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CHURCHES
Must the church build in Gothic or can contemporary architecture meet the needs of today's church? An essay illustrated with most successful church designs of the past decade and the most promising designs projected for the new decade.

HOUSE
An unusually open plan by Architect Hugh Stubbins makes room for an interior garden and a semi-detached bedroom suite.

MERCHANT HOUSEBUILDING
A top-flight architect helps a Washington, D. C., builder lay claim to the subdivision of the year in the moderate price field—Hollin Hills.

PREFABRICATION
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BUILDING REPORTER
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SHOE FACTORY
Florsheim bucks the trend toward decentralization and one-story construction by building a seven-story plant in the center of Chicago.

THREE SHOE STORES
Widely divergent designs featuring an open front, an all-glass front and a steel front.

SCHOOLS
FORUM takes a second look at its October reference number on schools.

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A review of shell concrete construction whose increasing use saves concrete, costs and time.

REVIEWS

PRODUCT NEWS

TECHNICAL LITERATURE

Cover: Tabernacle Church of Christ, Columbus, Ind. Eliel and Eero Saarinen, Architects; E. D. Pierra & George Wright, Associates. Photo by Hedrick-Blessing Studio.
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*Bromble Exchange, Cincinnati Suburban Telephone Company, Cincinnati, Ohio. The interesting mortar-joint pattern is effected by the use of two sizes of Insulux Glass Block, Pattern Nos. 216 and 416. Insulux is made in a variety of designs, in three sizes.*
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Architectural FORUM December 1949
BUILDING GOES OVER THE TOP — 1949 will set a record. What will happen in 1950 is everybody's guess, and almost everybody's guess is good

“This is it” said statisticians as they watched October roll up 100,000 housing starts — a record for the fourth successive month and 26,600 units over October, 1948. There was no doubt, now, that home-building in 1949 would reach an all-time high. Only one question remained: how far above the old 1925 peak of 937,000 dwelling units would home-building go this year? A safe prediction was 950,000. Washington economists were confidently quoting 975,000. A few even hazarded a cool million. Total construction looked good for more than $19 billion — a record high in dollar volume and exceeded in physical volume only in the boom years of the late twenties and the peak war year of 1942. With a good year almost behind them, builders looked ahead. What would happen in 1950?

Experts agree. Building volume in 1950, says almost everyone, will be about as great as in 1949. Industry and government economists agree, however, that private construction will recede as public building takes up the slack. A joint estimate by the Department of Commerce and the Bureau of Labor Statistics says private construction will drop $925 million from the 1949 total of more than $14 billion, a decline of 7 per cent, with public expenditures increasing by a like dollar amount (a rise of 18 per cent.). Estimates by Economist Miles Coleen and F. W. Dodge vary somewhat from this forecast, but both agree on the trend. As for home-building, BLS and Commerce predict that 1950 “will be only one of the better years” with about 900,000 housing starts. Of these private housing will account for 830,000 units, compared with 960,000 this year, while public housing will comprise 60,000 to 80,000 units, up 32 per cent from 1949.

Even much “private” residential building will, in effect, be public—40 per cent of it coming under federal insurance, guarantee or mortgage purchase programs. Together with public construction, government-supported building will comprise 45 per cent of total construction.

Dark side. There were solid reasons for predicting less private residential building in 1950. Rental housing, which was chiefly responsible for the record total this year, is bound to slip, assuming FHA’s section 608 will not be renewed next March. Says the Real Estate Research Corp., flatly, “we are beginning to overbuild.” The term “overbuild,” says RERC, does not mean we are approaching a condition in which there are more dwelling units than families, but that we have arrived at a point in which the number of housing units is equal to the number of families who can afford to buy them at current levels of price and income.

Bright side. After all, the predicted 830,000 private housing starts is not far below the total for 1947, when 849,000 units were built with little help from public housing. But if FHA gets the new private housing bill enacted soon enough next year, it might generate an impressive amount of the so-called “bargain-basement” housing under Title I. The new bill improves the deal under Title I for low priced housing in rural areas where FHA can relax its rigid requirements imposed on construction in built-up areas. Under such conditions, mortgages might run up to 95 per cent on a $5,000 house.

Plenty of money. If prospects for expanded building under a private housing bill with relaxed FHA administration seem over-optimistic, there is still the sure effect of a mass of investment money seeking a market. Reserves of private insurance companies are increasing by some $3.5 billion a year and savings and loan shares by about $1.4 billion. Time deposits in commercial and savings banks is increasing annually by $1.6 billion. New money from these sources alone will approach $7 billion next year.

On top of that, 18 states have passed veteran’s bonus legislation calling for distribution of $2.5 billion. And starting in 1950 the Federal Government will dispense $2.8 billion in rebates on veterans’ insurance. Furthermore, if pension plan accumulations spread throughout all American industry, as much as $10 billion more could pile up for investment. This total would not be reached immediately, but the possibilities are tremendous.

Add to all this money the Federal Reserve Board’s survey indicating that seven million families plan to buy or build before the end of 1953—and there is a convincingly impressive prospect for home building in 1950. Conservatism of the “slide-rule squad” is based, primarily, on the impact of public housing, on the probability that, as more people are taxed to help pay the other fellow’s rent, fewer will be able to buy new homes of their own.

WASHINGTON

FHA INFLATION dangers, growing Fanny May questioned by Douglas

How much is FHA’s easy credit pumping up the balloon of real estate inflation? At one time or another, almost everyone to whom the term FHA means anything has mulled that question over. The latest to do so is Sen. Paul Douglas (D. III.), who heads a Joint Committee on the Economic Report subcommittee, and who has been confounding the Fair Dealers (he is one of them) by casting a critical eye over the price tags attached to many an administration program. He wondered whether FHA should be used mainly in dull periods and suspend...
Now underway in the Smolensky Square in Moscow is this 26-story office building, showing that the Russians are apparently as fond of steel cage structure as are Americans.

NO INFLATION IN FHA, says Foley

HHF Administrator Raymond Foley (above center), testifies before a committee headed by Sen. Paul Douglas (above left) that FHA's program of easy credit carries with it no seeds of inflation (see story, right). Sitting next to Foley is Berchmans T. Fitzpatrick, Deputy Administrator of HHFA.

GERMANY BUILDS homes from rubble

Workers in Hamburg, Germany, crush the rubble of blasted building materials to use in rebuilding the city's homes. Much of it is used as aggregate in poured concrete walls and floors to help meet Hamburg's yearly need for 200,000 homes.

FORD HOUSE ON WHEELS

Housebuilding has been constantly compared to auto building by critics who maintain that "autos are produced cheaply, why can't houses be?" Finally one leading automobile manufacturer has turned his talents to housebuilding. The result: a "tour wagon" 18½ ft. long (bumper to bumper), 6 ft. 2 in. wide, 71 in. high, all mounted on a Ford delivery truck chassis. Tour wagon body is manufactured by Boyertown Body & Equipment Co. of Boyertown, Pa. Wheel-house will sleep four persons. Price: around $3,500.

its operation when building was at a high level, or whether it should plough right ahead, conforming to the bullish market by hiking its interest, increasing its insurance premium, tightening up its appraisal policies and cutting down on amortization periods. He called HHF Administrator Raymond Foley before his committee to get a few answers.

No surprise. Foley's answers surprised no one—nor did they shed much light. They accurately reflected the popular belief shared by many an anti-New Deal private builder that FHA was the only New Deal brain child conceived without the taint of original sin.

Standing firmly on the contention that anything which brought new housing on the post-war house-short market was good for the economy, and pointing out that most of FHA's incentives are offered in the lower price fields, Foley insisted that the insured mortgage system was completely anti-inflationary, except perhaps for the emergency operations under Title VI—which had been extended just before each expiration date by congress. (He suggested that any such future emergency measures could be handled more realistically by giving the shut-off power to the president.) Aside from that, Foley could see no reason for tinkering with any part of the FHA program—not even the amortization period which Sen. Douglas was curious about. (It might discourage construction in a building-heavy year, he reminded the Senator, but it would also keep lower income families off the housing market.) Left to itself, Foley insisted, FHA would do all right. Backed up by FHA Commissioner Franklin Richards, he stoutly maintained that the prevailing price curve and FHA's long term valuations are now about at the same level.

Other worries. If Sen. Douglas took any encouragement from Foley's answers, he didn't acknowledge it. He went on instead to another question which was worrying him: Why was the Federal National Mortgage Association getting so big? The $30 million a week rate at which RFC's secondary market was buying FHA and VA mortgages was considerably higher than was anticipated in the budget. Were bankers anticipating higher interest rates? Every existing sign indicated that that was not true. Were banks "selling their sour loans to the government?" Foley didn't think so. He thought it was more likely that lenders had to sell their mortgages in order to make new ones.

Sen. Douglas might get a more complete answer by putting his question to a few
frank private lenders, who were now beginning to look with more tolerance on the VA 4 per cent loan because they had to (see pg. 15), but who were no more pleased with its unnaturally low interest rate than they ever were. And as long as the interest rate remained low, they would keep right on feeding their mortgages to Fanny May.

SENATORS like Sweden's co-op housing, especially the financing

Sen. John D. Sparkman (D. Ala.), one of the congressional backers of the proposal which came up last year to grant Federal loans to cooperative housing for middle income families, took off on a junket to Sweden and northern Europe to prove that the cooperatives in those countries were successful. He returned last month, still impressed with Sweden's co-ops but impressed even more with the system of joint Federal-private financing he had seen there.

So impressed was the Senator with Sweden's system of allowing a private investor to hold the first mortgage on a development, amounting to about 70 per cent of the total investment, and the government to hold a second mortgage on the rest, that he thought it might be wise to revise, along with the rest of the total investment, and the government to hold a second mortgage on the rest, that he thought it might be wise to revise, along Swedish lines, the co-op bill now waiting for action in January.

Not only Sparkman and Sen. Ralph Flanders of Vermont, who sees eye to eye with Sparkman on housing matters, were impressed, however. Swedish co-op financing had caught the fancy of two other junketing senators who had stoutly opposed the idea of government sponsored co-ops. John Bricker of Ohio and J. Allen Frear of Delaware indicated their opposition might wither in the face of a program modeled after the one they had seen in northern Europe. (The Mortgage Bankers Assn. promptly announced that it would send a delegation abroad, to see just what this Scandinavian financing is all about.)

PUBLIC HOUSING starts with bang, slum clearance trails behind

The Public Housing Administration finally fired the first salvos of its big guns: $20,375,400 worth of loans were shot out to 108 communities to cover the cost of 134,500 public housing units, all to be started within the next two years. (Biggest grant: $2,790,000 to New York, $2,180,000 of which will go to New York City.) And it was only the beginning. Also earmarked for distribution in the first two-year period were allocations to another 100 local housing authorities.

It appeared that few of these units would be built on slum land cleared with federal funds. Title I (Slum Clearance) of the Housing Act was getting started much more slowly than the more dramatic public housing section. (The Slum Clearance division last month was still filling the vacancies on its staff; see People.) Chicago and Detroit were the only cities which had started demolition (and they were doing it with their own money). Several others were fairly well along in preliminary planning. But HHFA's official regulations and application blanks would not be ready until January.

No hoopla. One reason for Slum Clearance's slow start was that it had not had the hoopla and build-up that had fixed Public Housing securely in the public imagination. Another reason was that the high cost of public residential construction (see Market) would force many a government project to the cheaper land of the suburbs, (In a "statement of principle," PHA Commissioner John Taylor Egan told the public housers convening in Boston that PHA feels "bound to assure" that funds are used primarily for low-cost housing rather than for "write-downs for the cost of land where high-priced slum clearance sites are used.")

Once the program got started, what use would the cities make of this newly cleared land? None of those with plans already on the boards seemed to be interested in the sort of project which seemed to make most sense to planners who were pumping for decentralization within cities—the development of close-in land into play or park areas. Instead, they were all thinking in terms of the most profitable type of commercial re-use. Most would invite private housebuilding for middle income families. Others were hoping for new factory sites.

Code activity. Preparatory to the review of applications, Slum Clearance would take on one major task, however. It agreed to work with the Building Officials Conference of America, which had just completed a modernized performance code for cities of more than 25,000 population, to stimulate code revision activity throughout the country. To receive federal assistance for Slum Clearance, a community must set its code in order. And HHFA Administrator Raymond Foley, acknowledging that this could not be done "overnight," made it nonetheless clear last month that any city hungry for federal funds would have to take some kind of definite action.

MARKET

HOUSE-BUILDING heads for the cities— but centers in the suburbs

Last month the Bureau of Labor Statistics released a new analysis of housing starts by area, confirming the trend toward concentration of home-building in metropolitan markets. Said BLS: "In both rural and urban areas, 1949 has brought some rise in the proportion of new housing starts in metropolitan districts."

More specifically, during the second and third quarters of this year, 70 per cent of all private nonfarm dwelling starts were in metropolitan markets, either rural or urban, compared with a 61 per cent concentration in 1946 and 67 per cent last year.

How can the proportion of "metropolitan" housing be rising even in rural areas? That's simple, says BLS. Many "rural" areas are so defined because they are unincorporated or have a population under 2,500, yet they are really suburbs of cities. And it is these "rural" areas, well within metropolitan trading districts, which are attracting so many home-buyers (because of their low taxes) and so many merchant builders (because of their cheap land) that they are beginning to rival the cities as centers of residential construction activity.

Examples:

Baltimore: The suburban area, in October, again outdid the city itself in volume of total building—$5.7 million against $3.8 million for the city proper. In home building the suburban area hit $3.6 million against $1.4 million for the city.

