of its inherent strength, beauty and matchless wearing quality, granite has always been a *preferred* building material. The former high costs and problems involved in converting the rock into a usable, transportable, architectural stone have, however, frequently sent builders in search of cheaper, easier to handle substitutes. In fact, the advent of concrete and steel construction and mass produced bricks for a while nearly pushed granite from the construction scene.

Demand for the stone dropped sharply as builders turned to these new materials and the granite industry found itself forced into a less dominant position. This situation persisted for some time, until a few years ago when some of the more progressive companies decided to take steps to change it.

To understand the problems that have confronted the granite industry, it is necessary to understand something of the material itself. First of all it is abundant. So abundant, in fact, that if the world were an orange with a 20-mile-thick skin and the orange were to be peeled, 90% of this "skin' would be composed of granite. In addition a large portion of the remaining 10% would contain material eroded from granite.

Like all natural rocks, granite derives its inherent qualities from the manner in which it was first formed. The process began in the molten magma chambers deep within the earth. From here liquid mineral matter moved through cracks and fissures toward the exterior. Some of this material poured out onto the

earth's surface through volcanic outlets. Much of it, however, was unable to escape and cooled, or more correctly, crystallized, in passages it had melted for itself beneath the ground.

Generally classified, both of the materials thus formed are igneous rock. That portion which found its way to the surface is, of course, lava. The other, deep-deposited material is granite. There is a decided difference between the two. Lava is fine-grained and glassy due to its comparatively quick cooling. Granite, since it solidified slowly over millions of years, possesses large mineral crystals and is coarse-grained as a consequence.

There are two other general classifications of rock—sedimentary and metamorphic. Although entirely different in composition, they share one factor in common in that they were both produced from igneous material. Sedimentary rock, of which sandstone is an example, is a composition of mineral particles originally eroded from igenous matter which have been bound together by the cementing action of other minerals.

Metamorphic rocks are the result of great changes in either igenous or sedimentary material produced by pressure, heat or chemical action. Marble is perhaps the best known member of this group and was formed, through metamorphic action, from sedimentary limestone. Limestone in turn was produced from water deposited material originally eroded from granite. Therefore, granite emerges as the great-grandparent of all building stone.

The above is, of course, an oversimplified study of rock creation and one that would probably produce a few shivers in the average geologist. However, it does serve partially to explain the reason for some of granite's very desirable characteristics which, conversely, produce most of the granite industry's greatest headaches. For, above all things, granite is distinguished by its weight and tough resistance to practically everything, including man's efforts to remove it from the ground and shape it. This is chiefly due to the fact that granite is largely composed of two of the hardest minerals—quartz and feldspar—which occur in the rock in comparatively huge crystals due to the slow cooling during its formation. Granite too is impervious to water, being non-porus, and the effects of air, acid and centuries of time leave practically no trace regardless of how or where the stone is used. Unlike sandstone, limestone and marble it cannot be eroded by air-borne acids, wind, rain and freezing.

Although centuries of builders have been aware of the superior wearing qualities of granite they have been plagued by the tremendous problems involved in quarrying granite and cutting it into practical usable shapes. The Egyptians found a partial and temporary solution in their abundance of slave labor. Progress, of course, eliminated such methods and provided new means but cost remained consistently high.

Before the development of stone cutting machinery, granite was split; although the finished surface produced by this method was extremely rough, the rock, it was found, would break into true-planed forms. Even when faster, more efficient tools and methods came along, much of the work was done right at the site. Granite fabricators virtually did not exist and the comparatively rough stone was delivered direct from the quarry. This practice, of course, required the transportion of gangs of stone cutters to the building site, again, an extremely expensive proposition.

Despite these difficulties, granite enjoyed the wide use its quality deserved until the appearance of concrete and steel. The introduction of these two relatively less expensive building materials very nearly dissolved the architectural granite business. Slowly, however, a revolution developed in the industry, the effects of which are now just beginning to be noticed.

Manufacturers' attention first turned to fabrication and the establishment of uniform standards as a means of licking their problem of high production cost and price. Plants for cutting, shaping and polishing sprang up either as a part of or near most of the granite quarries. Research was begun to find better, cheaper means for handling each of these operations. Newer, more modern applications of the product were developed, among them the use of granite as a facing material and the design of pre-cut, pre-shaped units requiring no trimming at the site.

Gradually the industry's efforts began to pay off as cost curves dipped with the institution of mass production methods, the development of more efficient machinery and increases in volume. "Coring" machines made quarrying operations easier by freeing greater quantities of rock more economically with less waste. Methods of "gang sawing" were perfected and the sizes of all machines were enlarged in order to handle greater loads in less time.

An example of the increased efficiency which has enabled the granite makers to reduce their costs

is supplied by a granite company in Minnesota. In 1929 this plant, at Cold Spring, employed 100 cutters who shaped the stone by hand. Today, of 500 employes only nine do this type of work yet volume is at least five times greater. Architects will probably get a chance to see this operation during A.I.A.'s convention in Minneapolis in June, according to tentative plans of today.

Still the granite manufacturers are not satisfied. Better granite-working machinery is being developed. Newer, more effective methods of handling are being studied and put into effect. Costs, the manufacturers feel, can be reduced even more and some hope soon to be able to match the price of granite to that of the soft stones which have always been inexpensive to cut.

While technical research continues and new methods are thought out, granite manufacturers are watching the trend toward increased demand with anticipation for it represents another important key in the plan to reduce costs and price. One industry member sums it up as follows:

"Just as in any other business, increased granite demand will bring about lower production costs which will be passed along in the form of reduced prices. Although the price level today is lower than it has ever been, our aim is to get it even lower in order to make granite available for greater and more varied use."

The granite manufacturers have spent great quantities of time, money and effort in their attempts to return their product to the foreground of the construction picture. Both architects and builders want it and as things now look, they are going to be able to put granite to the use its superior quality deserves, granite fabricators believe.

MAY SOON GET ATOMIC HOME HEATING PLANTS

Residential heating plants which will use atomic energy may be as few as three years away, according to Frank L. Phillips, former project manager in design of mechanical facilities for one of the Atomic Energy Commission's major programs, the Argonne National Laboratories in Chicago.

Development of this aspect of atomic power is going ahead well, he said, and a few years should see the first plants in use, barring war or other restrictions on the peacetime expansion of the use of this source of energy.

Mr. Phillips said the atomic heating plant would have a non-radioactive heat transfer medium connecting the reactor with the boiler or converter. Any type of distribution system could be used with this central heat supplying unit.

DEPARTMENTS OF LABOR AND COMMERCE MERGE BUILDING PUBLICATIONS

Construction Review is the new name of a consolidated publication issued jointly by the federal departments of labor and commerce. The new publication, first issue of which came out in January, supersedes *Construction and Building Materials* of the Commerce Department and *Construction* of the Labor Department.

The new publication will bring to-

gether under one cover virtually all of the current construction statistics which are compiled by the federal government and will include some nongovernmental sources of information. It will contain articles on specific aspects of construction, including interpretation of trends in activity, outlook and reports on special studies.

The publication will cost $3.00 per year or 30 cents per copy, from the Superintendent of Documents, Washington 25.

SWIMMING POOL SOUND AND MOISTURE CONTROLLED BY FIBERGLAS TILE

Sono-faced acoustical tile, which is Fiberglas covered with a plastic film, has been used very effectively to control sound and resist the moisture found so abundantly in swimming pool buildings, according to members of the Owens-Corning Fiberglas Corporation.

Designers of recently constructed pools for schools reported to the Fiberglas people that the tile met their requirements well for a product with a non-painted surface, desirable acoustical and thermal insulating properties, good light reflectivity and imperviousness to moisture.

The tile also has value in building other athletic buildings like basketball courts, etc.

Parenthetically Speaking . . .

Our photographer caught these informal groups as they enjoyed themselves during the annual open house celebration of Haldeman-Homme, St. Paul. Those appearing in the numbered pictures are identified from left to right.

1—Duke Haldeman, C. H. Peterson, Eugene Corwin and Charles Magney; 2—Bob Glanville, Jack Simpson, Bob Dunning and Duke Haldemann; 3—Jack Homme, Bob Giere, Merle Abbott and Nils Mortensson; 4—Willie Storland, Chris Schristen, Jr., and Gene Sigvertsen; 5—George Gunderson, Hal Haroldson, Bob Hanson, Gene Flynn and Ron Ellsworth; 6—Bill Krueger, Edna Rich, Bob McGee, Carl Buetow and Ken Buetow; 7—Nils Mortensson, Horace Matson, Bill Krueger and Arnold Hartwig; 8—Ned Cooper, Paul Siebert, Gordon Matson and Jack Homme.

AGC Convention Pix . . .

Minnesota AGC Board for 1955—(top pic) seated, left to right, are M. E. Souther, M. E. Souther Construction Co., St. Paul, vice president of the heavy division; H. P. Phelps, St. Paul Dredging Co., St. Paul, secretary-treasurer; R. V. Johnson, Winston Bros. Company, Minneapolis, president; and A. H. Baumeister, Wm. Baumeister Construction Co., St. Paul, retiring president . . . standing, O. A. Stocke, O. A. Stocke & Co., Inc., Rochester, director; Richard R. Steenberg, Steenberg Construction Co., St. Paul, director; L. C. Halvorson, Madsen Construction Co., Minneapolis, vice president of the building division; Robert O. Ashbach, Otto B. Ashbach & Sons, Inc., St. Paul, director; and Howard Ganley, Howard Ganley, Inc., St. Paul, director. Leon Joyce, Rochester, vice president, Highway Division, was not present for the picture.

A panel of architects and contractors (center pic) participated in a discussion on the single contract vs. separate contract system. Standing are George C. Darrell, Ellerbe & Co., St. Paul, president of the Minnesota Society of Architects; Donald S. Haarstick, Haarstick, Lundgren & Associates, St. Paul; and S. L. Stolte, Bettenburg, Townsend & Stolte, St. Paul. Seated are O. A. Stocke, O. A. Stocke & Co., Inc., Rochester; C. H. Bingham, Kraus-Anderson Inc., Minneapolis; Tom Fowler, Fowler-Veranth Construction Co., Duluth; and Harry Lovering, Lovering Construction Co., St. Paul.

At the building contractors' meeting where W. A. Snow, Washington, D. C., national AGC staff member, discussed national AIA-AGC joint committee activities were (lower pic) Wilbur H. Tusler, Magney, Tusler & Setter, Minneapolis; Mr. Snow; O. A. Stocke, O. A. Stocke & Co., Inc., Rochester; Dean Lundholm, Standard Construction Co., Inc., Minneapolis; and Wes Bastedo, assistant manager, AGC of Minnesota.

Mr. Lundholm is committee co-chairman (AGC) of Minnesota AIA-AGC 1954 activities.