Cleveland: In the city, through October, permits were issued for $31 million, compared to last year's $33 million for the same period. But in the suburbs permits for more than $75 million were issued compared to $59 million last year. The suburban gain enabled the Greater Cleveland area to show an income of about 15 per cent despite a 6 per cent loss in the city.

Houston: Construction of homes and apartments inside the city limits dropped 31 per cent during the first eight months of this year (latest available figures) but rose 37 per cent in the metropolitan area outside the city limits.

Seattle: In the city proper, through October, residential permits were issued for $11.8 million, compared to last year's $17.6 million. City home-building permits were
Below last year (136 compared to 143 in 1948). But in Kings County, 253 residential permits were taken out in October compared to only 176 a year ago.

Chicago: While all building in the metropolitan area for the first ten months of this year is ahead by some $3.6 million over last year, Chicago itself fell $1 million behind October 1948. Simultaneously, the suburban towns gained more than $1.6 million in October over September—and more than $6 million over October of last year. Reported the Bell Savings & Loan Association: “More than three and a half times as many homes are being built in the suburban region as in the city.”

Los Angeles: October rang the cigar bell in number of permits — 5,263 valued at $264,4 million, the highest in history and a 37 per cent increase over October, 1948. There, befitting the fondest desires of the Chamber of Commerce, the trend to the suburbs was a tribute from the nation. Said a proud native: “More than 10 per cent of the nation's total dwelling units built in the last two years have been constructed within a 25 mile radius of the Los Angeles Civic Center!”

NEW YORK SKYSCRAPERS are changing Manhattan’s profile

It looked suspiciously like 1925 again. As in the roaring twenties, a dozen new skyscrapers inched their way upward, adding new peaks to New York's famous skyline and promising 5 million sq. ft. of office space to alleviate the town's shortage. And, as before, most owners rushed to fill every cubic inch inside the zoning envelope. With the notable exception of 1407 Broadway (see picture) whose architects, Kahn & Jacobs, had convinced the entrepreneurs that greater profit could be achieved by concentrating on high-rent tower space and cutting down on the cheaper, lower floor areas, almost all the new buildings ignored the obvious lesson of Rockefeller Center's successful open plan. Unlike the last lush decade, however, the 1949 crop boasted no 100-story super-scrapers. The tallest, 42 stories, was no match in height for the 70 story RCA Building, or the 102 stories of the Empire State.

DIRT CHEAP HOUSE costs builder $2,000

—only 88 cents for materials

J. McConnell Andersen of Ocean Springs, Miss., celebrated his tenth anniversary in his rammed dirt house. His three-room home cost $2,000, including wages for three laborers and 88 cents for dirt at 2 cents a cu. ft. The 18-in. thick walls, says Andersen, are becoming stronger with time.
PUBLIC HOUSING COSTS still high compared to private market

As its members met last month in Boston (see page 13), the National Association of Housing Officials, in its Journal of Housing, listed total average dwelling-unit costs (including land) of several public housing projects, most of which have been completed during 1949 under state and local financing programs. Examples:

<table>
<thead>
<tr>
<th>City, State</th>
<th>Project</th>
<th>Unit cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northampton, Mass.</td>
<td>Hampshire Hts.</td>
<td>$12,338</td>
</tr>
<tr>
<td>Milwaukee, Wis.</td>
<td>Northlawn</td>
<td>11,896</td>
</tr>
<tr>
<td>Milwaukee, Wis.</td>
<td>Berklund</td>
<td>8,928</td>
</tr>
<tr>
<td>Milwaukee, Wis.</td>
<td>Hillside</td>
<td>13,819</td>
</tr>
<tr>
<td>New York City</td>
<td>Jacob Riall</td>
<td>11,247</td>
</tr>
<tr>
<td>New York City</td>
<td>Gun Hill Houses</td>
<td>11,255</td>
</tr>
<tr>
<td>Taunton, Mass.</td>
<td>Project 200-1</td>
<td>12,059</td>
</tr>
</tbody>
</table>

How land clearance, equipment, relocation and other items can affect the total cost of a project is shown by a breakdown of component costs on Milwaukee's Hillside project. At Hillside construction costs were $7,771 per dwelling unit, but supplemental costs ran an additional $6,048, bringing the total cost per dwelling unit up to $13,855.

Total cost, however, is what private builders pay, and it was total cost they looked at when studying NAHO's survey of cost trends on 39 public projects. NAHO revealed that "development costs of public housing projects have declined more than $1,500 per dwelling in the last year." NAHO gathered its data from five states: Connecticut, Illinois, Massachusetts, New York and Wisconsin, reported: "median costs per dwelling of the projects built in the third quarter of last year were $12,464 as compared to $10,814" in the third quarter this year. Of the 39 projects surveyed, three cost less than $10,000 per dwelling, ten ranged between $12,500 and $15,000, the remainder were in the $10,000 to $12,500 bracket. But, said NAHO, the survey covered only the high-cost northern and eastern cities. A broader picture would show a lower average, and, "there has been a definite trend toward lower prices on competitively bid construction jobs."

Hopefully, NAHO looked for lower levels under the new federal-aid program.

Washington housing officials, about to embark upon that program in a big way, would have to stick to lower costs or face the embarrassing prospect of having their own admonitions to private enterprise tossed back at them. (The average price for houses paid by veterans under the VA loan program in 1949 was $8,941 in January; $8,700 in May and $8,365 in August.) Nevertheless, HHFA Administrator Foley and his top aides were still exhorting the industry: "the way to get more homes built is to lower costs and prices."

MONEY

VOTERS APPROVE $1.5 billion in bonds, most of it for building

Last month voters polled more prosperity for builders with a record-breaking total of $1.5 billion in bond issues for schools, hospitals, housing, airports and various civic improvements. More than half the total was for building. Biggest spenders were: New York State ($300 million for slum clearance and public housing); California ($250 million for schools); New York City ($150 million for hospitals).

Only in New Jersey did voters curb their spending urge, turning down a $100 million issue for public housing.

On their own. Not all big outlays were voted at the taxpayer's expense. The Federation of Jewish Philanthropies of New York announced they had raised more than $20 million of a $45 million fund for hospitals, community centers and other buildings—biggest private, charity construction program in the nation.

ECONOMY

TWO MILLION NEW HOUSES A YEAR
—says Keyserling, "fantastic" say critics

Reaction to Economic Adviser Leon Keyserling's proposal that the U.S. should strive for 1½ million new homes a year for the next ten years and 2 million a year thereafter was prompt and vociferous. Said Henry Bubb, President of the U.S. Savings & Loan League: "If we built all those houses we'd have houses coming out of our ears."

Housing economists, no less prominent than Mr. Keyserling, said that "his estimate, taking into account family formations, doubling and building up of vacancy reserves would leave us with an oversupply of 1 to 1½ million houses, requiring replacement of homes at less than forty years of age."

PRICES ARE STABLE—some up, some down, general movement is sidewise

Building material prices in November were spotty, with the stability the overall pattern. Copper advanced 7½% of a cent to 18½ cents a pound and held firm. Tin was still offered by RFC at 85 cents a pound but down 3½ cents from levels earlier in the month. Zinc, which rose a quarter of a cent after settlement of the steel strike, was still at 92½ cents with some producers asking 10. Lead, cut a quarter-cent to 12½ cents a pound, was still lacking active demand. Steel scrap, early in the month, had risen $1.50 a ton, then, at month's end, dropped back. Semi-finished steel was increased $5 a ton by one producer late in the month. Republic steel was "considering what effect" increased fabricating and labor costs would have on its selling prices.

Engineering News-Record reported cement up one cent a barrel to $2.95 for its 20-city index and lumber down an average of .53 cents per thousand. At mid-November, ENR's average on short leaf yellow pine and Douglas fir 2 x 4's was down to $78.56 per thousand board feet from $79.09 a month before.

The Bureau of Labor Statistics' wholesale price index for building materials was virtually unchanged in October (109.2 compared to 109.4 in September).

How long prices would remain stable depended on how rapidly pension plans spread and how soon pension costs might be reflected in final quotations. The general economic picture was more inflationary than deflationary. Builders weren't figuring on prices falling much.

ARCHITECTS FEES for public housing being reconsidered by PHA

Was the architect interested in taking on a public housing project? He would signify by answering a questionnaire and stating his qualifications. His statements would be "verified" by the Housing Authority, which would also check his references and "evaluate" his application on the basis of what it found. Then the architect would be interviewed and, finally, selected.

Next, if he were "a younger man" he might find the Housing Authority wanting to associate him with "an older firm." And he would be "instructed" that the program is "to serve people in a democratic society and to do so we must build acceptable buildings instead of barrack-type poor houses."

Finally, the architect "should meet the people on the project including the tenants."

Thus, at a panel session of the National Association of Housing Officials meeting in Boston, was pictured a public housing project in search of an architect. Whatever man the architect was had been settled —now it was just a matter of price.

James P. Murrin, PHA's Deputy Assistant Commissioner for Development rose to review the agency's methods of setting fees
in the past and to announce a new fee schedule:

<table>
<thead>
<tr>
<th>Project</th>
<th>Architect's fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 dwelling units</td>
<td>$24,000</td>
</tr>
<tr>
<td>300</td>
<td>$30,000</td>
</tr>
<tr>
<td>500</td>
<td>$60,000</td>
</tr>
<tr>
<td>1,000</td>
<td>$110,000</td>
</tr>
</tbody>
</table>

Mr. Murrin closed by asserting that PHA had always been willing to revise its fee schedule and would do so again whenever it could be shown that PHA's fees were inequitable. He was shown in short order. It could be shown that PHA's fees were insufficient for the objectives PHA sought to achieve. When Walker finished, NAHO voted to reopen the fee question with PHA. Late last month PHA, Walker and NAHO officials were closeted in conference. It appeared that a new fee schedule was in the making.

LABOR

**-builder loses labor lawsuit—$6,000 is "trifling and microscopic"**

Finding "the impact of this labor dispute upon commerce trifling and microscopic," the U.S. Circuit Court of Appeals in Denver last month denied a claim for damages filed by Groneman & Co., Utah builders, against the International Brotherhood of Electrical Workers.

Groneman had contracted with the Provo, Utah, school board to build a school. The board had subcontracted on its own with a nonunion electrician, Lloyd Engle. The IBEW promptly picketed the job (even though Engle and his son were not working) and Groneman's union carpenters walked out in sympathy, stayed out nine days. By the time the trouble was patched up Groneman was out $6,000. He sued in District Court, lost, and appealed, and lost again.

Says Groneman's lawyer: "Only a lack of funds prevents a further appeal."

The decision was instantly seized upon by Dan Tracy, President of the IBEW, who saw in the case proof that the Taft-Hartley Act won't work in the building trades.

Small loss, small recompense. The point at issue was the dollar stake involved in interstate commerce, not the principle, not the real fact of Groneman's loss. Under Taft-Hartley, a contractor, presumably, has recourse for damages suffered through an unlawful labor dispute involving interstate commerce. The Court admitted that, to some extent, Groneman was engaged in interstate commerce (i.e., his materials came from outside Utah). But, said the Court: "Assuming then, that this labor dispute was unlawful and that it interrupted commerce to the extent of $6,000, can it be said that this has such an effect upon commerce as is sufficient to give the court jurisdiction under the act?"

Apparently a contractor had to lose a lot more than $6,000 before his case would be big enough for Taft-Hartley treatment.

* * *

Put up or shut up. A Buffalo union offered to pay $1,000 for proof that bricklayers are restricting their output.

**people**

Frank Lloyd Wright added a new award to his collection last month—the Peter Cooper medal, at Cooper Union in New York City, for the advancement of art. He also hopefully predicted that before long a man, using a concrete block which can be laid up dry, will be able to build his own house for from $1,500 to $3,500. Wright explained to a reporter from the Milwaukee Journal that the house "has been on drafting boards at Taliesin since 1921. Now seems to be the propitious time for it."

A.I.A. President Ralph Walker foresaw a new kind of responsibility for the Institute. Said he, to the Virginia chapter, at Roanoke: "The A.I.A. must take the position of determining the qualifications of a competent architect, and its responsibility in this matter is greater than any individual school or registration board." A.I.A., he maintained, "must take a strong stand as to what a professional education should be: aim to establish it by either granting or withholding approval or credit, and further set up and be responsible for an educational program and the means of its accomplishment for the interim period between graduation and registration."

HHFA's new Division of Slum Clearance and Urban Redevelopment kept right on adding staffers: Carl L. Feiss, director of the University of Denver's School of Architecture, became Chief of the Community Planning and Development Branch; G. Raymond Meade, formerly chief engineer of RFC, was named Chief of Cost Review; Charles L. Farris, from National Security Resources Board, Chief of Field Operations; James E. McCormack, from War Assets Administration, Land Branch Chief.

Elections: President of the National Lumber Manufacturers Assn.—H. M. Seaman, Houston, Tex.; Vice President of Gunnison Homes, Inc., prefab subsidiary of U.S. Steel—Frederick J. Samerdyke, Cleveland; President of the American Society of Heating and Ventilating Engineers—Lester T. Avery, Cleveland (his nomination was tantamount to election); President of the Structural Clay Products Institute—W. J. Goodwin, Jr., Des Moines, Ia. (reelected).

OPEN FORUM

Bette Jenkins, Supervisor, Tenant Relations Division, Detroit Housing Authority: "I think all housing should be public, just like public education."

Catherine Bauer (wife of M.I.T. 's Dean William Wurster): "Homes built on FHA mortgages with a floor space of 630 sq. ft. are the ideal size for a modern two-car garage. For a family of three, they are a little more adequate than a standard dairy barn is for occupancy by cows."

Robert Moses, New York City Construction Co-ordinator: "If one-tenth of this construction (New York's public housing) were being done in any other city... the welkin would ring with extravagant encomiums, leading citizens would be giving away big cigars and the surrounding waters would be choked with a Niagara of self-congratulatory molasses."

Elizabeth Wood, Executive Secretary, Chicago Housing Authority: "Architects are entitled to more than their out-of-pocket costs, how much more I don't know."

Alfred P. Sloan, General Motors' Board Chairman on giving $1 million to M.I.T.: "Let's spend our money and get something for it while we can. The way our country has been going lately, God knows how much your dollar will be worth five years from now."

Nathaniel C. Curtis, Jr., New Orleans architect, sees "an opportunity for a regional architecture for our time in Louisiana. We don't need Cape Cod cottages, Monterey villas, Spanish haciendas and Virginia colonials. We don't even have to copy the lovely old homes in true Louisiana or Creole style.... we are perfectly capable of developing our own and have far more to chew on."

David T. Ellis, Atlanta architect, explaining the unusually low cost of an addition to the Georgia State Hospital: "All this building is to be is a warehouse in which to keep ill human beings."
Plenty of puzzles perplexed more than 1,000 public housers at the 16th Annual Meeting of the National Association of Housing Officials in Boston last month:

1) How to provide 810,000 housing units at an average cost of $9,450 per unit, including land? Already public housing projects are building at an embarrassingly high cost (see Market). Apparently, the only answer is to locate projects on low cost, outlying land, rather than to pay for high priced slum land. Thus, the purpose of Title I (and the passionate plea for slum clearance which helped sell the Housing Act to Congress) would go by the boards. But, by starting with outlying projects, “housers” would postpone solving another problem...

2) How to relocate families displaced by slum clearance? In Chicago, for example, of 3,500 families to be relocated under one project, 1,200 are ineligible for public housing because their incomes are too high. Yet there is “no private housing for them to move into.” What is HHFA’s answer? Said Director of Slum Clearance and Urban Redevelopment Nathaniel Kieth: “The extent to which the expenses of relocation can be absorbed by subsidies raises serious problems. It is important that we do not create any false hopes for fast results.” Said PHA’s First Assistant Commissioner, Warren Jay Vinton “There will be plenty of difficulty.” Not the least of which was...

3) How to handle the racial issue? “Living space for minority groups is the most important part of our program” said Director Keith. Two days later the Massachusetts Housing Council charged Boston’s Housing Authority with discrimination, threw a bombshell into NAHO’s convention with a rump session on the issue. Fired by charges of Negro segregation in Boston’s Public Housing, and a phillipic against discrimination by New York attorney Charles Abrams, NAHO decided to study displacement of minority groups in public housing projects. Said HHFA Deputy Administrator B. T. Fitzpatrick “the Act makes it clear we are obligated” (to nonsegregation). Was there anything the Act did not make clear? There well might be, for example...

4) What about enabling legislation? Local housing officials were wondering about many a measure involved in the Act. Ohio’s law is still pending before the state Supreme Court. On the second day of NAHO’s convention, Rhode Island’s Supreme Court, in a split decision (2 for, 2 against, one undecided) cast doubt on the

constitutionality of that state’s redevelopment law. Said Administrator Fitzpatrick: “We’re going to have litigation before we’re through.” Even the Housing Act itself faced a test with reference to the Federal Government taking over and operating a project if the local authority flunked out on its obligations. Said bond counsel Charles Kades of New York: “It is possible that Title III will be fought as unconstitutional.” And that brought up the question...

5) How much autonomy is left to local housing authorities? Peace-pipe talk of “cooperation” and “understanding” between PHA and the cities was quickly followed by an admission that “It is from PHA that all good blessings flow” (by Chemical Bank & Trust Co.’s vice president William Laemmel) and a straight-from-the-shoulder shot by the National Housing Conference’s Executive Vice President Lee Johnson: “In a program that is so completely dependent upon Federal contributions, the words ‘local autonomy’ are just so much nonsense.” The federal power of the purse involved another problem...

6) How to get good architects and how to pay for them? James P. Murrin, Deputy Assistant Commissioner for Development, PHA, explained the agency’s method of determining architects fees and announced a proposed fee schedule. He was followed by A.I.A. President Ralph Walker, whose reply resulted in a resolution by NAHO directing its Board of Governors to reopen with PHA the whole fee question (see Design).
NATION'S REALTORS look toward large but smart 1950 market and ways to tempt it out, note a

The nation’s realtors, assembled in Chicago’s huge Statler Hotel for their 20th annual convention, had a cheerful and prosperous look. Three years of peak building and brisk trading were behind them. And most of these members of the National Association of Real Estate Boards saw no reason why 1950 would bring anything but continued prosperity. Harold G. Moulton, president of the Brookings Institution in Washington, D. C., told them that residential, office building, and some types of commercial construction would "continue at a high level for the next year or so." Realty Appraiser Albert Lockyer, White Plains, N. Y., saw a "brisk demand" for housing for "at least two or three years."

Smart market. However, the realty delegates knew they were now dealing with the "smart market": desperation customers were a thing of the past.

But the big building years that had bettered their tailoring and their pocketbooks had sharpened their know-how, too. If the new market was perfectly willing to stay put until it was offered a building bargain, the realtors were perfectly confident that they knew how—and with what—to tempt the market out. Handsome Bob Gerholz, Lansing, Mich., who got the nod as NAREB's new president, spoke for most of the big merchant housebuilders present: "We shall continue to enjoy a market whose size can be gauged by the fact that only 10 per cent of the veterans have so far used their VA-guaranteed home loans. But the market is no longer automatic. The customer wants a better neighborhood, better design, better quality. We're giving it to him."

Grim voices. Among the generally cheerful delegates, only a few grim voices were heard. Chicago Real Estate Researcher James Downs expected a "marked change in the building climate by May of next year." Downs believes we are already overbuilt in most building types, and points to such tokens as a marked atrophy of occupancy in secondary stores, decline in family formations, an increasing lag in 608 rentals in most parts of the country. Houston Realtor Hugh Potter thought there were clear signs pointing to "possible overproduction of suburban shopping centers." And one insurance executive predicted that, since life insurance companies are nearing their legal limit of real estate ownership (3 per cent of assets), the wide practice of selling buildings to these companies and leasing it back is virtually over.

Photos: Arthur E. Haug

New President Robert Gerholz, Flint, Mich., housebuilder, said merchant builder's chief problem is high cost of "land manufacture; improved sites are a thing of the past. Surplus of the twenties has been entirely used up."

University of Pennsylvania President Harold Stassen presented Alfred P. Sloan, Jr., chairman of the board of General Motors Corp., Society of Industrial Realtors' 1949 Industrial Award. Stassen declined to discuss housing or his own political plans. Sloan warned that U. S. is "moving toward serfdom," took pot shot at RFC loans to Luetron.

Camera enthusiast Herbert U. Nelson, NAREB executive vice president, snaps Outgoing President T. H. Maenner, Omaha. Maenner urged realtors to join other business groups in program of "political action" to "help elect men who believe in our great tradition of freedom."

Albert Balch, Seattle, and San Francisco's David Bohannon were among big builders present. Bohannon plans to capture "smart market" by putting quality housing on volume basis. Paying close attention to grading, orientation, and "personalized" architecture, he is starting 200 $11,000-$14,000 houses, will increase number as he tests market.

Realtors John W. Lake, Brooklyn; Ward Smith, Tacoma; Henry S. Miller, Dallas; A. F. Bassett, Detroit. Miller said Dallas hopes to find oilman bent on rivaling Glenn McCarthy's Shamrock Hotel in Houston.

At executive session meeting: Arch I. Madden, Des Moines; Joseph W. Lund, Boston; Tom Cappage, Seattle.
few signs of overbuilding

George A. Kuhn, Indianapolis; Harry W. Goodwin, Louisville; and Fenton M. Parke, Buffalo, relax before session of Society of Industrial Realtors. Later, outgoing president Roland Randall, Philadelphia, (new president: Laurence H. Lang, Cleveland) said SIR, at request of HHFA, will begin investigating possibilities of industrial re-use of slum-cleared land. Randall said also that increasing shortage of industrial land had been "intensified by restrictive practices which zone against industry."

Other corridor sessions on residential real estate heard Oklahoma delegates report most marked recovery from let-down at year's beginning. In Texas, where building boom had reached sharpest peak—and had the sharpest fall—much less marked recovery had been felt. Houses in Houston built to sell at $9,000-$10,000 were on the market at a 30 per cent price slash.

SAVINGS AND LOAN MEN promise ample money for veterans, construction loans for builders

How much money will be available for house-building next year? Plenty. Will builders be able to get construction loans? Easily. Will the money for home purchase loans be obtainable only at high interest rates? Not at all; veterans' 4 per cent loans will be made in quantity; the rate on conventional will not go up. It will stay right around 5 per cent (where it is in all Federal Home Loan Bank districts except the 6 per cent districts of Topeka and San Francisco.) It may even dip to 4 1/2 per cent in some areas.

These prophesies—many of them—sound like the components of a builder's dream in a money-tight year. They may indeed be. They are also the sober conclusions reached by 2,000 members of the United States Savings & Loan League, meeting in annual session in Chicago last month. Looking cannily at the signposts they passed in the record breaking $3 billion lending year behind them, and applying the lessons hanging on those posts to the year ahead, the leaguers charted this picture of 1950:


A joint panel of ULI and NAREB's committee on city planning pumped for enlargement of number of realtors sitting on planning commissions. One speaker pointed out that local planning commissions will be required to pass on sites for public housing projects, and that "this should not be construed as encouragement for public housing."
USSL Leaguers want to end feud with bankers, fight public housing locally

Photos: Arthur E. Harg

At conference table: Ralph Crosby, president, Old Colony Cooperative Bank, Providence, R. I.; Ralph Cake, president, and Leslie Peyton, vice president, Equitable Savings & Loan, Portland, Ore.; and Henry J. Sinnett, Casco Homestead, Portland, Me.

New USSLL President Henry A. Bubb, president of the Capitol Federal Savings & Loan, Topeka, Kans.; Outgoing President M. K. M. Murphy, Rutherford, N. J.; and Morton Bedfish, chairman of the executive committee, preside over meeting of Board of Directors. Elected with Bubb as vice-president: Walter J. L. Ray, Detroit. Bubb said that present building volume carried over two years would lick housing shortage.

At lunch table: Home Loan Bank Board Chairman William K. Divers; Ralph M. Smith, president, the Middlesex Federal Savings & Loan, West Somer­ville, Mass.; Dandridge Murrell, 1st Federal, Lynch, Va. Divers told League "now is time to strengthen ourselves for such rough times as the future may bring."

Ben H. Hazen, Portland, Ore., urged League members to end feud with banks: "We should discontinue practices which may be perfectly honest but which are necessarily antagonistic ... In turn, bankers (should) recognize our rights to modernize our savings service just as they are modernizing their banking service.


Staff Vice President Frank Hardinge, Jr., said League would fight public housing on local levels.

Visitor Conrado Benitez, Manila, said Philippine Islands government is creating independent farmers, home owners.


Construction prices will drop very little, if at all. (Prices, however, the League's statistical department reported, are lower than they were six months ago on used and new high cost houses. They hover between the same price and slightly lower on medium-cost houses. On low cost units there has been no change.) Price stabilization is no surprise to builders and lenders. Now even the buying public, which had been hopefully holding out for a return to the prewar price structure, knows it too. That knowledge gives new strength to the market. It poses an effective demand for houses (mainly in the low cost and middle-cost field) sufficient to assure a satisfactory year for the industry.

Money for buyers. To give meaning to the demand is the continued ample supply of mortgage money which the industry has been noting with deep interest for the last several months. S & L members, along with the banks and insurance companies, had lots of money to dispose of. They had added another $1 billion plus to their assets last year. They would do as well next year, without having to change the average 2 1/2 per cent dividend they pay. The delegates saw no reason why the existing money supply would diminish at all. As a matter of fact, they thought mortgage lenders would now begin to feel the effects of the seller's market tasted by the rest of the industry. Warned Dr. Arthur H. Weimer, dean of Indiana University's School of Business and the League's economist: "You will be competing more directly than at any time since the end of the war with the sellers of automobiles, television sets, clothing, food, vacations and radios." Moreover, competition would be keener among all kinds of mortgage money sellers. One direct and foreseeable result would be the continuation of the recent rebirth of the VA 4 per cent program.

Money for builders. Another result would be more construction money for builders. The leaguers, who had used one-third of their lending money last year for construction loans were advised by the committee on trends and economic policies to cultivate builders and subdividers, for "construction loans will probably be relatively more important than during the coming year." (No one would venture the guess, however, that a lender getting a premium on construction loans would cut down on that practice.)
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SCHOOLS

Forum’s mail last month was heavy with comment on the special October reference number on schools, so this month’s LETTERS department is devoted exclusively to this subject. For the editors’ after-thought reaction to the school issue, see p. 98.—Ed.

Forum:

I sincerely wish that every architect, superintendent of schools, school committee member, and school building committee member in the Commonwealth of Massachusetts could read carefully your October issue... I would ask them to study your pages to learn why today’s average school is “an extravagant monument to a dead past.” And I would call their attention to Bill Caudill’s urging that the educational plan, the financial plan, and the architectural plan must all be well done if the end result is to be right.