. . . And the Story

With three major problems for 1955 under consideration, some 300 Minnesotans and others interested attended the 36th annual convention of the Associated General Contractors of Minnesota in Minneapolis late in January.

The association, made up of non-residential builders in the state, heard speakers and discussed the development of recommended standards of procedure in the construction industry, labor problems as they affect the state and the highway and heavy construction outlook for this year.

President A. H. Baumeister of St. Paul presided over the general sessions.

The results of co-operation of the A.I.A. with the A.G.C. through their joint committee were brought up for considerable discussion. W. A. Snow, Washington, D. C., representing the national A.G.C group, spoke of the results at the national level while the state situation was handled by Dean Lundholm.

National President-elect George C. Koss of Des Moines spoke on the program which presented President Eisenhower's proposed $101,000,000,000 highway program. Problems of bituminous, bridge, grade, municipal, paving and excavating contractors also were aired during the sessions.

Safety was given an entire session of the Friday meetings as discussions ranged from first aid on the site to award of honors to safety contest winners.

CLEARING LETTING DATES WITH JOINT COMMITTEE OFFICE PREVENTS JUMBLES

As the outlook for construction in the Northwest continues to show definite increases, the problem of keeping letting dates from becoming jumbled increases and the Joint Co-operative Committee of the Minnesota Society of Architects and the Associated General Contractors of Minnesota has called attention to its functions in this respect.

"From all indications a tremendous volume of work is shortly to be put on the market, concentrating primarily in February, March and April," R. J. Hendershott, committee secretary, said. "The joint committee reminds all architects of the advisability of co-operating with the committee's office in clearing letting dates before the actual date is set. This is for the purpose of avoiding conflict in letting dates between jobs as much as possible and is in the interests of the owner to assure better competition. All concerned are reminded that it is of equally great importance, if not greater importance, to sub-contractors and equipment and material suppliers than it is to general contractors."

The secretary also called attention to the A.I.A.-A.G.C.A. "Suggested Guide to Bidding Procedure" which provides, under "Submission of Bids," that "Bids should be delivered at the designated place and not later than a designated time, preferably a Tuesday, Wednesday, Thursday or Friday afternoon but not on a legal holiday or the day following."

St. Paul Builders Exchange Holds Annual Dinner

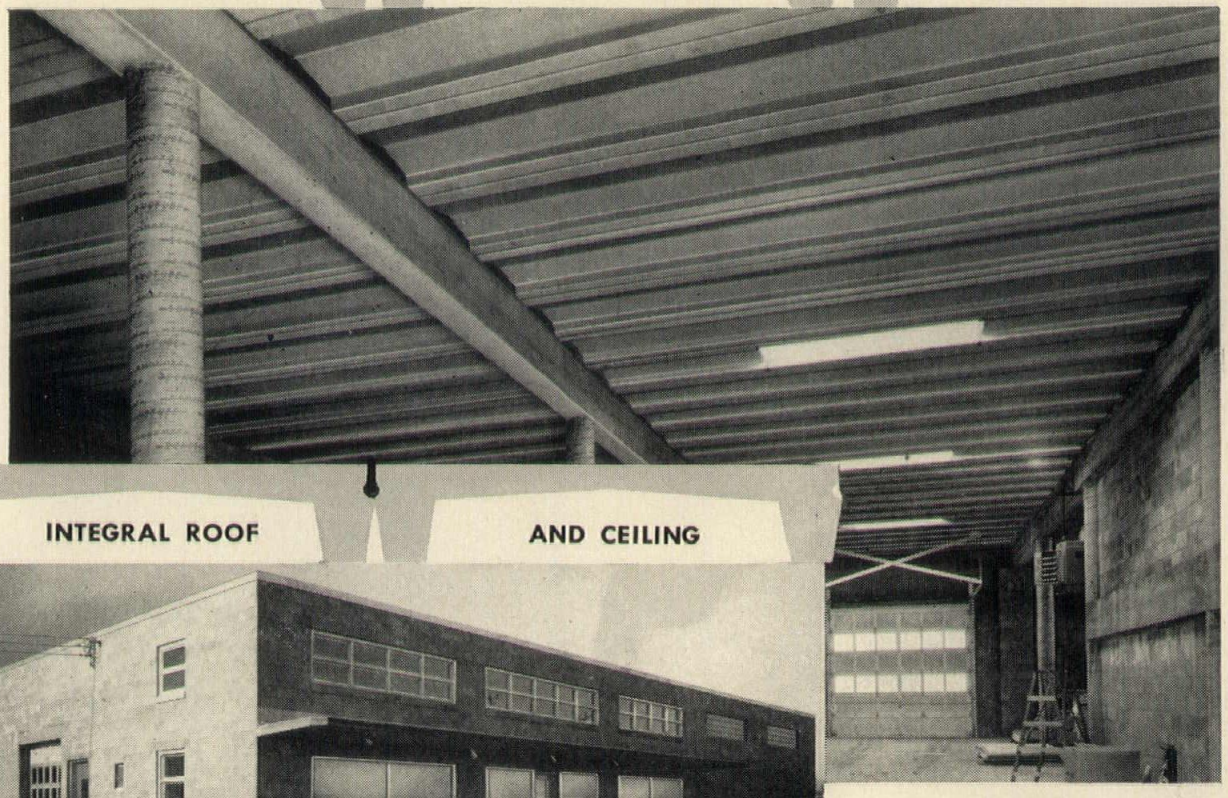
The annual dinner of the St. Paul Builders Exchange was a gala affair, as evidenced by our pictures, and the many architects, builders and others who attended voted it one of the outstanding events in the 49 of them held so far. President Evar Cedarleaf welcomed those who attended and the events of evening were carried through under the control of Toastmaster Herb Schell.

Our pictures show some of those present, in each case identified left to right in the numbered pictures.

1—Carl Fogelberg, Joe D'Antonio, Bill Mercer and Paul Beinhorn; 2—Maurice Johnson, J. R. Corwin, Harold Anderson and E. H. Lundie; 3—Frank Clark, Doc Hander Heyden, A. D. Hammerstrom and Brooks Cavin.

The head table—4—J. H. Cavanagh, Walter Baumeister, Gene Lambert, Roy Shelgren and Wm. J. Meyer; 5—Laurence E. Hovik, Lloyd Engelsma, Arthur Baumeister, George Darrell and Evar Cedarleaf; 6—Herb Schell, Ray A. Thibodeau, Robert O. Ashbach and Robert J. Hendershott; 7—Neil C. Sherburne, T. A. Cobb, Richard Radman, John Thera and Corwin Holland.

3'-0" WIDE | 4" TO 14" DEEP | 50' MAX. SPAN



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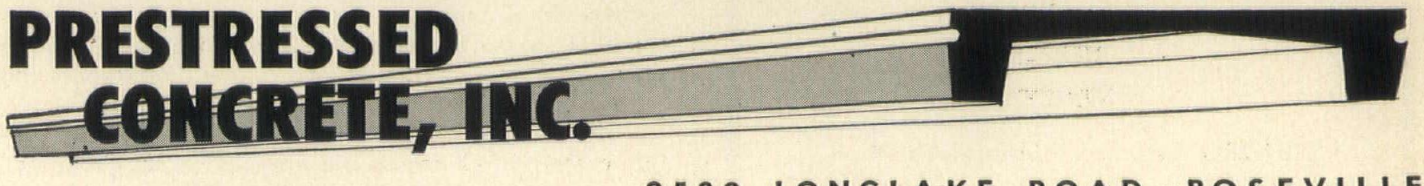


PHONE NESTOR 7458

2582 LONGLAKE ROAD, ROSEVILLE
SAINT PAUL 13, MINNESOTA

8—Sid Stolte, Bob Hendershott, Bud Holland and Joe Shiely, Jr.; 9—The Brothers Arrigoni, Chuck, Jim, Chick and Mike; 10—Evar Cedarleaf, George C. Darrell and Herb Schell; 11—Fred Strauss, Ray Thibodeau and Carl Buetow; 12—Louis Lundgren, Roy Shelgren, John Mathews and M. Berquist; 13—Gene Lambert, Robert Ashbach, Richard Radman and Neil C. Sherburne; 14—Joe Arrigoni, Pete Brescancini, Max Buetow and Harry D. Lovering.

NATIONAL PRODUCERS' COUNCIL OFFICIAL MEETS WITH AREA GROUP

Supply factors of the continuing building boom in the Northwest were the subject of a meeting during the recent visit in this area of John E. Shackelford, national field director for the Producers' Council, Inc., Washington, D. C.

Mr. Shackelford met with the executive committee representing the Minnesota-Dakota Chapter of the Producers' Council at a breakfast session in Minneapolis.

Our pictures show the visiting field director with

chapter officials. In the first he is shown (right) with Robert Olsen, Minnesota-Dakota Chapter president. The group shows (left to right) John Newhouse, Paul Buck, Mr. Shackelford and Howard Page.

RETAINED PERCENTAGES DISCUSSED BY BUILDING INDUSTRY REPRESENTATIVES

Millions of dollars of building credit now frozen by the practice of "retained percentage" can be freed for active use if proposals considered at a conference of building industry executives held in New York on January 25 are adopted by private building owners and state and local governments.

"Construction contract payments" said William Gillett, conference chairman and president of the Producers' Council, "are customarily made monthly as work progresses, with ten per cent, sometimes more, withheld

until completion to insure satisfactory performance of the work. Such retention, the conference agreed, should apply only to the first half of the project under normal conditions, otherwise the credit withheld becomes absurdly high in relation to the value of the uncompleted work."

By such action, according to William Stanley Parker, FAIA, for many years in charge of the A.I.A.'s standard contract documents, the owner should be adequately protected against incomplete or unsatisfactory work and the general contractor can use retentions on the second half of the job to make final payments on completed work. Thus credit, too often tied up unnecessarily for long periods, is freed. The maximum retention need not normally exceed five per cent of the project cost, he stated, and often might reasonably be reduced below this percentage as the project nears completion and if job conditions are all favorable.

Several conferees expressed the opinion that toward the completion of the job, the total amount retained should bear a relationship to the amount of work still to be completed, provided an amount be retained until completion that will protect the owner's interest. The meeting's moderator, past Council President, Tyler S. Rogers, said that these expressions of opinion of this second phase of the retained percentage questions were adopted as a basis for further consideration of the group at their next meeting.

MAGNEY SAYS ARCHITECT IS MODULAR MEASURE OBSTACLE

"The architect is the only obstacle in the way of nationwide use of Modular Measure," John R. Magney, member of the firm of Magney, Tusler & Setter, Minneapolis, told those who attended a recent conference on the system under auspices of the Building Research Institute.

Mr. Magney was one of the speakers who found that progress of this unifying measure was not progressing as rapidly as its backers had hoped. Many laid the responsibility on the doorstep of the individuals in the profession who have failed to avail themselves of the design possibilities of the measure.

"When architects use the system," Mr. Magney reported, "their clients get buildings that are designed better and built better at a lower construction cost."

"Many architects seem prejudiced against this change," J. K. Shear, editor-in-chief of the *Architectural Record,* said. "It appears that there are Ferdinands in the building industry who are loathe to fight for economy and unity."

The conference was attended by 239 designers, manufacturers and builders from all parts of the country. It was the industry's first definite symposium on the modular system and it was sponsored by the American Institute of Architects, Producers' Council and others.

University Armory *(Continued from Page 22)*

away but under the new R.O.T.C. program few medical students are expected to enroll in military science. The accessibility to the site is very good for both instructors driving their cars, student parking lots on 4th Street, S.E., and the bus line.

In order to have sufficient land, however, the present athletic practice area to the south would be needed for the new unit and the practice area to the far south and east needed for a drill field. Both of these are used by the athletic department, one in conjunction with the military, the other exclusively. The indoor sports area is the right size for an enclosed drill area but is unavailable to R.O.T.C. for its heavy winter drill needs. This site is scheduled for use of I.T. expansion.

II. River Flat Area.—This beautiful site, situated beneath the noise level of the university proper and overlooking the Mississippi River, is ideal for this type function except for two factors. The first is that it requires approximately 15 to 18 minutes to walk from the SLA-Education part of campus to the site. What with crowded class scheduling and 10 minutes commuting time allowed, this is unsatisfactory. Secondly, the river site was originally planned as a water-sport area for university students, an idea which can now possibly be carried out, considering that sewage is no longer dumped into the river

III. Existing Parking Area between 4th Street, S.E., and 5th Street, S.E., and 16th Avenue, S.E., to the tennis court block.—This flat area now used to park autos could easily be graded and landscaped to the design requirements. It is well located with respect to the major college groups. Accessibility by car or bus routes is very good. The disadvantage of this site is its rather distant location from the medical science group. As stated earlier, however, very few medical students now enroll in any of the three military science branches but rather complete their academic training and then enter special officer schools in the Armed Forces. Another disadvantage is the noise level created by trains along the north and west boundaries.

Site Conclusions

The site chosen is that area bounded by 4th and 5th Streets, S.E., between 16th Avenue, S.E., the railroad tracks and to the east to 19th Avenue, S.E. Acquisition of this land requires that the tennis courts now be shifted east one-half block, replacing a parking lot. The federal government will purchase land and supply all funds for construction of the new Military Science Armory. The university will take responsibility for all heating and maintenance once it is completed.

For the purposes of this academic solution to the problem it is assumed that the government will confiscate the four northeast one-half blocks from 15th Avenue, S.E., to 19th Avenue, S.E., between University Avenue and 4th Street, S.E., and turn this area over to the university for a development area for the fraternity and sorority buildings on the University Avenue side of these blocks. The strip could be developed into parks and recreation areas and serve as a mall connecting the new armory with the campus. The area directly north of the proposed site would be acquired for parking ramp development.

The dimensions, location and topography of the site are such that orientation of the units is possible in almost any direction. The site is level except for its northwest boundary, which cut down to the railroad tracks approximately 15 feet, and a gradual grade decrease from 18th Avenue, S.E., to 16th Avenue, S.E., and then increase to the 15th Avenue, S.E., bridge along 4th Street.

Building Space Requirements

I. Requirements of Army, Navy and Air Force which will be met through existing university facilities.

A. Large auditorium—Museum of Natural History.

B. Swimming pool—Cooke Hall.

II. Requirements of the three services for joint use.

A. Small auditorium—**Function:** The auditorium will be used for lectures and film showing to entire class. Acoustics and lighting of this auditorium are important factors. It is desired that no loud speaker system be needed for lectures but that sound speakers for audio-visual aids be designed into the room. **Area:** Sufficient to seat 150, with a small speakers' platform, screen and projection room. **Requirements:** Room should be acoustically good, easily darkened and well ventilated.

B. Drill Areas

Enclosed Area—**Function:** Serve as a drill field during inclement weather. May also be used for indoor sports of R.O.T.C. cadets. The unit must be heated to about 60°, well ventilated and consideration given to the acoustical problems involved in the type structure. Relate to Gun Armory. 30 hours—⅓ of instruction—of drill is given to freshmen and sophomores. It is important to have adequate space and unrestricted use for their training; 30 hours—1/5 time—for juniors and seniors. **Area:** 80,000 sq. ft. **Equipment:** Flooring suitable for drill and sports activity; storage for temporary bleachers used during dress parades and reviews; loud speaker system; toilets.

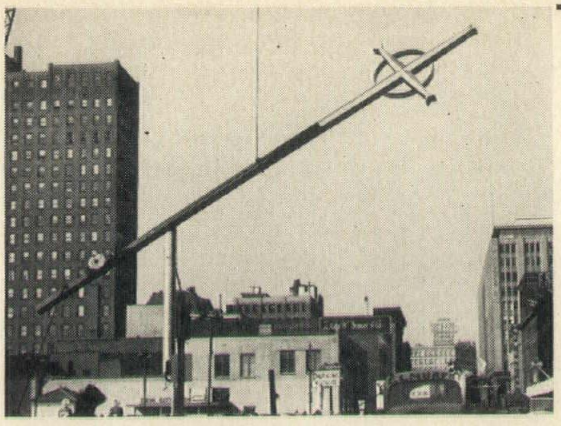
Open Drill Area—**Function:** Review parade and practice drill field. Area must be level and grassed. **Area:** Approximately 300′ x 500′.

C. Rifle Range—

Target Range—**Function:** Student practice area, used by both male and female students. **Area:** 20 sections at 4′ wide, 1000″ line to target, 25′ behind line, 6′ behind target. **Requirements:** No columns in line-target area, well ventilated and sound proofed.

Small Arms Room, Ammunition Vault—**Function:** Storage for 40 rifles used on range. **Specifications of Arms Storage:** Ref. SR 145-42-1 c-4; Ref. SR 140-440-1; Safeguarding of small arms and sensitive items of equipment; Locked outside door; Locked arms storage room door; Locked arms rack; Heavy hardware and construction; Windows protected by bars, metal frames or steel mesh not more than 2″ o.c.; Padlocks; All arms rooms of extra heavy, reinforced construction. **Area:** 150 sq. ft. **Equipment:** Two 4′ x 2½′ racks 20/rack; Vault at 5′ x 5′.

Dressing Room—**Function:** Changing of clothes for



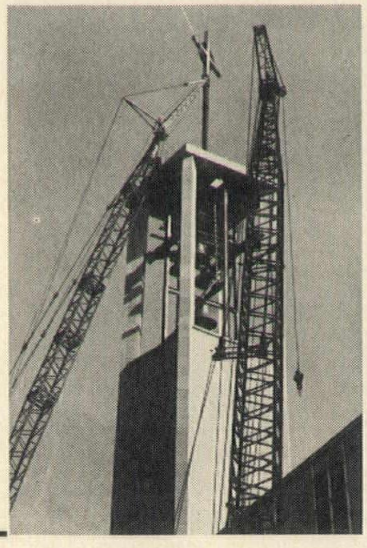
A symbol of Peace in the Skyline

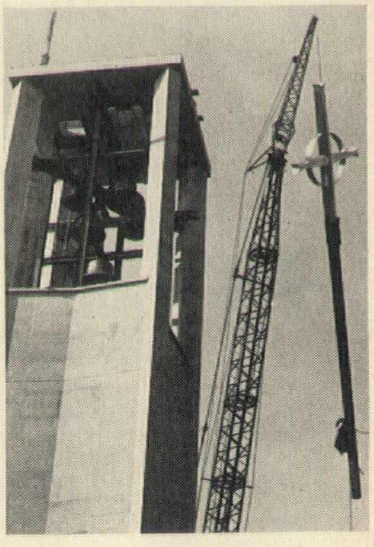
Successful "comebacks" always make inspiring stories and the rebuilding story of St. Olaf's Catholic Church in downtown Minneapolis isn't an exception. When the church was gutted by fire on Ash Wednesday in 1953, one of the oldest landmarks in the city left the skyline.

Now, just a little more than a year and a half later, a new church designed by *Thorshov and Cerny*, architects and built by *McGough Brothers*, contractors, is rising to take its peaceful place in the heart of the metropolitan area.

The 5,000 pound stainless steel covered cross extends 36 feet above the roof of St. Olaf's bell tower and was put in place a few weeks ago after being expertly fabricated by the ornamental metal craftsmen at *Minnesota Fence and Iron Works*.

St. Olaf's is tentatively scheduled for completion by Ash Wednesday, 1955. Then once again its long tradition of community service will again give faith and hope to all.





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SHIELY STONE

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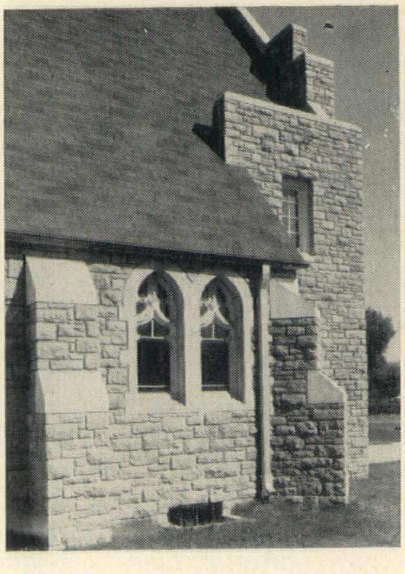

Rugged in Texture

and colored by nature in soft tones of blue, gray and autumn gold.

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range practice. **Area:** 200 sq. feet. **Equipment:** Lockers and benches. Men's and women's toilets. **Small Office for "Sergeant of Range":** Area 100 sq. ft.; Equipment, desk and file.

Rifle-Arms Room—**Function:** Storage of 1,000 rifles (500 at present) used by students in drill. Student instruction in cleaning of weapons. Automatic weapons armory in area but separate room. **Area:** Approximately 200 sq. ft. **Requirements:** Two doors—in and out passage around rifle racks. 50 racks at 4′ x 2½′—20 rifles/rack. Area for class instruction with 10 tables for weapons work and chalkboard.

Student Rest Rooms—**Requirements:** Sufficient facilities to accommodate students in classes at peak load hours.

Class Rooms

Army—**Function:** New program of G.M.S. for 2,500 students. Plan to expand to 5,000 in case of compulsory military training. **Size of Class:** 30 pupils each per hour. 1 at 150—auditorium—lecture and visual aid. **Requirements:** Same as general college classroom—darken for visual aid. Auditorium—acoustics, etc., to be studied.