JOHN E. MARSHALL, Administrator
School Building Assistance Commission
Boston, Mass.

Forum:

This issue of Forum should be in the hands of every school board member, school administrator, architect, engineer, and contractor. Also, all persons interested in having better schools in their communities should be acquainted with this material. It is provoking, constructive, and stimulating.

The whole issue is a swell job. Congratulations.

WALTER D. COCKING
Chairman, Board of Editors
The School Executive
New York, N. Y.

Forum:

You have done an excellent job, and I am sure that many schoolmen will find much of real value in it. My congratulations.

WALTER E. HESS
National Association of Secondary-School Principals
Washington, D. C.

Forum:

. . . I was very much impressed with your October issue on the general subject of Schools. For some years I have been a member of the School Building and Planning Committee of Middlebury, and it so happens we are about to start preliminary work as a committee on a new school building this coming week.

Would it be possible for me to purchase eight copies of this October issue? I’d

(Continued on page 26)
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FOR INSULATION

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Husky big blocks of Foamglas are so light that the large expanses of roofs in which they are used as insulation need no extra structural reinforcement... so rigid that they readily support their own weight, become an integral part of the structure, when built into walls... so strong that they safely support more than ordinary loads when used to insulate floors, platforms, ramps, etc. in all sorts of structures.

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Its ability to retard heat travel, to reduce condensation, to withstand humidity, make Foamglas an exceptionally effective insulation. Freedom from repairs, maintenance and replacement make PC Foamglas an exceptionally economical insulating material.

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like to furnish each member of my committee with a copy for his serious study.

CHARLES H. URSON
Middlebury, Conn.

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Forum:
The school issue is a honey. Congratulations!

WILLIAM W. CADELL
Research Architect
Texas Engineering Experiment Station
Agricultural and Mechanical College
College Station, Texas

Forum:
This issue is an epic. Congratulations.

JOHN LYON REED, Architect
San Francisco, Calif.

Forum:
... A significant contribution to the solution of the critical schoolhousing problem.

RAY L. HAMON, Chief
School Housing Section
Office of Education
Federal Security Agency
Washington, D. C.

Forum:
I was particularly pleased with the folding: the cover design, "Today's Schools," and the treatise on mechanical and acoustical work.

I was not particularly pleased with the rectangular 1950 school. I feel that the overheard daylighting scheme would be quite monotonous in a very short time and am not convinced that the lunchroom would work well through the center of the building. I was much more impressed by the circular school with the possibility of several of these units dotted on the landscape and connected by galleries or porticoes.

HENRY L. BLATNER, Architect
Albany, N. Y.

Forum:
I wish to congratulate your entire editorial staff on the excellence of the entire issue.

I have been following the issues in the Forum for a number of months quite closely and each issue has dealt with a specific situation very timely. I only hope that other consumer magazines will do something like you have done for people in the building industries. It may inspire others to do a similar job to that done in Arlington, Va.

ROBERT W. TIECKMANN
Gypsum Association
Chicago, Ill.

(Continued on page 30)
Check the current ratings! You'll see that wire and cable with Alcoa E.C.* Aluminum conductor with type RH Insulation can replace copper with type R Insulation. This gives you superior insulation plus aluminum's lighter weight and low cost.

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(Continued on page 42)
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It is this: step by step, as the decoration of their home matures, home-owners discover how versatile oak is in combining perfectly with other materials—with other woods, with glass and fabrics, with metals—and with all motifs from Period to Modern.

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Your building doesn't have to be as high, either. A Preferred unit requires much less headroom than a conventional boiler. And you don't have to allow as much floor area for the boiler room—only about half as much as needed by ordinary boilers of equivalent output.

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Home is where the heat is... for since time immemorial the center of family life has been around the source of warmth!

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pares in emotional quality to the effect Aalto achieved in the reading room of his library at Viipuri.

Corbusier obtained a wonderful quality of lighting in his "Urbanism" pavilion at the 1937 Paris Fair by the use of a canvas roof, I suppose that is what people liked in Saarinen's music tent out West. The light produced by the cheese-holes is somewhat like that of the tents except that it has a buoyancy which must come from the numerous reflections and refractions.

In Aalto's library one was not aware of the source of the light. There were hardly any shadows and the atmosphere in the large room had a sort of floating tangibility. I could become very rhapsodic about that big library room. It was wonderful to sit there—just the right physical environment for relaxed and contemplative reading...

Unfortunately, I am not at all sure that cheese-hole lighting is appropriately used by Nowicki even though I think he ought to have a chance to try it. He'll get the fine light quality all right—although I believe his holes as shown on his section do not have enough depth to achieve the best results. The trouble with using this system in a school is purely psychological.

I had a similar problem on a recent hospital design. For functional reasons there seemed to be no need for windows in the operating rooms. They were air conditioned, the lighting was always electrical and the walls would have been easier to clean if unbroken by openings. Nevertheless, the surgeons, the nurses and even the cleaning personnel insisted on windows. I suppose there's some claustrophobia in all of us. I argued that we don't mind the absence of windows in theaters, in many restaurants and even in types of classrooms and lecture halls. But I lost and we had to include fixed windows at eye level.

I think it will be similarly difficult to get acceptance for the practically windowless classroom, especially where children are involved. (I recall that the only thing which made my four years of Latin tolerable at Boys High School in Brooklyn was the bird-filled church steeple which I could see from the classroom window. Without that window it would have been horrible.)

Perhaps the reasons why we accept the absence of windows in some rooms and demand them in others need investigation. There may be many factors at work. But before I went as far as Nowicki does in his school, I would want to be sure of the effect on the room occupants.

Of course, these observations have nothing to do with the quality of the cheese-hole lighting which is bound to be good if properly designed. Nowicki might even

(Continued on page 48)

THE M. DUCOMMUN CO.
580 5th Avenue, New York 19, N.Y.
PLEXIGLAS

FILLS THE JOB!

Acrylic plastic PLEXIGLAS fits right into your glazing program—especially in high-breakage areas. Half as heavy as glass, it’s many times stronger, and weather-resistant in the bargain.

Glazing the window openings in the roof of the University of Delaware’s new field house was easy with PLEXIGLAS. Lightweight, white translucent panels, corrugated to match the corrugations of the sheet metal, admit light freely and cut maintenance costs to a minimum. A 15-square-foot panel weighs only 12 pounds. Installed by Sheppheard & Co., Inc., Wilmington, Delaware. Architect: E. William Martin, Wilmington.

Here’s the cure for high glazing-replacement costs. Tough PLEXIGLAS, the outdoor plastic, withstands hard blows. Both clear transparent and white translucent PLEXIGLAS are light, easy to handle, easy to cut and form—even into curved sections. In hotels, schools, factories, housing projects—wherever breakage is a hazard—PLEXIGLAS more than pays for itself in structural and replacement savings. A recent issue of Rohm & Haas Reporter gives the amazing story of PLEXIGLAS for Glazing. Write for your copy.

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"Can't Be Beat For Economy And Appearance Of Finished Job"

Architects say of the NEW

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CONCRETE FORM PANELS

"...easily handled...produce stain-free finishes...save money because of re-use factor..."

ARCHITECTS Lance, McGuire & Muri, Tacoma, Washington, specified the new PlyForm concrete form panels for all pours on the new wholesale warehouse being constructed for Washington Hardware Company of the same city.

They report: "PlyForm was specified because of the ease with which it can be handled and the stain-free finishes which are obtained. PlyForm saves money because of the great number of re-uses. As many as 12 and more are possible, depending on care. PlyForm can't be beat for economy and appearance of the finished job."

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*The highly moisture-resistant (but not waterproof) glues used in PlyForm permit multiple re-use of panels (as many as 10 to 15 are not unusual). For the greatest possible panel re-use, however, specify Exterior-type Concrete Form grade of Douglas fir plywood bonded with completely waterproof phenolic resin adhesive, for special architectural concrete, requiring the finest possible finish, the architect or contractor may specify Exterior-type or Interior-type Douglas fir plywood in grades having "A" (Sound) face veneer — or one of the new plastic-surfaced panels.

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ARCHITECTURAL FORUM December 1949

HUGH STUBBINS was born in Birmingham, Ala., 37 years ago, earned his Bachelor of Architecture in 1933 at the head of his class at Georgia Tech. Awarded a Harvard scholarship, he migrated north to win a Master's degree and at least seven different prizes in two short years. He has been an instructor at the Harvard Graduate School of Design since 1948, playing the dual role of architect and teacher, and practicing conservative Boston with some of the best examples of modern house design in America (p. 74).

Architect CHARLES GOODMAN and Builder ROBERT C. Davenport are responsible for Washington's newest modern subdivision, Hollin Hills (p. 80). Goodman has been on the Washington scene since 1938, when, as designer for the Public Buildings Administration, he fought stubbornly to banish "post-office Federal" architecture. He was wartime architect for the Air Transport Command, has been in private practice for 8 years. Davenport was in the Department of Agriculture for 13 years, became interested in building after joining a cooperative to erect his own home.

HARRY NAGIN, president of Reliance Homes, Inc. (p. 84), is a Russian-born civil engineer with a degree from Cooper Union. A prolific inventor, Nagn has 185 patents to his name, is generally credited with the design of the famous steel airport landing mats that achieved global fame in World War II. CHARLES LAWRENCE, Washington (D.C.) dealer-rentor for Reliance, was a secret-agent and public official (FPHA), and one of the first half dozen to receive Reliance franchises. Lawrence received his baa in July, 1948.

ALFRED SHAW, C. A. METZ and JOHN DOLIO are Chicago designers with a roster of clients covering the city's leading merchants (p. 90). Partners since 1947, Shaw is the architect, Metz the structural and Dolio the mechanical engineer. In association with others, the trio has helped design some of Chicago's best-known structures, among them, the Merchandise Mart, the Field Building and the Dodge Chicago Plant. Shaw's old firm was Shaw, Naess & Murphy. Metz and Dolio have been practising engineers in Chicago for more than two decades.

BURTON SCHUTT, designer of the sumptuous Innes Shoe Store (p. 92) has designed buildings for many tropical climates. His structures have flourished in the heat of Mexico, Hawaii, Guatemala and Brazil, as well as in our own southwest, from Los Angeles to New Orleans. Schutt came to Los Angeles at the age of 16, worked his way through art school as an apprentice in the building trades. He is well-known for the Bel-Air Hotel in Beverly Hills, a successful project which he both backed and designed.

WALTER SANDERS and ARTHUR MALSIN became partners in January, 1946, shortly after their return from overseas duty with the Army and Navy, respectively. When Sanders was appointed this fall to the faculty of the Architectural School of the University of Michigan, he opened a branch office in Ann Arbor, leaving Malsin and DON REINMAN, a recent associate, behind to run the New York practice. The firm specializes in residential and commercial work (p. 96), industrial research and product development.
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Can today's **CHURCH** contribute importantly to today's architecture, as did the church in ages past? Can contemporary architecture meet the spiritual needs and economic limitations of today's church as did the design of the Colonial meeting house, the Gothic cathedral, and the Egyptian temple? Such are the questions explored on the pages which follow.
CHAPEL AT ABO, FINLAND. ERIK BRYGGMAN, ARCHITECT

This chapel, shown also on the frontispiece, offers convincing proof that contemporary architecture, using such modern materials as plate glass, can create a really beautiful church. The entire south wall is glass and sunlight, playing through the surrounding firs, gives the interior an ever changing pattern of light. Pews are angled slightly toward the glass wall. The garden entrance (upper right) is a free standing masonry unit ornamented in bas-relief. Brick and concrete are the structural materials with walls finished in white plaster.
In our generation the church is contributing little if anything to architectural progress, and contemporary architecture is contributing very little to the church.

Seldom, if ever before, has this been true. From the dawn of history to the mid-Victorian age the building of temples and churches was the highest form of architectural expression. The great buildings of Egypt were temples. The great buildings of Greece were temples. The great buildings of the Middle Ages were cathedrals. The most beautiful buildings of our own Colonial and early Republican days were churches. Through nearly five millennia ecclesiastical architecture set the pace and pioneered the development of architectural styles and forms which were later borrowed and adapted to secular architecture.

Even in Victorian times, when ugly churches proliferated over the world in amazing numbers, it could at least be said that church builders were doing their best to keep up with the times. If a General Grant church was nothing of beauty, it was, at any rate, on a par with most General Grant domestic and public architecture.

Only in our own generation has religious architecture broken away from the present. About the time that secular architecture began reaching forward for a new and truly contemporary idiom to replace the eclecticism of the turn of the century, church architecture in America took just exactly the opposite turn toward the past.

Most of the resultant churches have shown far better taste than their Victorian predecessors. Many of them have been excellent. Quite a few have, in fact, been worthy to rank side by side with the great churches erected in times long past. But almost without exception the houses of worship erected in this country since 1920 could more appropriately have been built in England about the time of Crecy and Agincourt or in Colonial America in the reign of George III. Its most famous architect spent his winters in a furnace-less Massachusetts house to put himself in the mood and spirit of long past centuries in order to design more perfect anachronisms.

**Groined vaults to laminated arches**

What kept the religious architecture of the Middle Ages great and vital through many centuries was its constant quest for new means of architectural expression in stone and glass, its unceasing use of new knowledge, new resources, new devices, new materials—groined vaulting, skeleton construction, diagonal ribs, sexpartite vaulting, pointed arches, flying buttresses, lierne vaulting, fan vaulting, pendant bosses, jeweled glass window tracery and half a hundred other new ideas each opening new opportunities for structural development or decorative advance.

In our generation, more new tools, more new materials, more new techniques have been placed at the disposal of
Like Saarinen's church at Columbus, Ind., (see cover), this is a good illustration of the dramatic effect achieved through scale and careful proportioning. The absence of all mystical implication was a wish of the church body. Characteristically, Saarinen offsets the blankness of vast flat areas by facing them with tapestry-like texture particularly noticeable in the vast pierced wall over the west colonnade and in the wood screen to the right of the altar. While still in the study stage and yet to be approved by the congregation, it is estimated that the church, including furnishings but excluding basement, will cost roughly $1,136,000, or about the amount of a most Gothic reproduction of the same cubage.
church architects than the Middle Ages ever dreamed of. But the adventuring spirit of the medieval builders has somewhere been lost. Among all the thousands of churches, Protestant and Catholic, on which so many millions of dollars have been lavished in the past three decades, not more than a few dozen have made any attempt to take advantage of present day building techniques to develop a religious architecture in keeping with our times.

Secular architecture today is so far ahead of secular architecture in the 13th Century that any comparison would be too absurd even to consider. But of our religious architecture, the best that can be said is that some of our recent churches could have been built 700 years ago.

In quantity and dollar expenditure, ours is probably a great church-building age. Congregations which pay hardly more than a living wage to their ministers are ready to spend up to a quarter of a million dollars on the bricks and stones of a new church. The Protestant denominations alone have more than a billion dollars worth of church construction planned. Much of that billion dollars will be spent on the strange effort to prove that church architecture can disregard all the progress the world has made since Magna Charta and build the way men built who could remember Coeur de Lion and Robin Hood. Very little of it will be spent utilizing the new tools and techniques unknown to our forefathers which might make possible a contemporary architecture more moving and more spiritually satisfying than that of any other age.

**Clergyman, parishioner or architect?**

Some architects place the blame for the backward march of church design on the congregations. They assert that rigid traditionalism is almost universal in both clergy and parishioners. But churchmen in all past generations have shown such a willingness to seek new architectural expression for their religious aspirations that this rigid traditionalism, if true, is in itself a surprising new phenomenon.

"Whether we like it or not, the cost of labor and materials is forcing modern design but we seem to be in the middle today and are groping for something different."

**FRANKLIN X. McCORMUCK,** Editor & Publisher Church Property Administration

"There is something about the Gothic style which enables one to use the arch of the church as a tool, if for nothing more than to achieve spiritual atmosphere."

**MERBRITT FARBEN,** Secretary Joint Commission on Church Architecture and the Allied Arts of the Protestant Episcopal Church

"A building functioning as a church should look like a church without having to stamp it with a cross."

**CLARENCE W. HALL,** Managing Editor Christian Herald
This church represents a radical break with traditional Catholic architecture in the U.S. Its semi-circular plan, seating 500, places no worshipper more than 50 ft. from the altar. A high clerestory window admits light from three directions, all of it directed toward the altar. A special effort to have the exterior of the building reflect the interior function explains projecting confessionals. The “crying room” permits babies to attend mass in audio-isolation. This church, built for $300 a seat, contrasts sharply with Saarinen’s Cincinnati church (p. 60), which will probably average about $2,272 per seat.
Critics of the church would say that the failure of the church architecture to keep abreast of our times is a reflection of the failure of the church itself to keep abreast and to hold the same position of prestige and authority it held in the 13th or the 17th Centuries. Others would say the return of the church to earlier models expresses the turning back of Christianity itself to an earlier spirit.

Critics of Victorian architecture would offer a simpler explanation—that the church was so disillusioned by the ugliness achieved by its more experimental ventures two generations back that the church in our time has been well advised to experiment no more.

Perhaps a better explanation is that so far our best contemporary architects have offered churchmen so little alternative to a safe return to the tried and true architectural beauties achieved in other times.

Some architects, like Pietro Belluschi (whose comments on contemporary church architecture appear on page 72), maintain that modern architecture has almost invariably failed when it attempted to create something that would satisfy the emotions and the spirit rather than the mind alone, and question whether our modern architects can, in fact, create a new monumental architecture for the church.

A new church architecture

As for traditionalism among churchmen, Belluschi reports that every church client has begun by asking him to design a Gothic church. But when he told them he loved the Gothic far too much to design a cheap imitation, and gave them figures on what a really good Gothic church would cost, he found them more than ready to work out with him a contemporary solution to their needs.

Certainly it is true that very, very few contemporary churches have been built which can invite comparison with the great churches of the past. It has taken months to assemble from home and abroad the examples presented pictorially on these pages of the FORUM. Perhaps a dozen other churches could have been included in the collection. Few as they are, however, they do show the possibility of a new church architecture which could make its own contribution to the same sort of mystic experience offered by Chartres and Notre Dame; a new architecture that would not dissipate the building resources of the parish on the imitation of obsolete methods but would rather call upon today’s new techniques to create a new type of beauty.

A survey by the FORUM reveals that more than half the leading contemporary architects have done no recent church work whatsoever and consequently have played no part in the development of a contemporary church architecture. Now a real effort is being started to organize the participation of the best modern architects. Perhaps the time will soon come when congregations will indeed be offered an inspiring alternative to Gothic and Colonial.

ST. CLEMENT’S CHURCH, ALEXANDRIA, VA.
JOSEPH H. SAUNDERS, ARCHITECT

Dark windowless walls and a ceiling studded with pinpoint lights that render it almost invisible impart an unusual and dramatic mysticism. The church is treated much as a theater in the sense that the enclosure is entirely subdued—virtually ignored—in favor of the pagent. The building is rectangular in shape but the seating arrangement (plus lighting) gives a circular effect with the audience clustered around the central altar. Aside from its striking atmosphere, this design permitted the use of very economical building materials, a saving on cubage and circumvention of a familiar pitfall: artificial and natural light canceling out each other. Exterior (below) reiterates the simplicity of the interior.

"The attitude of the Catholic Church toward contemporary architecture is one of benevolent indifference. It is still under the influence of the romantic past. Church people say they are being 'prudent' when what they mean is 'timid.' Ordination has not bestowed architectural knowledge on the clergy."

MAURICE LAVANOUX, Secretary
Liturgical Arts Society, Inc.
FIRST CHRISTIAN CHURCH, TUCSON, ARIZ.
ARTHUR T. BROWN, ARCHITECT

The worshipful, restrained quality of this church has been achieved principally through the handling of light, though texture and color also play an important part. The tall side louvers do more than to hide windows and to channel the light toward the altar; they also conceal the side aisles. The privacy they provide for people entering the church, arriving late, has turned out to be an important psychological factor. Incidentally, white cathedral glass was used for the windows which explains the mellow quality of the lighting. Interior colors range from yellow to very dark green with touches of terra cotta.

REDEMPTION LUTHERAN CHURCH, DETROIT, MICH.
EMMERLING, SPELLICY & HARTMAN, ARCHITECTS

In this church extreme emphasis has been put upon the chancel by the brilliantly illuminated cross behind the altar and, by the absence of any other lighting except that shining up from a cove on the right-hand wall. The severe lines of the interior are relieved to some degree by a swastika-like pattern at the windows and by the fretwork flanking the altar. Exposed laminated timbers support the church's low pitched roof. Recently completed, it cost about $.66 per cu. ft. to build.
That regional expression has its place in contemporary ecclesiastical architecture is demonstrated in this small chapel where a clean, simple handling of plan and detail is combined with logical hearkening to indigenous style. Because of its transient and seasonal congregation the building had to be kept to a minimum cost. Desert site and climate dictated easy-to-maintain materials. Cost: $13,392.

NOTES ON CHURCH DESIGN

Because, before God, man is at his simplest, the contemporary idiom seems the most natural in the world for church design. As the primary instrument of man's religion the church deserves an architecture as vital and forthright in expression as his hard won privilege to worship according to his belief. Therefore, if it is true that the church is timeless, unscathed by and transcending the rough hand of history, should it not, symbolically, appear as a modern manifestation of the best inspiration, talent and technique?

The contemporary architect is more than justified in turning to the emotional elements of the Gothic cathedral for spiritual inspiration, but his interpretation should be solely through the materials and techniques of our own age.

However, where architects and churchmen alike have been unable to create a new contemporary standard for religious architecture, the Forum certainly will not attempt to lay down any set of prerequisites. Instead, here are a few notes on the problems posed:

The machine age with all its conveniences and comforts has affected the church no less than it has the life of the individual. Stepped-up transportation, shifting population, the growth of cinema, radio and television have delivered a severe blow to the church as the nucleus of community life. In the new social aura the bite of man's conscience in terms of his religion has lost much of its sting. Huge individual endowments to the church have decreased in number. The future does not promise many more gifts comparable to those of Rockefeller and Mellon. Therefore it does not seem rash to prophesy that the completion of New York's St. John the Divine may mark the end of great cathedral construction in the U.S.

An expendable building

When, as in the middle ages, the church was a divinely mandated institution, claiming power in heaven and holding both economic and political dominion on earth, the wealth of the community and the bounty of the nobility poured into its coffer. This made possible the concept of the great Gothic cathedrals—eternal monuments to the glory of God and perpetual tribute to the artisans of the age. The church of the future, however, will have to be regarded as expendable.

New York is currently witnessing the impact of present-day economy on the traditional concept of the church: the dramatic demolition of the Collegiate Reformed Church of St. Nicholas, which Frank Lloyd Wright declared the finest in New York. Located on one of Fifth Avenue's costliest and most coveted corners, it will make way for an office building. True, the Consistory will realize a substantial income from the site, but from a business viewpoint, the church's 77-year life span hardly justified its costly construction and elaborate Gothic ornamentation.

Wildly fluctuating values and the nomadic urge inherent in twentieth century living dictate that the life expectancy of the modern church should not greatly exceed that of other architecture. With so many denominations competing for survival and expansion within the U.S., it follows that the future of church construction will produce a quantity of small neighborhood churches rather than a few costly and imposing edifices. And with neighborhood complexions—not to mention current building costs—changing as rapidly as they do, it makes sense for the modern church to be economically constructed.

Despite the church's apparent reluctance to accept contemporary architectural forms, its cognizance of today's trends and values is demonstrated by the new emphasis being put on ambitious parish programs requiring expensive, up-to-date recreational and educational
Producing one of the most successful wartime variations on the Quonset-type chapel, the architect has in this case substituted a ceiling clerestory for the usual, elbow-height ribbon strip. Exposed structural materials, inside and out, are complimented and softened by the use of indoor and outdoor planting. (Photos show the church on its original site—a Seebee camp near Pleasanton, Calif.)

Where climate permits, an open structure such as this has many advantages. Three louvered walls eliminate all problems of fenestration, make for pleasant, subdued lighting inside. The unusual location of the baptistry at the entrance of the church has symbolic as well as functional significance. It is protected by a cantilevered arch (which also serves the main entrance) and a free form concrete wall decorated with mosaic tile. Planned for a refinery town, the church is considered as an integral part of the community center. The bell tower, consisting of two concrete fins, is located at considerable distance from the church at the head of an approach esplanade. A double cantilevered concrete shell, spanning reinforced concrete arches, permits effective circulation of air within the roof proper. (The design has been approved by the Bishop of Caro.)
facilities. This is the church’s obvious but intelligent bid to recapture some of its dynamic influence in community life. It also provides an added argument for economy since widespread construction of elaborate parish buildings will proportionately cut down the money available for the house of worship itself. The church’s role of the future will no longer be that of an austere and aloof monument. In conjunction with its parish buildings, it is seeking to be regarded more and more as an active, integral part of the community center.

Regardless of type, stylistic mimicry is not worth its weight in cinder block. Currently available building materials and economically sound structural systems lose their meaning with traditionalistic handling. This applies even to the Johnny-come-lately “Colonial type” church that has recently met with such favor because it is the cheapest of all styles to reproduce and utilizes a popular economical material—brick.

As in all other buildings, the church enclosure must be functional. However, unlike many other buildings, its function is primarily one affecting the spiritual and emotional side of man. If it were merely a matter of erecting a thermally and acoustically satisfactory shelter, there would be no problem. But the church service is in itself a manifestation of tradition as well as faith and, to date, it is in the complex interrelating of ritual and surroundings that the contemporary interpretation has fallen short.

**High in volume, human in scale**

If it is true that a feeling of loftiness is directly connected in the average mind with ceiling height, then church construction will inevitably remain more expensive than lay architecture because of the additional cubage. Most denominations through boards and committees have made thorough economic studies of church requirements and costs. Building a seat for every member of the congregation is a thing of the past since attendance in Protestant parishes seldom runs over 30 to 40 per cent. Most churchmen now agree that, with provision for a 50 per cent growth, the seating provided should not exceed 60 per cent of the congregation. Incidentally, this expansion figure is not as optimistic as it may seem at a glance since church membership has increased from 19.9 per cent of the population in 1880 to 53.3 per cent in 1949. A query of all denominations reveals that the anticipated cost for an average church, exclusive of furnishings and equipment, runs from $50,000 to $550,000. Pews, rugs, organ, chapel, etc., usually add 10 to 12 per cent of the overall cost.

Since the church is acquiring more and more human scale, landscape architecture is becoming more and more essential to the overall design. The object is no longer to construct an edifice that will dominate the entire town (and in some instances the countryside as does Mont St. Michel and Chartres) but to design a building that will be harmoniously related to the community. As the church becomes more and more related to the human scale, so does its relationship with nature increase.