Navy—**Function:** Instruction at five hours per week per student. Enrollment is 250—stable. **Area:** 4 class rooms—co-use and schedule; one small auditorium. Two navigation lab rooms—1,000 sq. ft. with work table and training area.

Air Force—Same general requirements as those for Army.

Number of classrooms has been determined from classroom scheduling as shown in Section III.

Gun Armory—**Function:** Demonstration, instruction and storage of large equipment and official transportation. Outdoor area for displays and demonstration. **Area:** 10,000-15,000 sq. ft. **Requirements:** Reinforced floor—1000#/sq. ft.

Loading Dock—**Function:** Dock space for receiving supplies and uniforms.

Enclosed Parking—50 staff cars.

Women's Lounge—**Function:** Serves office personnel and secretaries of professors. **Area:** Approximately 500 sq. ft. **Requirements:** W. C. and powder room; lounge furniture.

Gym—

Gym Floor—**Function:** Basketball, volley ball, etc. Co-use by three units. **Area:** Regulation basketball floor.

Lockers and Showers—**Required:** four head showers; forty lockers and benches—dressing area; W.C.'s.

Maintenance—Janitor areas and closets; steam conversion room.

Army R.O.T.C. Requirements.

Administrative:

Reception and waiting area—**Function:** Reception area for students or persons on administrative business. **Requirements:** Reception counter; waiting area for ten persons.

General Administrative Office—**Function:** General office work of unit. **Area:** 600 sq. ft. **Requirements:** Five desks, 15 files and one 15 ft.^{3} safe.

Instructors of MS I, II, III, IV Offices—**Function:**

Instructors' offices for preparing lesson plans, correcting tests, etc., and also for counseling of students. **Area:** 600 sq. ft. **Requirements:** Eight desks, eight files and additional chairs for student interviews.

PMS and T Office—**Function:** Head of Army R.O.T.C. **Area:** 400 sq. ft. minimum, plus conference area. **Requirements:** One large desk, lounge chairs and tables for entertaining V.I.P.s.

Executive Officer's Office—**Function:** Relate to PMS & T and general office. **Area:** 200 sq. ft. **Requirements:** Desk and storage files.

Adjutant's Office—**Function:** Relate to PMS & T and general office. **Area:** 300 sq. ft. **Requirements:** Desk and storage file. Sec. for adjutant.

Lounges

Officers and Non-Com Lounge—**Function:** Serves as a day room for the instructors and personnel and as informal conference room. **Area:** Lounge 1200 sq. ft. minimum. **Requirements:** Lounge furniture—include tables; magazine table (long); writing table; radio TV; W.C.'s.

Students—**Function:** Student recreation and day room—relate to class rooms. **Area:** 1,600 sq. ft. **Requirements:** Two ping pong tables, trophy rack, writing desks (two or three), magazine table and lounge furniture.

Student Organizations

Pershing Rifles—**Function:** Student fraternity—uniform storage. **Area:** Meeting room, 600 sq. ft.; dressing room, 400 sq. ft.; uniform storage, 200 sq. ft. **Equipment: Two desks, lounge furniture, lockers for 20,** racks and cabinets and armory for small arms—30 sq. ft. double doors.

Scabbard and Blade—**Function:** Student meeting area. **Area:** 400 sq. ft. Equipment: two desks, 20 lockers and coat storage.

Library—**Function:** Serve students for study and faculty for research. **Area:** 1200 sq. ft. **Equipment:** Standard library racks.

Band Storage—**Function:** Storage of band instruments used in drill—relate to drill area. **Area:** 400 sq. ft. **Equipment:** Racks for instruments.

Training Aids—Reproduction and Drafting—**Function:** Preparation of training aids, lesson material and miscellaneous displays. **Area:** 1000 sq. ft. **Equipment:** one drafting table, stencils and mimeograph machine, one work table, one stencil file and supply storage—paper and 30 x 40 sheets.

Supply Storage

Student waiting area and issue counter—**Function:** Students check out uniforms and supplies. **Area:** 200 sq. ft.

Supply clerk's office—**Function:** Records kept here of invoices, issues, etc. **Area:** 200 sq. ft. **Equipment:** Desk and files.

Uniform storage area—**Function:** Storage of R.O.T.C. uniforms. **Area:** 4200 sq. ft. **Equipment:** Racks for uniforms, enclosed cabinets and shelving.

Text book storage—**Function:** Issue of texts—to student directly and through staff. **Area:** 100-200 sq. ft. **Equipment:** 30-40 feet of storage shelves.

Administration storage—Training Aid storage—

Function: Supply storage for administration and staff. **Area:** 400 sq. ft.

Receiving Dock—**Function:** Trucks unload supplies and equipment. **Area:** Sufficient to unload and temporarily store supplies.

Regimental H.Q.—**Function:** Student officers meetings for staff briefing—relate to staff officers and instructors. **Area:** 1800 sq. ft. **Equipment:** Ten desks, coat storage and small cabinet storage—enclosed.

Publications Room—**Function:** Student and staff publications, social activities advertising and planning.

Air Force Requirements.

Administration

General administration office—Waiting area and reception counter; **Function:** Students waiting and record checking counter. **Area:** 400 sq. ft. **Equipment:** Counter and six chairs.

Records Registrar—**Function:** Students records kept and worked on here. Relate directly to waiting and reception area. **Area:** 200 sq. ft. **Equipment:** Files, desk and small storage.

Administration offices—**Function:** Serves all Air Force personnel, records, etc. **Area:** 200 sq. ft. **Equipment:** Eight files, one sec. desk and three enlisted men's desks (Coat storage for entire staff in one of these areas).

Instructors of A.S. I, II, III and IV offices—**Function:** Space for lesson preparation and student counseling. **Area:** 600 sq. ft. Requirements: Eight desks, eight files and eight additional chairs for student interviews.

Central office group—

Colonel's office—**Function:** Head of Air Force's office. Used for staff conferences and inter-service conferences. **Area:** 300-500 sq. ft. **Equipment:** One conference table for 14 men, one large desk with flagstand behind and lounge furniture.

Executive officer's office—**Function:** Serves as aid to colonel. **Area:** 200 sq. ft. **Equipment:** Desk, two chairs and file.

Adjutant's office—**Function:** Private office, he acts as aid to colonel and executive officer. **Area:** 200 sq. ft. **Equipment:** One desk and one personal file.

Lounges

Student lounge—Two ping pong tables, one TV and radio, lounge furniture and magazine table.

Staff—instructors—15-20 maximum—TV and radio, ice box, hot plate, coffee maker and storage for above, lounge furniture, magazine table and two bridge tables.

Supply

Loading and receiving dock—**Function:** Covered or enclosed area to unload supplies.

Receiving and shipping room—**Function:** Area to store and unpack goods received. Relate directly to dock and storage area. **Area:** 400 sq. ft.

Main storage room—**Function:** Storage of uniforms on 25 racks @ 6′ x 8′; storage of small uniform items in cabinets. **Area:** 4000 sq. ft.; 70-80 linear feet—floor to ceiling. **Equipment:** Racks and enclosed cabinets.

Text Book Supply—**Function:** Issue to students—separate and through instructors. **Area:** 400 sq. ft. **Equipment:** 30′ of storage shelves.

Administrative storage and supply—**Function:** Supply storage for administration and staff. **Area:** 400 sq. ft.

Student waiting and issue desk—**Function:** Students pick up uniforms and supplies. **Area:** 400 sq. ft. **Equipment:** Counter and 6-8 chairs.

Office—**Area:** 200 sq. ft. **Equipment:** Desk and files.

Band Room—**Function:** Storage of Air Force band instruments—closely related to covered drill area and drill field. **Area:** 400 sq. ft. **Equipment:** Racks.

Arnold Air Society—**Function:** Student honorary fraternity. 60 members—16 girl auxiliary members. **Area:** 400 sq. ft. **Equipment:** Informal furniture, coffee and lunch kitchenette.

N.R.O.T.C. Requirements

Administration

Receptionist and waiting area—**Function:** Student-public reception—controls traffic to officers. **Area:** 400 sq. ft. **Requirements:** Six chairs, one receptionist desk and reception counter.

Administrative general office—**Function:** With reception counter relate to administrative group. **Area:** 600 sq. ft. **Requirements:** One secretary desk, one supply desk, one administrative desk, one supply clerk desk, eight student files and four record files.

Instructors of Naval Science Offices—**Function:** Instructors' offices for preparing lesson plans, correcting tests, etc., and also for counseling of students. **Area:** 600 sq. ft. **Requirements:** Eight desks, eight files and eight additional chairs for student interviews.

Captain's room—**Function:** Professor of Naval Science. **Area:** Office 400 sq. ft., plus conference area.

Supply

Student waiting area and issue counter—**Function:** Students come here to get uniforms, all academic text books and miscellaneous supplies. **Area:** 400-600 sq. ft. **Equipment:** Counter and six-eight chairs.

Supply clerk's office—**Function:** Record of invoices and issues. **Area:** 200 sq. ft. **Equipment:** Desk and files.

Storage Area—**Function:** Storage of all students academic and military text books, paper and supplies. Storage of office materials—uniforms are not stored here, issued through this area in fall to freshmen and in spring for summer cruises. **Area:** 2,400 sq. ft. **Equipment:** Floor to 8′ storage shelves—enclosed, 4′-6′ cabinets for office supply and one long pipe rack for uniforms.

Receiving Room and Dock—**Function:** Trucks unload supplies, room to store uniforms, etc., temporarily. **Area:** 400 sq. ft.

Band Storage—**Function:** Student storage of instruments—relate directly to drill area. **Area:** 400 sq. ft. **Equipment:** Racks.

Anchor and Chain Society—**Function:** Naval fraternity for students. **Area:** 400 sq. ft. **Equipment:** Seating for 50 students plus informal seating.

Structural Design Solution

The drill armory of this design requires an area of approximately 80,000 sq. ft., to be framed and covered without interrupting the floor area with columns.

It's your magazine and you can give it a big hand up the ladder—see the envelope.

The solution to this problem that I choose to use is a flat, box-type space frame. The geometry of the frame is based on the cube. Diagonals are run from alternate corners of the cube to the center. This in reality is a system where a diagonal of the cube runs from its corner to the center of the cube and is terminated there at a steel ball joint. These cube systems are joined together by connecting the ends of the diagonals along the edge of the cube with braided fiberglass cord cable. The individual systems are joined so that the entire space frame is composed of two compression systems acting in three dimensions, held in equilibrium by the fiberglass cable, thus resulting in a continuous tension, discontinuous compression frame.

The frame consists of 3″ aluminum rods joined at the centers by threaded aluminum balls. The fiberglass cable is connected to the rods by threaded aluminum rod connectors acting as twin buckles. All rods and cables would be pre-cut to exactly the same lengths, the cable fitted with the connectors.