Whether or not it is the product of a deeply rooted association, arch construction—of all modern building techniques—seems the one most naturally adapted to the average requirements for church design. Whether it be of metal, wood or concrete, the arch’s visual action of drawing the eye upward suggests symbolically the supremacy of God in terms that can be understood by all. (We do not mean the squat, barrel shape of the Quonset-type hut which, though it proved admirably adaptable to the design of temporary chapels for the armed forces during the war, generally enforces a tunnel-like interior and poses an unduly awkward problem of fenestration.) More than any other contemporary form, arch construction requires the greatest skill in handling. Nothing is quite so unwieldly as the poorly proportioned arch. But while the parabolic version would theoretically...
seem the most natural for church design, there remains to be built a church in which this form has been gracefully or subtly adapted. Truss construction, with its inevitable angular product presents the age-old problem of ideal proportioning and tends to present a chillier, more austere interior. Furthermore, in order to achieve a psychologically satisfying auditorium, the rectangular form more often than not dictates proportionately greater height than arch construction and consequently a higher cost per square foot.

Wood, stone, color and art

Like that of the theater the church enclosure is used as a setting for a highly personal and usually emotional reaction on the part of the audience. Visual stimulation is one of the most important design elements. Structure, color and the handling of light appear to be its chief components. But can we hope to achieve the "visible energy" of the Gothic cathedrals—ultimate in stone construction—until the contemporary idiom evolves into a much more highly refined and disciplined art? There is no question but that past civilizations were more deft and profound in their treatment of spaces embodying awe; temples, monuments and churches. Somewhere along the line the formula was lost. But, whether dealing with large or small areas, it can and must be rediscovered. And copying the exact proportions of the Parthenon is not the answer. Monumentality in terms of great size may be a dying form of ecclesiastical architecture, but in spiritual significance it is anything but dead. In the latter sense, the psychological elements that appear most important are dignity, loftiness and reverence. Contrary to popular belief, however, none of these qualities need necessarily be expressed through formality. The unostentatious little California chapel by Donald P. Smith (p. 70) embodies them all in its disarming simplicity of line and frank use of raw native wood.

The Gothic cathedrals to which all turn for spiritual inspiration are the ultimate examples of exposed raw materials in church construction. Perhaps because of their profound influence on the emotions of all who have ever studied them, the use of raw materials has carried over as one of the happiest elements in contemporary church design. There is a warmth about wood and stone that speaks directly to man's most fundamental instincts. Yet rare spiritual quality is expressed in the Abo chapel built almost exclusively of man-made materials.

The large plain areas that characterize our contemporary churches make perfect spots for color, murals or sculpture, but at the risk of wearing thin a much repeated admonition, it is essential that the ornamentation of a church be planned from the beginning with the active collaboration of the architect and all other artists involved.

Heating and air conditioning

When all churches were unheated, draughty edifices, there was no need for the plan to include facilities other than those for worship. Now, however, that it is not considered sinful to pray in anything but acute discomfort, adjuncts such as cloakrooms are assuming more importance in the plan. In the south air-conditioning has become a must. All churches should have scientific acoustical treatment. And in almost every church, the congregation requires adequate light for reading. Radiant heating is too widely accepted as the latest and only means of turning a church into a thermal heaven on earth. Too many people recall interminable sermons punctuated only by the tapping of concealed toes against an icy and unresponsive marble floor and tend to regard warm floor panels as the end-all in church heating. Actually in many structures, convected heat would be scien-
This group of churches illustrates two of the most important elements of ecclesiastical architecture: skillful handling of raw materials and planned collaboration among the arts. Both the small California chapels are built of native redwood. The top one, while contemporary in feeling, has all the warmth and appeal of a village church in the Tyrol; the lower displays a more studied dignity and grace—it was originally part of a Merchant Marine training school, but is now used as a library. Interesting texture has been achieved on the exterior of the Chicago church, though it boasts only modest brick contrasted on the interior with rich wood paneling. The Negro mission (left), familiar to many, is characterized by fine sculpture set off against a simple interior, realistic in its rigid economy.
tically more appropriate. The problem of church heating is exactly the same as that in domestic or commercial architecture and should be governed by the same rules. Cubage, proportion of glazed areas, insulation, etc., remain the governing factors.

Most contemporary churches have retained the rectangular plan, in some instances chosen the semi-circular. Both make for more intimate atmosphere of group participation than the cruciform. Contrary to common belief, the practice of bringing the altar forward to the center of the church is no innovation. As a matter of fact it was the arrangement of some of the earliest Christian churches. Not unjustifiably, many people feel that a circular or semi-circular seating arrangement is distracting because it emphasizes the presence of other worshippers and tends to detract from the importance and significance of the service. Nor is the location of the choir in front of or flanking the altar a liturgical requirement. In most traditional churches it blocks the vision of the altar and adds only one more distracting element. Side or rear choir seating, either at ground level or in balconies seems a logical answer. The former also has the advantage of retaining the facilities for the processional.

**Windows and light**

The creators of the great Gothic cathedrals were well aware of the psychological impact on the congregation when they introduced color into churches. Even by present day standards, luminous color can be an extremely moving design element and therefore leads many to question the obsolescence of stained glass. But even though moderns have never been able to duplicate certain medieval colors in stained glass—the blue of Chartres, the red of La Sainte Chapelle—some very fine examples are being produced today. They are, of course, costly amenities. Much the same effect can and has been achieved through colored lighting.

White light, so popular with many of our contemporaries and widely used for many years in Protestant churches, is the most ticklish of all to handle as it has little or no emotional or symbolic content. It is generally agreed that when white light is used, it is best directed from the rear or sides of the church toward the altar. Since the church service is usually a ritualistic pageant, it is as illogical to confront and distract the congregation with clear or translucent spots of white light as it would be a theater audience. Many contemporary churches have utilized clerestory windows for general illumination but in few cases does this device seem as pleasing, no matter how skillfully handled or controlled, as concealed natural light. Most churchgoers seek to be taken out of themselves, to concentrate and to be elevated. By using ordinary windows many architects and clergymen seem to deny the need for all mystery in the church and its ritual (and many are raptly opposed to it) but, dispassionately speaking, they are forcing on the congregation a source of disconcertion.

**An architectural seminary**

In most architectural schools, the curriculum can only afford to give the student one or two brief exercises on church design. However, the complex ramifications of ecclesiastical building require a substantial amount of specialized knowledge. The overwhelming number of inferior contemporary churches proves how involved the problems are. A correlation between seminary and architectural education has even been suggested for students expecting to specialize in the field—and in view of the amount of planned building, why shouldn’t they want to? However, suggestions such as this, a thoughtful one, have fallen on the deaf ears of architects and clergy.

Planned for a poor but touchingly devout congregation, this small chapel pushes economy to its limit. It is to be built of simple timber trusses and a concrete block wall strengthened at 10 ft. intervals by piers. The altar will be of wood, the cross itself a prism illuminated from behind. So far only a quarter of the required $40,000 has been raised, but the parishioners plan to do a substantial amount of work themselves. Not discouraged by their modest means, they hope to have murals by Romare Bearden, a mosaic pool by Max Spivak and a piece of garden sculpture by Ahron Ben-Shmuel and landscaping by Lynch & Klene. In its utter simplicity this little church proves that dignity and reverence do not require the glitter of gold.
AN ARCHITECT'S CHALLENGE

Has contemporary architecture lost the power to create churches that will satisfy the spirit as well as the mind?

by Pietro Belluschi

Two centuries of materialistic progress have done great damage to all forms of emotional expression. Painting has had to retract into a sort of individualistic and rebellious introspection; sculpture has lost itself by becoming unrelated to its surrounding; and any endeavor to create purely monumental architecture has become sterile as the stimulus of emotional urgency ceased to be a reality in the lives of men.

After four hundred years of struggle through the sterile and circumscribing influence of the Renaissance and the blind alleys of revivalism, architecture has at last found a certain emotional quality in the drama of scientific progress. What it now lacks in human understanding it makes up in honesty and logic. But the last four or five generations, with very few exceptions, have been incapable of producing works of real monumental character, unless mere size can be accepted as a substitute for spiritual significance.

Of all creative efforts, the design of the church is the one which shows most clearly the decay of our spiritual heritage.

Our society believes mainly in the importance of scientific progress, pays only lip service to the old images of God—and finds it difficult to formulate more convincing ones. Our heaven is now on earth; it takes the shape of social security, the thirty-hour week, and restless and uncreative leisure—a heaven, of course, that gives no serenity nor spiritual nourishment.

In spite of the advantages and satisfactions accruing to the modern religious congregation by its advocacy of social advances, it must be admitted that to many persons the result of this course is the least rewarding in spiritual satisfaction. To them, God is still an intimate necessity, not satisfied by the knowledge that social advances have been made. To these, and to the many persons who are lonesome and bereaved, to the unhappy people whose only source of courage in their daily tribulations is their opportunity of prayer and emotional release; to the sick and the dying, and the fearful to whom the last source of strength is the image of a personal loving God; to all these, our modern religious establishments have to a large extent failed—and the measure of this failure is shown in the miserable architecture of their churches.

Then what is to be done about church architecture if we cannot find refuge in a sterile copying of the past? Many architects have been baffled and impotent in their struggle to become again simple and believing. Only a handful have succeeded in recreating the atmosphere in which the religious man, the man who still deeply and humbly believes in God, may worship him in appropriate surroundings.

The number of conflicting denominations has tremendously weakened the church as a divinely mandated institution, and the time and wealth which a community can devote to construct its church could not possibly be compared with the wealth devoted to the same purpose in the middle ages, when life revolved around the religious institutions. However, if we cannot erect great monuments, we may endeavor to create small temples, in a more human scale, designed in a sensitive and creative manner so as to produce the kind of atmosphere most conductive to worship.

Architect Belluschi has recently designed eight churches to meet this need, four Protestant, four Roman Catholic. Examples of this work will be shown in future issues of the Forum.—Ed.
Riverfront house

Photos: Damora
On a gentle ground swell overlooking the Connecticut River, Hugh Stubbins has designed this house for an amateur yachtsman. Its rectangular plan has been manipulated to take best advantage of the undulating site and (budget permitting) has been loosened out to give extra light and greenery to each of the well placed units—dining, living and sleeping.

Prime advantage gained from the sloping site is, of course, the basement area set entirely above ground. A generously lighted workshop, laundry and indoor-drying space are fitted here, as well as a wine cellar, dark room and space for storing the owner's small boat. A covered walk connects kitchen and carport, while the area between the two is utilized as an outdoor drying yard—well-protected and out of sight of the main living rooms.

The roof-line which at first glance seems as haphazard as a stretch of the nearby sand-dunes, is actually a deliberately broken contour, rising at one end to accommodate the elevated dining-kitchen area and angled to open up the house to light, air, sun and view. Materials chosen for the house are well in keeping with its site and purpose. Natural white cedar is used for beams; native stone for ballast.
For all its air of vacation ease, the house reveals a firm structural discipline throughout. Nowhere are basic materials or methods camouflaged, and a modular post and lintel system is used (4 x 6 in. posts and 4 x 14 in. girders). Such framing, spanned by 2 x 8 in. joists, leaves the long walls of the house nonbearing.

The living area takes full advantage of this freedom with an entire window-wall overlooking terrace and river. Generous ventilation panels invite the river breeze in summer. Extra light is brought around into the music corner by a narrow strip of windows set under the hanging bookshelves (see photo at left). Most dramatic source of natural lighting is, however, the clerestory-skylight set above the massive fireplace.

Two children's bedrooms open directly off the living area, a location which allows them to double as guest rooms when the children are away at school and camp. The large bookcase-radio-phonograph unit (photo above) gives privacy to the bedroom entrance. Door transoms and the open house-plan compensate for lack of cross-ventilation within these rooms.
A little triumph of dynamic balance is revealed in the above detail for double fireplace-garden-stairway-clerestory-skylight. Natural light, desirable for brightening the stairway, also serves to dramatize the handsome stone chimney and bring sunshine to indoor plants. The pleasing and varied textures in this complicated unit (as shown in photo above right) demonstrate the architect's esthetic as well as functional virtuosity.
An in-line kitchen opens directly off the dining area at the east end of the house, and provides a handsome answer to the owners' request for informal serving. It is connected with the basement by a stairway from the adjacent entrance hall. This hall leads also to the covered walk joining house and carport. The master bedroom, at the opposite end of the house, is linked to the main house block only by an isthmus-like passage lined on one side with storage cabinets. The other (south) side of the hall opens to allow direct access between the bedroom and terrace. The small courts resulting from this arrangement admit extra light to both bedroom and living areas and give the bedroom suite the privacy of a separate wing. This suite is divided into two munificently fitted sleeping-alcoves by a joint bathroom. The unbroken half of the room forms an inviting living area with fireplace and full view of the river.
The master bedroom's two sleeping alcoves are separated by a bathroom with spacious wardrobes on either side. Exterior view (below) shows chimney for bedroom fireplace, and court giving direct access to outside terrace. The overhang spanning thin air seems to hark back, however, to an era of conspicuous waste.

Here is a merchant building operation that is distinguished both in planning and execution. Located near Alexandria, Va., it features good land planning, a series of contemporary house designs and a merchandising set-up which minimizes the speculative risk for both the builder and his customers. Builder Robert C. Davenport's 225-acre Hollin Hills subdivision is a hilly, heavily wooded piece of land. When he first saw it back in 1946, he had the normal builder's reaction i.e. avoid extensive site development at all costs. Aided by his architect, Charles M. Goodman, he saw the possibility, however, for a dramatic development. Architect Goodman pointed out that he could avoid expensive site work by working with the contours of the site, rather than trying to erase them by high-priced grading operations. Davenport's decision to go ahead with the project has paid off handsomely both on the site and in his profit statement.

Goodman has planned three different houses, for three different price ranges and the three different types of topography. They are: a small $12,000 unit, and a $17,000 split-level house, both of which are shown in these pages. Still on the boards is his third house—a rambling $20,000-and-up version on which construction will start next spring. The main topographical feature of the site, a high ridge running down its middle (see plan, p. 82) determined the siting of the different models. The high-priced house gets the high-priced lots on top of the ridge with its view of Virginia valleys and hills. The middle-priced houses are spotted on the side of the ridge, while the $12,000 smaller houses fill in at the bottom. The air photo above shows how neatly site-planned are the small houses (on the right) in relation to the larger ones. Also shown: the happy results of Builder Davenport's determination to preserve the wooded character of his site. After a year of site development, Davenport has proved to his own satisfaction that grading can be done around most trees rather than over their uprooted sites, also that a house can be built amongst trees without any appreciable delay.

Hollin Hills' layout is further enhanced by the determination of both the architect and builder to eliminate cement curbs, gutters and sidewalks—all over the loud protests from the local FHA office. After several months' discussion, FHA finally agreed to approving a graded, grassy swale alongside the roads. (Streets having a grade higher than 5 per cent will have a concrete valley-type gutter.) Architect Goodman further raised blood pressures of Northern Virginia FHA officials by suggesting that they approve his plan for not paving the roads on the subdivision. His suggestion: gravel-and-tar-mix roads. He lost his fight and, as a result, Hollin Hills roads are blacktopped. But Goodman remains unreconciled: "I regret the necessity for installing a paved road not only because it is a conspicuous expense but also because of its hard city-like character, reflecting great heat in the summer and creating ice hazards in the winter."

For construction simplicity and economy, Goodman has restricted all his houses to large plain structural units, mainly glass and solid masonry. All the glazed casements throughout the 350-house tract are fabricated on the site, have a modular height (3 ft. 1 in.) and only three different widths (2 ft. 2 in., 3 ft. 2½ in., 4 ft. 2½ in.). Roof trusses, doors, shelving and closet fronts are also standard throughout. Such standardization, Goodman feels, is the only effective means of construction economy in a relatively small development like Hollin Hills which will probably be completed at the rate of about 75 houses a year. A more provocative cost-cutting decision was to reduce interior storage space in his small houses to a bare minimum (see plan, opposite). "Any excess storage space in a little house is expensive and cuts down needed living space," says Goodman in defense. To meet the storage problem he has designed an outdoor "storage increment" which is nothing more than a 4 x 8 ft. shed whose cost ($300) is less than half that for similar space within the house structure. Another "outdoor increment" combines storage with a car shed ($700) that is neatly connected to the house with a series of 2 x 4 ft. vertical louvers.

Having established his land and house planning, Builder Davenport next took a hard look at his financing. He conceived a development in which he acted as the building agent, at a firm price, for a client who bought a piece of land in his subdivision. By thus having a "guaranteed" sale on a contract arrangement, he could bail some of the speculative water out of his price. Says Davenport: "It's essentially a cost-plus operation, falling into my concept of the builder as a service agent for his customers."

Davenport starts out by selling a Hollin Hills lot to a prospective housebuyer. His price range, for one-third acre and up, varies from $1,800 to $3,000. This gives him some initial working capital. The customer then signs a contract for the construction of his house, making a down payment with provisions for further payments at various stages of construction. On a typical small house, the down payment will be around $500. This

Handsome small house makes simple, straightforward use of bricks, glass and wood panels on exterior. Main variation for house is in siting.

House plan (left) demonstrates Architect Goodman's theory that interior storage space should be limited to large closets with bulk storage in inexpensive outdoor shed.

Handsome small house makes simple, straightforward use of bricks, glass and wood panels on exterior. Main variation for house is in siting.

Modern furniture in dining area (right) is one of several types which are sold at discount by builder to his customers under unique plan.
means, of course, that Davenport's customers have to have at least $2,300 in equity for the house and land before they move in. Davenport points out that it is a good investment, also that they are saving on the service charges which accompany interim financing. A VA mortgage for $10,000—the Fannie May limit—is arranged when the contract is signed. Davenport gets all but $3,000 of this in construction payments from the mortgage house with the balance being paid off at the mortgage closing.

Davenport has extended his financing plan to cover something that is seldom seen on subdivisions—good modern furniture. Since most of his customers have already collected some period-style furniture that is ill-adapted to his contemporary houses, Davenport has arranged to sell contemporary pieces at the builder's discount. Among the firms participating in his plan: Knoll Associates for furnishings, Kurt Versen for fixtures and the Glass House of Washington for china and glassware. "It's the next best thing to getting them into the mortgage," Davenport points out. "The best thing, of course, would be to include them." Strangely enough, he also carries this discount plan over to two items—washing machines and refrigerators—which can be included in a package mortgage. Davenport's reasoning is that many of his customers already have these items, that the others might want to keep their mortgage costs down.

Davenport's use of VA mortgage financing is the result of his unsuccessful attempts to work out an equitable arrangement with FHA. Despite their pious talk about the value of planning, FHA's conduct in handling this subdivision shows its officials often fail to recognize a good planning job when they see one. Since the Hollin Hills project was totally different from the distilled-colonial shoeboxes they were accustomed to insuring, local officials gave Builder Davenport an appraisal of only $9,500 on his big house, $9,100 on the small one. Davenport therefore took his business to VA for the 40 houses he is building this year. The GI-financing appraisal: $12,250 for the small house, with land; $17,250 for the big one. Recently, FHA had some contrite second thoughts about their treatment of Davenport's project, have indicated to him that they will give him an appraisal more in line with the true value of his subdivision and its houses. As a result, Davenport's 1950 program of 75 houses will probably have the better-late-than-never advantage that comes with FHA-insured financing.
Big floor-to-ceiling windows are a dramatic feature of the house’s living area. Hopper windows near floor provide ventilation.

Split-level units, above, show calculated integration of site and house on side of hill.
Reliance houses rumble along 2,300 ft. assembly line (above) in seven-piece "packages." Present production rate is a house an hour. Bolted together, sections form compact three-bedroom unit.

First operation is welding 16-gauge steel channels into wall and roof frames on large jigs. Overhead crane then moves frames to assembly line.
STEEL HOUSE, factory-built in seven pieces, sets new standard in industrialized housing

The basis for most factory-built homes has been a big package of panels of one sort or another which are assembled on the site. Reliance Homes Inc. has pushed this concept considerably further by factory producing a five-room, steel-framed house in only seven big pieces. Each section is not only structurally complete but also has all mechanical equipment, wall finishes and fixtures in place. Site operations are limited, therefore, to preparation of the slab floor, hooking up utilities and painting and wallpapering the interiors and exteriors. Resembling the TVA-prefabricated home of a decade ago in both design and production technique, Reliance's 947 sq. ft. model is now being produced at the rate of six a day in a converted war plant in Lester, Pa. on the industrial outskirts of Philadelphia.

Kingpin of the Reliance operation is its president, shrewd affable Harry Nagin. He came to this country in a steerage 40 years ago, worked his way to a civil engineering degree at Cooper Union and, during the twenties, became a vice-president of a middle-sized steel fabricating firm, Reliance Steel Products Inc., in McKeesport, Pa. An assiduous inventor who is credited with developing the steel airport landing mats of World War II fame, Nagin began working on a steel house back in 1935 as part of the steel company's development program. During the war, he worked at it harder with the idea of creating a new postwar market for the company. Like many another doodler in factory-built housing schemes, he went to Washington during the house-hungry spring of 1946 when Wilson Wyatt announced that his veteran's housing program would include a lot of prefab houses. Nagin and his sectional steel house, however, got short shrift from the Wyatt planners. He retreated to McKeesport and made what for a postwar prefabber was a radical decision, i.e. to build his house with his own money. Reliance Homes Inc. was formed with a capitalization of about $1 million, all of it supplied by Nagin, his friends and some officers of Reliance Steel Products.* Since then, Nagin's notions of financial independence have been amended somewhat by two RFC loans—one for $355,000 granted in October 1948 and another for $3,200,000 granted last June.

To supplement his steel background with expert house design and engineering, Nagin called in Architect William Lescaze and Engineer Paul Weidlinger. The resultant house went into limited production in September 1948. Although Lescaze's original design (see p. 87) has been changed somewhat by Reliance engineers, the initial production idea has remained the same.

* Although technically the two companies are separate, all of the six and a half tons of steel in the Reliance house comes from Reliance Steel Products, Inc.

A rigid frame in steel

Nagin's approach to house building is that of a steel engineer (which he is) who knows a great deal about industrial production (which he does). The Reliance production line is, in his mind, a means for attaching things to a welded steel frame. That seven of these rigid frames, with their attachments, will form a house when bolted together is probably less important to Nagin's engineering mind than the fact that he has produced each frame as simply as possible. The Reliance process is so simple as to deflate the still-current belief that production of houses in a factory must involve a lot of expensive equipment.

The fact is that company's tooling-up was accomplished for the impressively low figure of $400,000. Most of this was spent on the jigs used to form the rigid frame and on the conveyor system which moves the assembly line itself. All in all, it is a bargain-basement price for a production line that has a rated capacity of 25,000 houses a year. Nagin is nonplused, however, pointing out that his use of simple production methods and orthodox materials made the line intrinsically simple. "You only spend money tooling up when it means that the job can be done simpler and cheaper as a result." It is apparent that the Lustron house violates this rule of simplicity. Produced with over $15 million worth of machinery, the Lustron still leaves the factory in over a thousand pieces—all of which must be assembled on the site.

Because he has no high fixed equipment charges, Nagin claims that he can cut his production down to four houses a day and still make a profit—an important point in the present touch-and-go-period when his dealer organization is shaky and orders are uneven.

A.F.L. tries the new look

The production simplicity of his steel house has permitted Nagin to give careful attention to his labor costs. Instead of trying to work out a labor contract, with the major A.F.L. housebuilding trades, as Lustron did, he signed an overall contract for all his 250 factory workers with the A.F.L. International Association of Structural & Ornamental Workers. With his contract, he has dumped the fiction that assembly-line workers in a house factory must be recruited from the old A.F.L. building-trade unions. Since it is axiomatic that factory-built houses have to be built at factory-labor prices, the Reliance contract has hopeful implications for the new industrialized housing.

Photos: William M. Kittaz

On line, individual frames are welded together to form walls and roof of one house section. Jig clamped to frame assures exact fit.

Large precut wallboard sections are screwed to frame after rough wiring. Sections are mounted roof-side down on dollies for convenience in applying ceiling panels.

Insulation is applied, followed by exterior wallboard and corrugated aluminum facing. Section is then flipped over on dollies by overhead crane and tar roofing applied.

Bathtubs and other equipment are installed. Only items not hooked up: heater; stove, washer, sink.
industry. Equally important, in terms of production costs, is the fact that most of the Reliance production can be handled by unskilled or semi-skilled "assemblers." Over two-thirds of the 300 man-hours of labor required to make a Reliance house is performed by assemblers with a maximum pay scale of 1.27 an hour.

$4,590 F.O.B., Lester, Pa.

These production economies are all reflected in Reliance's $4,590 f.o.b. price for its 947 sq. ft. three-bedroom model. (Lustron's f.o.b. price is $5,700 for a 1,050 sq. ft. two-bedroom model.) Although this represents a square-foot cost of $4, Nagin knows that it is the final price-on-a-lot that counts. He is convinced, however, that he couldn't have produced a house that was much more adaptable to a quick site operation. After being carried to the site on three trucks, the house is closed in as quickly as a crane can lift the sections off the trucks and place them on a concrete slab. Reliance time-study engineers estimate that 40 man-hours over a five-day period should be sufficient to handle the remaining operations: hooking up the utilities and mechanical equipment laying the asphalt tile floor, applying the three-ply built-up roof, painting the exterior and wallpapering the interior. Nagin, wise to the vagaries of site operations, will settle for 100 man-hours in a 10-day period. It hurts his engineering sensibilities, however, to think that it takes even this much time. In his early houses, he tried to eliminate one of the biggest site jobs—interior decorating—by applying wallpaper at the factory. The results were efficient from an engineer's view, but he was stopped by a problem that has moved many another builder to quiet desperation. No matter how expensive and how tasteful a decorating job the factory did, the wives of his buyers always wanted another color scheme. Factory efficiency soon deferred to feminine whim.

However, after examining another factory operation—installation of a heating system—Nagin made a shift from factory to site operation on economy and efficiency factors alone. The first Reliance houses had a hot air system with bulky tin ducts which gummed up an otherwise simple structure. Reliance engineers eliminated the ducts, specified instead a radiant heating system to be installed in a concrete slab on the site. The slab itself eliminated the factory-installed steel floor which was part of the original house. By eliminating the floor, over three tons of steel were saved. The Reliance factory may produce a house that can be site-erected in jigg time but it is up to its dealers to do the job efficiently. The dealer organization is still small: only about 25 have been franchised. All are within 400 miles of the factory—a self-imposed shipping limit.