The height of the frame, likewise each side of the cube, is 8′-0″. This is an estimated distance based on relative comparison with other space frames.

The space frame used in the administration and class room element differs from the discontinuous compression system in size and the use of aluminum tubing for all members. The depth of the frame is 2′ 6″, with maximum column spacing giving bays of 48′-0″ x 64′-0″ center to center. The tension cables have been replaced by tubing, due to concentrated loading and fire restrictions.

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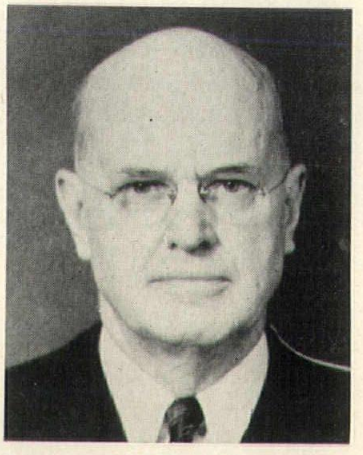
MINNEAPOLITANS NAME WHEELER "ROSTER ENGINEER"

Walter H. Wheeler, well known Minneapolis engineer who developed the "Smooth Ceilings" system of flat slab construction, has been honored by the Engineers' Club of Minneapolis, which named him the club's "Roster Engineer for 1954-55."

This honor is given each year to an outstanding



Mr. Wheeler

engineer and his accolade is made a part of the club's annual roster publication. A graduate of the University of Minnesota in 1906, Mr. Wheeler belongs to the Minnesota Society of Professional Engineers, was first president of its district five, and is a life member of the American Society of Civil Engineers, of which he is a past president of the Northwest section. He also is a life member and past president of the Minneapolis engineers club.

Free Fuel *(Continued from Page 16)*

climates, the aqueous vapor can bake out to as low as five per cent. On a muggy summer day the aqueous vapor content of the outdoor air can reach 95%. A comfortable proportion, outdoors and in would be, say, half and half. This water vapored air in heated houses passes over any kind of high temperature heating gadget, in basement plant or room heater, and gets warmed to 72°, making an agreeable *temperature* of air in the room, but not an agreeable air *quality* if dried out to 5% or 10%, or if filled with the fumes of combustion.

Heat passes quite easily from very hot heaters to air containing water vapor and the more aqueous vapor there is in the air the more heat is conveyed. But in even well balanced "fifty-fifty" air, heat does not pass at 72° to furniture, walls and floors except very slowly. Even with considerable insulation in the outside walls [redacted]s of houses, transmission of heat by walls [redacted] is much more rapid than air at room tempera[redacted] can replace it. This is one reason why metal objects in a warm room feel cool. It must be noted here that air containing no water vapor cannot absorb and carry any heat whatever. Dry air is a non-conductor of heat — hence the hot days and freezing nights in desert climates.

THUS IT IS that where the floor is a mild temperature "radiator," the benefits to the people do not come from the floor warming the people but because the people are no longer obliged to warm the floor.

THIS SITUATION is now familiar to the millions who use the new electric bed blankets. If the blanket "feels" warm you have it set too high. The blanket thermostat is ideally supposed to exactly balance the normal loss of bodily heat. People who have become excited by glass wall houses should keep in mind that heat passes out right through a plate glass window pane ten times as fast as through a normally insulated house wall, and five times as fast through even *double glazed* window walls. This loss of heat will be exactly registered in your fuel bills. It is one of the reasons why Becky Millar sitting near the big window beside the grand piano, or under the reading lamp near her living room wall, felt winter cold in a "warm" room. She was radiating her bodily heat to help warm up building material which was passing that heat on outdoors. There is *no* radiant heat in her house except herself; only the secondary "convected" heat as warm air pushed into the "space" which is "the room."

The warm air *in* a room will not maintain people in balanced warmth in the absence of radiant heat. "Heat always travels — i.e., radiates — *from* the warmer to the colder body." In that proposition lies the control for whatever is done in "people heating."

THIS NEW HEATING is a big subject. You already have a lot of questions. It would take two books to answer them—one for the users, one for the engineers.

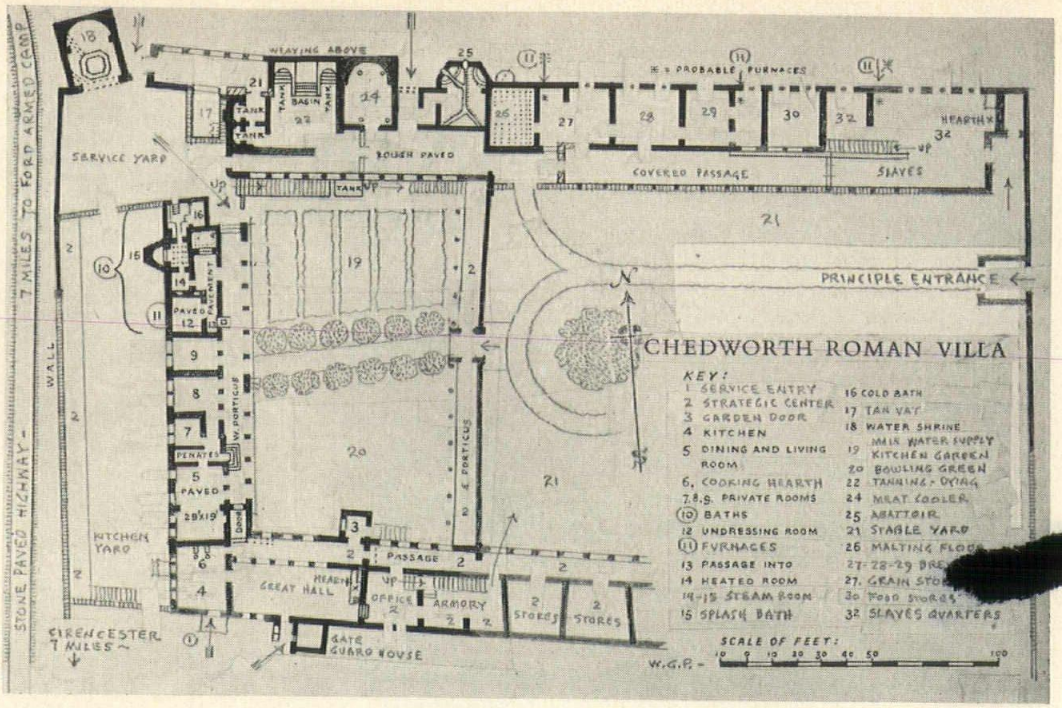
TO PRE-PRINT such books in NORTHWEST ARCHITECT is not practical because we have too many kinds of readers. We just have to assume that manufacturers and merchants, and mechanics, shoppers and students, housewives and husbands are also just plain folks in families who would like to hear something useful or newsworthy.

Readers can then take off from there. Let them ask the people who offer their products or services in these pages, or go to the public library. Many reports on all kinds of stored heat systems have appeared in other architectural periodicals. You will find in-the-floor and in-the-ceiling-and-walls systems, with pictures, diagrams and operational tables. Some of these are serviced with hot water tubes, others with embedded electric heating wires for states where low cost public power current rates make electrical heating economical. The various types of forced air circulation and crawl space *under* floor heat are also described. In none will you find the basic and essential factor which is our contribution to this research, namely, that: *any system must be designed so that the people can retain their own bodily heat.* The heating plant must supply *all* the heat. To "heat the building," whatever that means — or the air content of the rooms, is just *not doing that job.*

We will look over the comments that always come in after every issue of NORTHWEST ARCHITECT, and if we seem to have your further interest we will run a few pages of answers for consumers. The producers will have to get together with the experts, who will then become more practical, the producers better informed, and cool people be warm with less heat, more light we hope, and lower fuel bills.

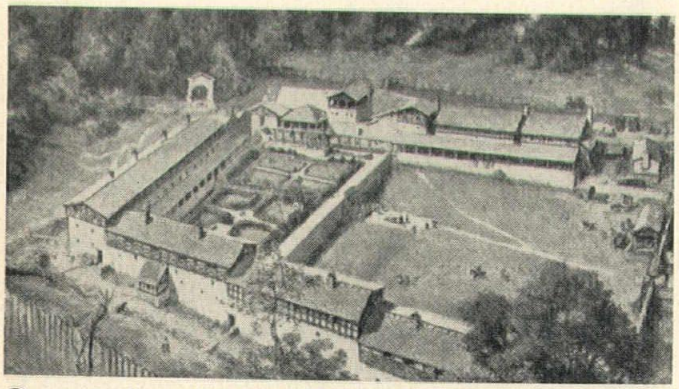
Editorial Page Notes

Showing how the brewing of beer was joined with bathing habits to make a perfect method for heating ancient store houses



CHEDWORTH ROMAN FARMSTEAD, A.D.200-400 PLAN AND TEXT BY W.G.P.

A Roman "Villa" was not a suburban country home but a highly organized and self-supporting farm establishment with craft and trade shops, barns and shelter for livestock and slaves, all within one enclosure. The buildings at Chedworth are arranged about three sides of two adjoining and well guarded courtyards, the western one for family and household, the eastern for farming operations. These two courtyards were separated by a high wall and supporting portico with double doored vestibule. Thus the inner family court was well guarded by the larger and also well defended farmyard. This cross portico opened toward the garden court and served as a storage for tools and sheltered outdoor work space. Its roof was a good platform behind the upper part of the cross wall for all operations of defense. The farmyard was also defended toward the east with a vestibule and two pairs of solid gates. Such a well protected compound into which the cattle and horses could be driven was essential. This farm colony was cut out of the ancient forest of Britain around the year A.D. 175, in the time of the Emperor Marcus Aurelius, whose rule represents the Golden Age of Rome. By 180, under the succeeding Emperor Commodus, the decline of Rome had begun.



General view of Chedworth about the year 300 A.D.

Chedworth Villa was located exactly one Roman mile from each of two armed highway forts—Cirencester to the south and a river castle to the north. It was under construction for several decades and was a colonial "county" seat until the Romans finally left Britain in 406 A.D., each owner continuing to make alterations to suit himself throughout the two centuries and more of this occupancy. No doubt it continued in general use for several generations more, possibly occupied by descendants of its Roman owners, for although the Roman Legions had departed, the Roman citizens of Britain generally remained undisturbed, under slowly changing relations to the native Britons, just as they have done in India in our day. It may have been burned during the Saxon raids which culminated the week of October 18-25 in the year 499 A.D. when King Arthur finally turned the Saxon tide in a battle only about two days' march west of Chedworth. In any event as long as enclosed rooms and stable lofts remained intact, together with the walls and fences needed for farming, parts of it must have continued in various slowly deteriorating uses for many centuries.

The south wing was the first to be built and originally contained slaves' quarters at the east end (not shown in plan). The kitchen (No. 4) helped heat the general room which later became the Great Hall or formal guest and management center. There probably was an earlier kitchen in the south wing. The first room of the growing west wing was the living and dining room (No. 5). Instead of having rugs on the floor, it has the ornamented pavements with which all rich Romans decorated their rooms. These pavements are mosaics, little cubes of blue slate, red tile, yellow limestone and other bright stones making pictures which still exist,

perfectly preserved. The four corners show the different seasons. Spring is a small girl with bird and flowers, summer is Cupid with a garland, winter is a cloaked man with dead branch and hare, but autumn has disappeared. The rest of this pavement has pictures of satyrs and nymphs. The north half of this room has a geometric pattern, gay in color and bordered by a scroll with vases. The room was heated by the system of under-floor hot air as shown in the pictures. The finished walls were of painted plaster in the Pompeian fashion.

The next three rooms in this wing were private sleeping rooms. Beyond them is the bath group (No. 10, a most important feature of Roman life. In the suburban and rural villas and farms it was a poor Roman indeed who had no bath-suite in his house; in the towns this was not so essential as there were always public baths. Such bath did not contain individual fixtures as we know them but were like today's Turkish or Finnish baths. With the Romans it was customary to spend the whole afternoon there, probably on Saturn's day. After the bather had been sweated and steamed (Nos. 12 and 14), he would take a cold plunge in the alcove tank (No. 15). Or after a hunt or journey from the legion camps seven miles away, he could take a quick wash in the cold tank (No. 16).

A spring with a small shrine (No. 18, Nymphaeum) is dedicated to the goddesses who watched over the villa's water supply. The spring is at sufficient height above the entire establishment so that the water would flow naturally downhill to all points of use in family rooms, manufacturing shops and barns. Strong stone walls joined the stout springhouse to the walls of the main house to protect the water supply during attacks.

No. 25 is the slaughterhouse, with corridor opening to the forest on the north, for bringing in the far ranging sheep or deer from the hunt. The passage opposite brought in the creatures from the farmyards and barns. The groups or rooms Nos. 17, 21 and 22 in the north wing served the home tanning and dyeing industry. The tank still shows the stains of the dyes. There is a bed of Fuller's Earth, for fabric finishing, in the wood west of the villa. The rooms include semi-circular dipping-tanks (No. 21) and rinsing tanks (No. 22). No. 24 appears to have been a cooling and preparation room for the meat supply.

The above picture of the malting room (No. 26) gives a clear view of the standard construction required for the Roman house heating system. The small forest of stone piers, several feet high, with variable thickness cap stones to facilitate leveling, were floored over with thin slabs of stone or large burnt clay tiles two feet square. This formed the floor on which the sprouting barley was kept gently warm while germinating, later turned and roasted. The heat was supplied by an oven built against an outside wall. This was served with a chimney flue to provide draft until the fire was well started. The hot smoke and gases could then be directed through an opening in the outer wall, still visible but blocked up, in the far corner. The heat would then spread by natural draft throughout this under space, producing any desired heat in the floor and room above. The smoke eventually escaped up around the walls of the room through the properly placed chimney flues.

When such a room was used as living and household working space or for the hot and steam baths of that era, these rough rubble walls would be lined with an inner wall of finished work in stone, brick, tile or plaster, leaving a space between the two walls to act as a continuous vertical smoke flue for all four sides of the room. The poor slave fireman became very skillful in balancing the fire against the weather and at long last was occasionally able to save himself a beating by maintaining a neat 70° in floors and walls of all rooms. To supply proper heat for the "Turkish" bath rooms and for the brewing, malting, dyeing and

baking diverse temperatures were required which the fire tender could as accurately appraise without thermometers as could our American pioneer women bread bakers, with their brick or cast iron ovens and wide variety of fuels. The Roman colonial women, wives of the soldiers, brought along to Britain little trays of lily-of-the-valley to remind them of home. In the small galleys, crowded with oarsmen and freight, the two months' sea journey from Italia was a rugged experience. Even if they crossed France, in springless wagons, travel would also be hard. But the lilies they cherished still bloom in the woods around Chedworth and in the museums are the enameled jewels from their garments. Thus time saved the poetry of old Rome. The ruins were despoiled of their stones to build castles and barns; the Temples of Venus and Mithras provided arches and columns for medieval churches. Clanking power shovels, excavating a London steel skyscraper in 1953, uncovered one of the temples of Mithras, a religion which for five hundred years competed with Christianity for the hearts of men. King Arthur and his times saw the last of it . . . well not quite at that for the Spanish Gypsies still worship Mithras.—W.C.P.

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If you wish to enjoy a very readable story of the daily life of Roman Colonials in Britain and what the Pater Familias saw when he went up to Londinium, most any library will loan you "The Little Emperors" by Alfred Leo Duggan, Howard McCann, New York, published in 1953.

Another very distinguished and beautifully made book on this era, which I acquired in 1947 from John Grant in Edinburgh, is "A ROMAN FRONTIER POST AND ITS PEOPLE. The Fort of Newstead in the Parish of Melrose," Scottish Border, by James Curle, F.S.A. Scot., Glasgow, James Maclehose and Sons, University Publishers in 1911. *His work is scarce, will only be found in special libraries, but should not be overlooked by students doing serious research on Roman Britain.*

MORE CITY PLANNING EXPERTS NEEDED

More trained specialists in city planning are needed if urban communities are to accommodate the population increases predicted for the future, Dr. John T. Rettaliata, president of Illinois Institute of Technology, stated recently before a Chicago meeting.

Noting that the population of the country is expected to reach at least 210,000,000 by the end of the century, Dr. Rettaliata said there will be a need for "thousands more trained in city planning, construction, transportation, and other activities."

"Just to think of the Chicago of tomorrow is a challenge to each of us," he declared. "Our leadership in the various arts and sciences which will determine our living conditions in the future depends greatly upon the productiveness of the teaching and research programs of technological institutions.

"Such institutions are the source of supply of elements essential to the survival of every progressive business, profession, or undertaking."

These essential elements, he explained, are a continuing supply of fundamentally trained people, scientific discovery and the development of better production methods, materials, engineering, and techniques.

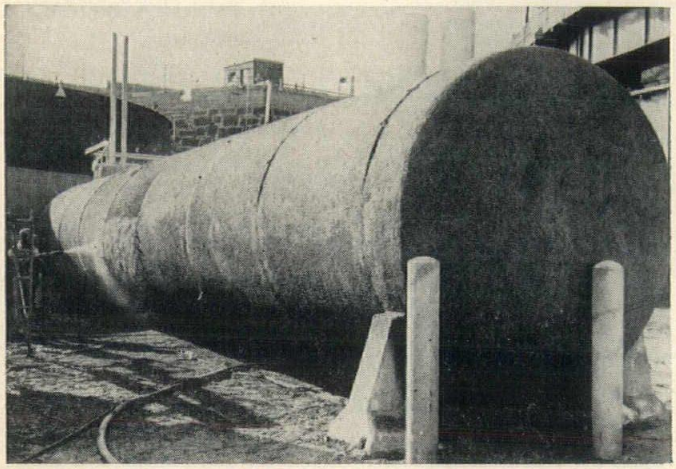
HOME BUILDING IMPETUS FORECAST BY NATIONAL SURVEY OF COLLEGE SENIORS' PLANS

Eighty-two per cent of today's college seniors who are planning marriage eventually intend to buy their own homes and 91 per cent intend to raise families, according to a survey just finished under the direction of the consumer research department of Kentile, Inc. The study was made to find out the future planning and the type of thinking of the generation which will enter American industry, business and professions in 1955.

Only 11 per cent of the 4,000 seniors said they expect to live with their parents after graduation and marriage, while 89 per cent declared their intention of setting up their own homes; 52 per cent of the students said they intend to live in a house and the prospective apartment dwellers totaled 39 per cent of those interviewed, with nine per cent reporting that their future living plans are undecided.

When they were asked about their future housing plans, 82 per cent of the students said they intend to buy a house eventually and 18 per cent said they did not intend to purchase home property.

Minneapolis Gas Company Uses Sprayed Concrete to Insulate Tanks

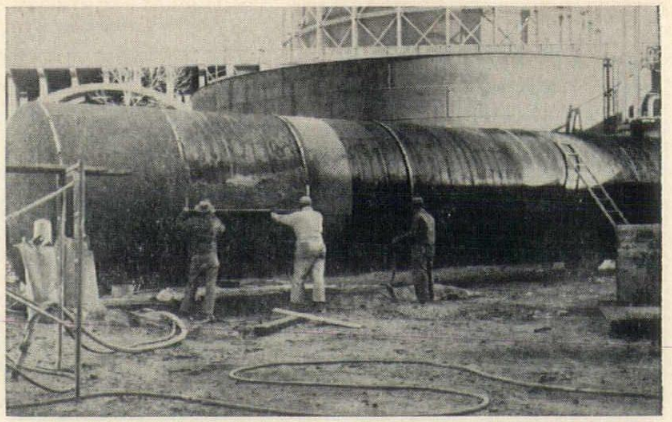


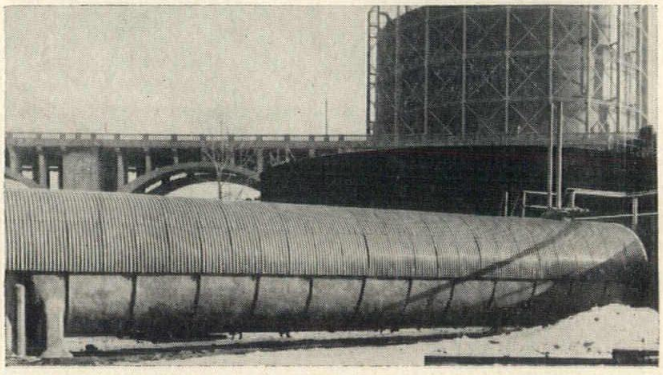
Fire is an ever-present danger where flammable materials are handled and the liquefied gas industry has done much to protect its plants and handling facilities against this menace. A practical answer recently evolved by experts of the Minneapolis Gas Company involves the spraying of its petroleum gas holding tanks with a 2½-inch covering of vermiculite concrete.

This material has been used for more than 15 years in the construction industry as poured-in-place insulation but spraying it on "with a giant gun" is quite new. In the gunning operation, the Portland cement and vermiculite aggregate are premixed and placed in a hopper. From there the mixture is conveyed by compressed air through a hose to the nozzle head of the gun. As the dry material hits the nozzle, it is mixed with water and emerges as a spray. This may be applied directly to the painted metal surface of the tank or to expanded metal lath or hexagon mesh netting.

Insurance specifications for liquid propane gas tank fireproofiing require that the temperature of the metal not in contact with the liquid propane shall not exceed 800° F., after two hours' exposure to an air temperature of 1800° F. Vermiculite concrete fireproofing is well within this limit.

A test of a pilot model steel tank 5 feet long, encased in 2¼" to 2¾" of air-placed vermiculite concrete showed that 4 hours and 20 minutes were required to raise the temperature of the steel to 700° F. in an average furnace temperature of 1890° F. The highest recorded temperature beneath the insulation at the steel surface of the pilot tank did not exceed 237° F. after two hours' exposure in a somewhat higher air temperature than that stipulated in insurance specifications.





Screeding the first coat (above) is done with an 8-foot metal straight-edge. After the coat has set the second coat of fireproofing is gunned on (left), this coat also filling voids left by removal of the screeds. The complete tank is shown (below) with its steel housing and weather-proofing on lower portion.

Air-placed vermiculite concrete is also durable. Examination after the test disclosed that the insulating jacket had retained approximately 75% of its original structural strength and had not fallen off or cracked seriously.

On the basis of this test, which was made in one of its own furnaces and anticipated the highest possible temperature conditions, the Minneapolis Gas Co. decided to fireproof a full scale butane gas tank with air-placed vermiculite concrete. The container is 9 feet in diameter, 53 feet long and has a capacity of 24,000 gallons. It lies horizontally in a concrete support at each end and stands from 1½ to 2 feet off the ground.

The tank was first thoroughly de-rusted and was painted with metal primer and aluminum paint. It was then given an extra coat of water-resistive, grease-type paint. Expanded metal lath, painted black, was then applied over the entire surface. Four screeds made of 2-inch by 4-inch steel bands were placed 7 feet on center and were moved along as the concrete was applied.

The first coat was gunned on 1 inch thick. As soon as a section was blown, it was screeded with an 8-foot metal straight edge held by a man at each end. When the entire tank had been covered with the first coat,

hexagonal wire mesh was bound tightly over the concrete and a second coat of concrete was gunned on 1½ inches thick.

A final coat of structural concrete, ½-inch thick, was blown to the under side of the tank and half-way up the sides for weatherproofing. This thickness was straightened with a scraper and feather-edged into the vermiculite concrete.

The entire tank could have been weatherproofed in this manner, but the Minneapolis Gas Co. decided to apply a metal housing over the upper half. This consists of a hood running about 4½ feet down the sides and overlapping the sand concrete coat.

To install the housing, ¼-inch by 1¾-inch steel straps were wrapped around the tank 4 feet on center. The straps have a clip angle at each end with a hole through which a bolt was run to draw the straps tight. To them 2-inch 20G purlins were welded 2 feet on center running the length of the tank.

Corrugated galvanized 26G curved sheets with corrugations running down the sides of the tank were nailed to the purlins with 6-penny lead head nails. About 7 or 8 nails were used per sheet at each purlin. The laps were sealed with asphalt mastic.

The ends of the tank were framed in a half-round box by letting the horizontal members project beyond the ends. Additional pieces of 2-inch 20G studs were placed in between, over the face of the ends, to secure the sheathing firmly. Joints all the way around were flashed and the housing and exposed straps were painted.

Breathing vents (holes ½-inch in diameter about 2 feet on center) were bored along the bottom line of the tank through the total thickness of the insulating jacket to provide escape for moisture that might condense on the tank for any reason.

A 1-to-12 mix of vermiculite concrete was used: one part Portland cement to 12 parts No. 0 size vermiculite aggregate, the largest size processed. The amount of water depends on the type of surface and whether fresh or rebound material is being applied. Unlike sand concrete rebound, which must usually be discarded, vermiculite concrete rebound can be shoveled up and used again; hence, there is no waste.

The 1-to-12 mix, air-placed, has a "K" factor of about .95, a density of 40 pounds per cubic foot, and a compressive strength of 190 pounds per square inch.

One of the great advantages of the new treatment is speedy application. An average of about 300 square feet per hour can be covered with a 1½-inch thickness by one machine.

In addition to fireproofing, the insulation value of an LPG tank fireproofing material to keep temperatures inside the tank constant is a factor to be considered. Such tanks are usually protected by pop-off valves that operate when the gas inside the container reaches a certain temperature. It would be hard to meter the economic loss of gas escaping in this way but it represents waste and a temperature differential of a few degrees might make the difference.

Moreover, on a hot day "wild" ethane gas, usually present in limited quantities, could develop a higher vapor pressure and start "popping" and, since these vapors are heavier than air, they might settle back down or even travel in layers over a point of ignition if the wind were not right.

The insulating properties of air-placed vermiculite concrete are indicated by the fact that temperature increases of uninsulated tanks in comparable locations at the Minneapolis Gas plant averaged about 2° F. from 10:00 a.m. to 2:00 p.m., for summer days, while the temperature increase on the tank treated with vermiculite concrete averaged less than 0.3° F.

THEY SAID IT! Edited by William Gray Purcel

OPEN HEARTH FIRES in a recent number seems to have found most families sitting by their first indoor fire of the season and feeling sentimental. The issue brought many hearty replies. Not the least was the photograph here from a client for whom Mr. Strauel and I planned this dwelling in 1941. In interior photographs it is difficult to maintain a balance of light values between a blazing fire in the lens, electric room light and the overall flash that takes the picture. Here it is perfect; not a dead spot; the unselfconscious faces and figures each brought out with individual portrait lights. Especially charming are the heads at left, and throughout a sense of solidity, almost stereoscopic. The modest photographer-client has asked us to please withhold by-line on house and picture.

—

THIS FIREPLACE seems to provide most of the cooperation we thought good in our fireplace story. The floor of the room steps up through the arch to the fire bed; you can see the top of the flames; the fireback is a brick heat lens that also keeps the fuel and blaze visually forward; the fire it not caged; the swinging iron kettle-cranes work and in twelve years of much use no sign of sooted up face bricks from smokey draft.

GOSTA EDBERG
architect SAR
N. Mälarstrand 12, Stockholm K, Sweden.
P. O. Box 758, Nassau, Bahamas, B. W. I.

Dear Mr. Purcell:

I have just read the NORTHWEST ARCHITECT about fireplaces and feel that you definitely talk about something very valuable, which today seems to be overlooked. Now rooms, frequently, are made into abstract patterns of generally fashion-approved design. The human aspects are thus easily forgotten, for **THE PATTERN IS ALLOWED TO BE ART IN ITSELF.** A house is never a house before somebody starts to live there and like it.

Gösta Edberg

—

● **We Agree**

No Smog in Family Campfires

OUTDOOR EDUCATION ASSOCIATION
369 Lexington Ave., New York 17, N. Y.
L. B. Sharp, *Executive Director*
National Camp, Matamoras, Pa.

Dear Bill:—

I thoroughly enjoyed and appreciated your article on "Open Hearth-Fires." With experienced feelings one cannot miss in designing a hearth fireplace.

Only one tiny addition. I rebel at using a fireplace as a trash burner and would never use paper for starting fires. Paper ashes fly around and get smudgy and

messy. I even dislike to see any remnants of cigarette butts and such around the edges of a fireplace. All just clear, clean ashes of wood. Anyway, it spoils the wonderful spiritual value of the fire which you have so well presented.

Very sincerely, L. B. Sharp

—

● **No More Haywire**

The Passing of an Era

OUR TECHNICAL EDITOR applies his architectural views to the passing scene and comes up with some remarkable exhibits. He recently sent us a bit of grass green fibre binder-twine. His tag said, "Haywire, famous for seventy years has been recently superseded by this green cord. My neighbor, John Patrick Costello, in the earth moving business (by horse power—live horses) says the green color is in honor of the Irish teamsters.

"In the western blizzards of 1920 the cattle were to have been fed by baled hay dropped from airplanes. The usefulness of the hay-drop was much reduced because the poor animals could not gnaw through the bales which failed to burst in the soft snow. J.P.C. says cord is cheaper, easier to use, cattle can safely eat it.

"I believe that the historic fact of the abandonment of haywire should be recorded. What will the masses of Hillbillie mechanics do now when facing repair problems on farm and home? Where turn for such a soft workable wire of great strength?" John Jager.

Haywire helped condition a special race of men and gave the American language many pungent words. A whole era has "gone haywire" and with it the men who could get broken machinery back to work with "what they had handy."

—

● **Grandma Moses the Popular Painter**

Had nothing on Grandma Gray the popular and successful home medicine maker.

A TEAM OF DOCTORS, researching on a cure for the common cold, has found that the white flesh under the rind of lemons is a specific that will do the job under 48 hours. "Liberal separate doses of Vitamin C should accompany the lemon skin." Principal vitamin of the inner lemon rind is vitamin C, also K, P, the newly discovered G and no doubt many others.

Dr. Gray's wife, "Kitty," for colds used to slice thin a couple of whole lemons. To these she added a bit of brown sugar, or better molasses or honey and a liberal helping of flax seed. This was cooked and then allowed to simmer in a shallow "crock" on the back of the "range" for some hours, until it became a sort of thick caramel. We were encouraged to eat this, ad lib, lemon rinds and all of course. The chewey lemon was the best part of this medicine. That was her cold cure and it worked. Incidentally, a slice of lemon was laid on every glass of all tart jelly and jam while still hot. I suppose these were slightly pre-cooked. This lemon slice was prized more than store candy.

● **This College Year**
For Architectural Students

EVERYTIME you put a pencil to paper, say to yourself:

"Perhaps I am only producing a *graphic* esthetic. Here am I, trying to be a Builder-in-Chief. I ought to be making only helpful memoranda of my *architectural* pre-concepts. I wonder. Is my mind functioning *wholly* within the building art? And how about my economics? Do dollars decide these details? I must give them their say."

If you are really "in" architecture, know that *when* you are really in architecture as an expert in creating buildings, you can hire draftsmen to make drawings.

At this point I hear a distinct groan from several offices who have lately gone through a hire and fire routine. That system also produced no results. One office now contracts with its draftsmen for the working documents, complete at deadline, at a percentage of the professional fee collected. The contractor draftsman works when he wishes. This arrangement is reported mutually satisfactory.

REHABILITATION CAN BE AS HEAVY A JOB as new construction when the structure happens to be a weatherbeaten ball park. The St. Louis Cardinals' home park, Busch Stadium, recently was found to have taken too much battering and it had to be reconditioned. Most damage was to concrete columns, ramps, floor beams and soffits, in some places so far gone as to expose the steel reinforcing materials. After thorough testing for soundness, bad concrete was cut out, cleaned by a sandblast, reinforced and refilled with gun-applied concrete. Final step was a special surface proofing to spare the under-material from the weather.

ARCHITECTS' HANDWRITING BAFFLES SECRETARIES

Surprisingly, architects scored poorly in the results of a handwriting poll conducted by the Norma Pencil Corporation. The survey, which asked secretaries to rate their bosses' handwriting, revealed that 66 per cent found it hard or impossible to read their bosses' notes. Apparently many architects have laid aside their penmanship skills in favor of the slide rule and T-square. The illegibility score for all executives reported was 41 per cent.

Advertising men and aviators were also flunked badly by their secretaries, while executives in the building trades, electrical engineering and the school systems won the blue ribbon honors for a nice touch with the pen.

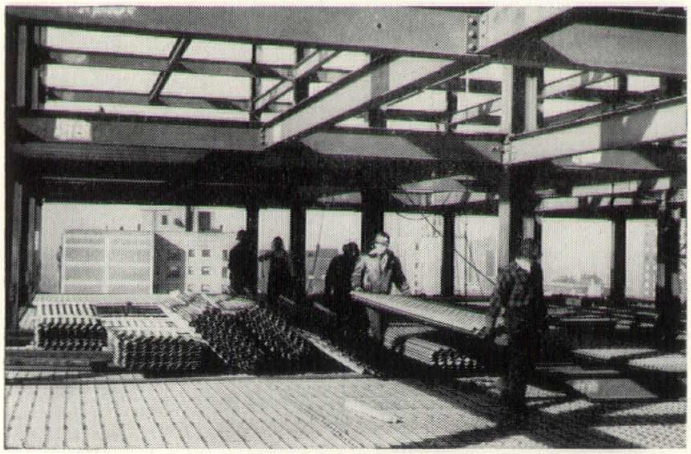
Despite the popular belief that the younger generation has had less drilling in the three R's, junior executives as a group got a higher legibility scoring from their secretaries than executives over 40.

ADVERTISING

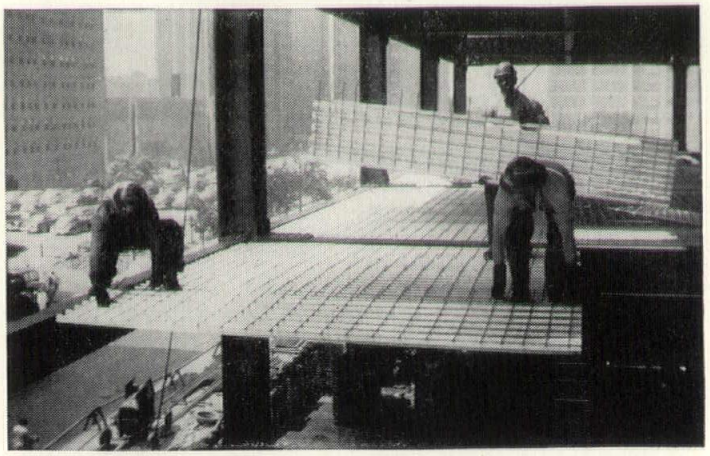
COFAR...

THE REINFORCEMENT THAT FORMS

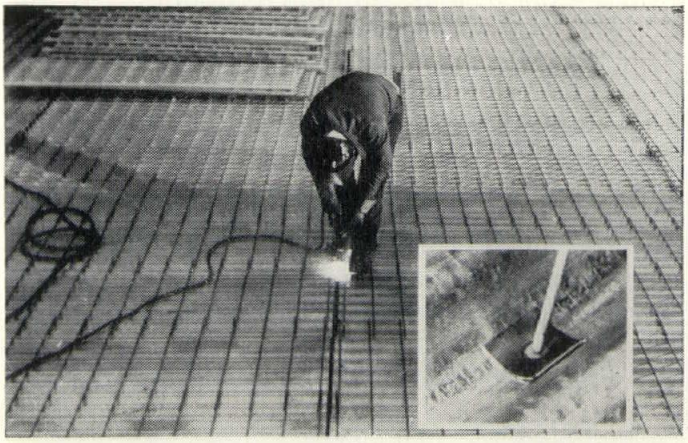
Speeds construction • Cuts building costs
Eliminates wood forms



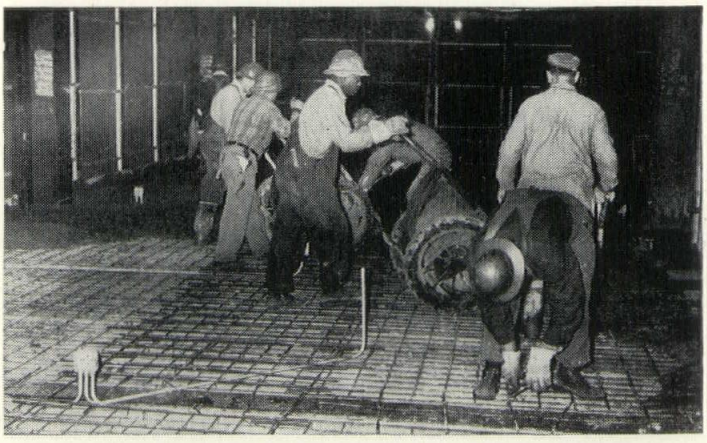
1. Cofar, a deep-corrugated steel sheet with T-wires (transverse wires) welded across the corrugations performs the dual function of reinforcing and forming concrete slabs. All Cofar units are cut to fit the building frame and are ready for immediate placing upon arrival at the job site.



2. Cofar placing follows directly behind structural steel erection. Weighing only 2 lbs. per square foot, Cofar sheets are easily handled. Sheets interlock by a one corrugation sidelap assuring a tight form for concrete. In position, they provide a safe, unobstructed working platform for construction activities.



3. Cofar sheets are welded to the structural framing members. Construction advances quickly, easily. There are no forms to build and tear down and incombustible Cofar eliminates construction fire hazards. Tough, high-strength steel permits Cofar to absorb extreme construction abuse without damage.



4. Placing concrete is a fast operation. The main positive reinforcement is provided by the deep corrugated steel. T-wires welded across the corrugations furnish the necessary temperature reinforcing and mechanical anchorage between concrete and corrugated steel. Result: A safe, high-strength concrete floor.

GRANCO
STEEL PRODUCTS CO.
(Subsidiary of Granite City Steel Co.)
GRANITE CITY, ILLINOIS

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KEELOR STEEL, Inc.
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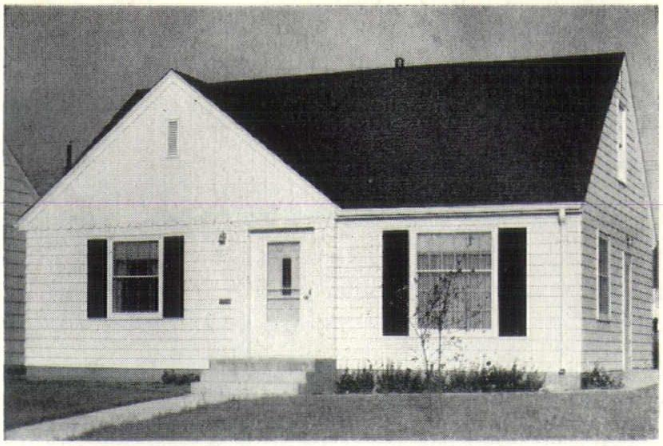
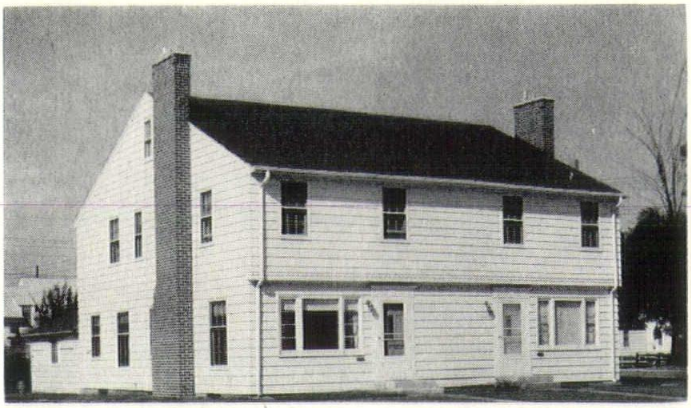
PALCO REDWOOD "THE WOOD ETERNAL"

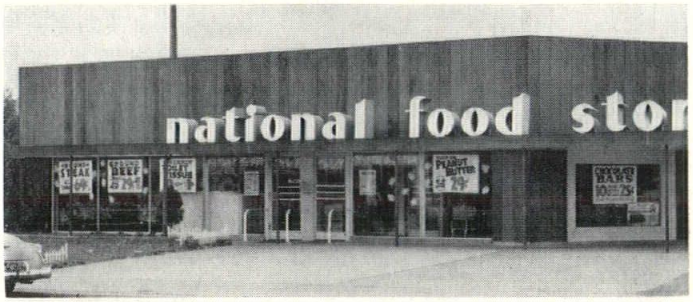


SMALL HOMES—5/8x8" Bungalow Siding and Board and Batten Front Gable.

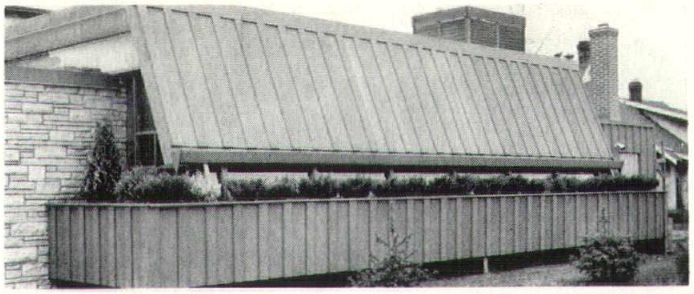


LARGE HOMES never are monotonous with 3/4x10" Palco Redwood Bungalow Siding.

PORCHES—This one has Palco Redwood floor, ceiling & Paneling with contrasting bamboo shades and furniture.

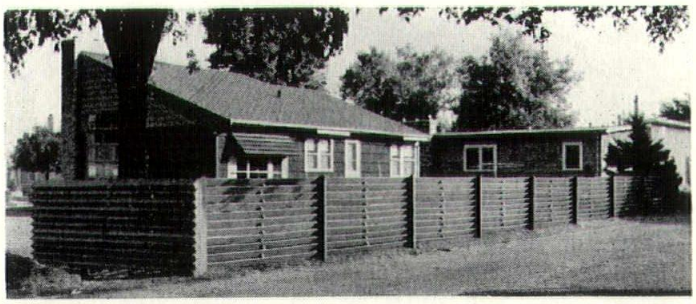


STORE FRONTS of Redwood V-joint add a touch of warmth to the community.



RESTAURANTS—This Board & Batten overhang and planter insures privacy to the patrons.

SPECIFY PALCO REDWOOD WHEN YOU WANT BEAUTY, WARMTH, DURABILITY, COLOR, AND ENDURING CUSTOMER SATISFACTION.



FENCES of Redwood should be included in the original architectural specifications.

PALCO REDWOOD MEANS QUALITY REDWOOD