Perhaps the most important decision that Reliance has made in setting up its merchandising operations is to concentrate the sale of its houses in subdivisions rather than individual lots. (It is interesting to note that Lustron is now making a latter-day attempt to do this.) In the first place Nagin figures that his best market is with the vast majority of house-seekers who do not already own land. Secondly, he figures that his flat-topped houses look better when grouped together rather than in the uneasy company of Victorian and Colonial units. But most important is his belief that the houses can be put up more efficiently in large groups. Example: the high-boomed crane which is necessary to move the house sections from the trucks to the slab can handle eight houses a day. Thus, its flat daily rental ($100) can be prorated in a subdivision operation with resultant economies. Although dealers are not prohibited from selling houses on individual lots, Nagin tells them that he considers this a pastime only for slack periods. Or to use his pointed phraseology: "Between subdivisions."

The Dealer's Dilemma

Typical of the Reliance dealers, who sell both on and off their subdivisions is Charles Lawrence, a former government housing official who holds the Reliance franchise in the Washington, D. C. area. Lawrence has been erecting Reliance houses in Fairfax County, Va. for over a year. In that time, he had filled a small 30 lot subdivision and put up about a dozen houses on buyers' own properties.

On his small red-clay subdivision just outside of Alexandria, Lawrence is selling his house for $10,490. The difference between this figure and the $4,590 price he paid for the house at the factory is perhaps the best evidence of how site costs mount up even on a house as completely factory-finished as the Reliance. The biggest item is the 60 x 100 ft. lot and its improvements, including streets, walks, utility lines and the concrete slab with its embedded radiant heating coils. Lawrence figures this at $3,000. Finishing the house after it arrives on the site accounts for another $1,200. These costs, plus transportation charges at $2 per mile ($278), almost double the original cost of the house. The rest of his selling price ($1,422) covers his overhead and profit. Lawrence agrees that his price is high, but he points out that, dollar for dollar, he is selling more house for the money ($11 per sq. ft.) than the great majority of builders in his area. The solution to lower priced houses, he points out, is to build

(Continued on page 110)
Although the Reliance house is factory-produced, it does not lose to more conventional houses in its concern for family living requirements. In fact, it provides more living space than orthodox houses of the same exterior dimensions because of its factory engineering. Example: the compact heating and plumbing space. Also noteworthy are the three bedrooms, the large living room and the size of the closets and storage room. An additional bedroom section can be included for about $300.

Robert C. Lautman

Utility hook-ups are concentrated in simple plumbing wall. Concrete slab, with embedded radiant heating coils, must be carefully prepared to mesh with factory-installed pipes.
BUILDING REPORTER
--a quick look at many new ideas featured by many new buildings

This is a new department which has borrowed an old name. It will serve two purposes: 1) Whereas, heretofore, the FORUM has had to confine its monthly report to a dozen or so new buildings of outstanding design, this new "short story" department will make it possible to keep FORUM readers informed on the new departures and other interesting features of all important new projects. 2) Whereas the News department at the front of each issue is limited to news of Building, as opposed to buildings, this new department will make a place for many brief news items about buildings and about the people who design, engineer, and operate them.—Ed.

Michael Miller
100 Park Avenue

Update with air conditioning

Rockefeller Center is getting ready to meet competition from the horde of new office buildings (all of which are air-conditioned) by offering air conditioning to all its present tenants at something like 45 cents a sq. ft. additional rent. One-third of the Center's 4,000,000 sq. ft. is already air-conditioned. Air conditioning the other 2,500,000 sq. ft. will be one of the biggest air conditioning jobs to date.

New York City's new skyscraper

From a quality point of view, the best of New York's postwar office buildings outside Rockefeller Center is the 35-story tower which 100 Park Avenue Corp. has just completed on the site of the old Murray Hill Hotel at Park Ave. and 40th St. (photo, left).

Like all the others (see News), it has taken advantage of air conditioning and modern lighting to fill every cubic inch permitted inside the zoning envelope, with the result that some of the office space is 60 ft. from the nearest window. And like almost all the others, the air conditioning is a split system with units under every window to take care of the outside zone. (The air conditioning cost $2,250,000 or approximately $5 a sq. ft. of floor area.)

Architects Kahn & Jacobs wanted to design the building with an all-metal and glass exterior, but compromised on columns faced with brick. Continuous windows run from column to column above aluminum spandrels backed up with 8 in. of brick. (The original specifications called for stainless steel mullions, but an aluminum fabricator "stole" this business from the steel companies by volunteering a bid of $36,000, or approximately $12 a mullion, below the best stainless steel quotation.) The casual observer might think all the windows and spandrels are alike, but actually 14 different widths had to be fabricated, with the widest less than 2 in. wider than the narrowest. This lack of standardization added considerably to the cost of the aluminum windows and spandrels. (The aluminum fabricator assumed $56,000 of the difference.)

Inside finishes underline the careful attention given to maintenance: where marble walls turn a corner, the corner is rounded off to prevent chipping; walls meet floors in a curve instead of a dust-catching, difficult-to-clean right angle; lavatory walls are tiled to the ceiling instead of to the usual half-way point.

The building is 80 per cent rented with the tower rents running up to $6.25 a sq. ft. The biggest block of space was rented to American Can for 20 years at a rate somewhere between $4.25 and $4.50 a sq. ft.

General Contractor: George F. Fuller Co.

A new use for high ceilings in old buildings

New York City's smart department store, Saks Fifth Avenue, has just been air-conditioned from top to bottom without sacrificing an inch of floor space on any of its seven sales floors. This was done by taking advantage of the generous story height (14 ft.) to hang 34 similar shop-prefabricated central stations from the ceiling, each 6 ft. high and about 12 ft. square; each containing a mixing plenum, a stationary filter, an electrostatic filter, dehumidifying coils, fans, and all the other necessary equipment.

Where this hung ceiling trick has been used before, the result has usually been a very tough maintenance problem, with the maintenance men crawling around the machinery on all fours and carting filter dirt out by hand. At Saks, on the contrary, Engineer Charles S. Leopold claims that maintenance will be almost ideally simple. The 6 ft. height of the units enables maintenance men to work standing up, and dirt from the filters can be piped out through the central vacuum system. Vibration of the fans is picked up by a three-point suspension for the fans and the motors. The plenum is lined.
with air acoustic sheets behind perforated metal pans, with the result that no noise from the air conditioning machinery reaches the work and sales areas immediately below.

**Store design which bucks the trend**

Bonwit Tellers' new $2 million women's specialty store in Chicago challenges all of the generally accepted principles of contemporary store design (photos, right). It has no open front, no blank, windowless walls, no open planning, no flexible partitioning, no showcases, no modern furniture, no new lighting fixtures. Instead, Bonwit's six stories are subdivided into separate specialty shops by permanent ceiling-high partitions comprised of stock storage facilities. These shops are sumptuously furnished in period furniture, lighted by ornate chandeliers and recessed ceiling spots, and decorated in quiet colors (gray, pink, canary yellow, light blue, etc.) and even wallpaper.

Thirty-seven large windows are punched out of the building's two limestone facades. Some of them have no relation to the interior plan since they light fitting rooms which are not as wide as the windows. Others are curtained and draped to add to the parlor-like atmosphere of the salesroom which they light. One of these (top photo) is two stories high, flanked by office mezzanines over the second floor fitting and stock rooms. On the ground floor, only one of these windows is a real show window (and a small one, at that); the others are used to daylight the salesrooms.

Bonwit's new store is highly successful. Its design, like its merchandise, caters to a highly fashionable clientele which apparently prefers to shop in a quiet, plush environment reminiscent of "home." (In purpose and design, it is strikingly similar to the I. Magnin's store in San Francisco—Forum, May '48). Architects: Shaw, Metz & Dolio. Interiors by William Pahlmann, Associates. General Contractor: George A. Fuller Co.

**New ideas amid New England conservatism**

In many respects, including its overall appearance, the new 26-story John Hancock Building in Boston is a 20-year-old office building. Indeed, some of its details date back 20 centuries, for it demonstrates the traditional concept that, for some reason or other, insurance company stability must be equated with Greek temples and Egyptian pyramids. (The columned temple is at the bottom; the corbelled pyramid, on top—see photo right.)

Hidden within John Hancock's thick, traditional skin, however, are several new ideas in office building design and construction:

- The skin of sandstone is insulated with 2 in. of foam glass. It is claimed not only to cut down annual heating and air conditioning costs but to pay its way by lowering the required capacity and initial cost of the heating and cooling equipment.
- All windows are double glazed and set in horizontally pivoting aluminum sash to permit washing from the inside. (Their insulating properties are claimed to produce savings in heating and air conditioning which more than offset their higher initial cost.) Windows and aluminum spandrels were prefabricated units and raised into place in one piece.
- Windows are fitted with cotton-wool mohair draperies, instead of the usual Venetian blinds, because John Hancock figured that they are cheaper to install, easier to maintain (they will be dry cleaned every year or two and replaced every ten years), more colorful in appearance and, when pulled, they will cut interior sun heat by 50 per cent giving the shielding effect of Venetian blinds tilted at a 45° angle.
- The 18 passenger elevators are supplemented by two sets of reversible electric stairways running from the basement to the eighth floor to help carry John Hancock's 5,000 employees.

(Continued on page 112)
In the present ebb tide of industry from America's big cities, this building is an occurrence of note. The Florsheim Co.'s new $2.5 million dollar structure houses: two complete and separate shoe factories; a cutting factory, shipping, receiving, and storage facilities; and general administrative offices—and it is built in a location near the heart of Chicago.

There are three tangible reasons for Florsheim management's decision to build in Chicago rather than to follow other light industry to the clover fields:

1. Convenience to Chicago's important terminals (and Chicago's convenience to the nation) are important factors for sales and purchasing for this national operation.
2. This location enjoys a good labor supply, which has been explored and developed over a period of years at Florsheim's old location in this area, a rented building across the street.
3. There is easy access from administrative offices to banks and other offices in the downtown business district of Chicago.

A fourth advantage—less tangible but no less deliberate—is the advertising value in the location of this obviously new, obviously modern, obviously efficient plant right next to Union Station where it will be seen every day by thousands of people.

There are six floors of above-ground space in the building plus a ground floor which utilizes the sloped site to include a private parking area and a protected shipping dock wider than the average Chicago street. When the building was first contemplated, the owners had searched for a flat site, but the architects converted the slope of this parcel into an asset.

The first floor is office space, and on the five upper floors manufacturing operations are lined up on the perimeter of the building to take advantage of natural light and air. Processing of leather, the basic manufacturing material, is planned in a series of operations which progress around the perimeter of the building, starting on each floor at the elevators and moving around the entire perimeter, ending again at the service core. This emphasis is born in the importance of daylight in matching leathers and other colored materials.

Four shapes were considered for the structure (see sketches at left). The E plan was discarded because of the narrowness of the courts, high square foot area, and large number of angle turns in the production flow. The H had the same faults and in addition lacked the long north exposure to efficient light. The U produced the proper relation of daylighted perimeter to minimum area—200 ft. more perimeter than the rectangle with about 3,000 sq. ft. more area (none of it interior waste space) and good cross ventilation.

In order to be sure that the north light would not be blocked by future building on that side of the Florsheim plant, the factory portion above the first floor was set back 25 ft. from the lot line. Similarly, the mechanical core, which is fundamental to all floors and which would have floated in the center of the rectangular plan, is placed on the exterior also, gaining natural ventilation and daylight for lockers and toilets.

The tall ribbon windows in this light-thirsty building are neatly detailed, flush with the brick facing. Behind them the concrete frame takes the form vertically of round mushroom columns, a happy switch from the usual four-cornered fireproofing of set-back columns.
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Cost</th>
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</thead>
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<tr>
<td>Excavating &amp; backfill</td>
<td>$33,189</td>
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<td>Concrete piles</td>
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<td>Fire escapes</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$2,575,021</strong></td>
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**CONSTRUCTION OUTLINE:**
- **Exterior walls:** reinforced concrete spandrel beams faced with brick.
- **Steel:** E. F. Hauserman Co. Ceiling—reinforced concrete or Acoustone. U. S. Gypsum Co.
- **Roofing:** Koppers Co. **Insulation:** Celotex Co., Zonolite Corp., and U. S. Gypsum Co.
- **Windows:** Sash—projected steel. Truscon Steel Co. Elevators—Westinghouse Electric Corp.
- **Finish flooring:** Lobby—Marbelette, Marbelette Co. Office area—rubber tile, Hood Rubber Co.
- **Plant area:** Industrial Mastic, The Flintkote Co.; installed by Cemansco Co. Private offices—carpet.
- **Wall coverings:** Wood paneling.
- **Doors:** Dahstrom Metallic Door Co., The Kinnear Mfg. Co., Pittsburgh Plate Glass Co.
- **Plumbing fixtures:** Crane Co. Toilet partitions—Sanymetal Products Co. Pumps, etc.—Well Plumbing Co. Water heater—American District Steam Co. KITCHEN EQUIPMENT—Imperial Restaurant Supply Co.
recent years competition among shoe stores has been so keen
they have been forced to do the very best planning of their space
equipment. As a result, there is no type of store which has shown
better progress in developing improved design.

Three of the best new shoe stores are shown on these pages. All of
them have been notably successful, though it would be hard to im-
agine how three stores could be much more different. Their variety
goes all the way from the almost monastic simplicity of the Coward
store in Brooklyn to the Hollywood lushness of the Innes store in Los
Angeles; from a stern steel mesh wall to an all-glass facade and on to
"open-air plan" in which it is hard to tell where the outdoors ends
and the store begins.

There is still no one best plan for shoe stores. There is still plenty
room for individualism, imagination and creative planning.

Located in the base of the new Prudential Building in Los Angeles,
the store pictured at the right is designed as an enticing customer
map, baited with $3,000 worth of ornamental vegetation (some
growing, some dead) which serves as the backdrop for shoes priced
at $3 to $70 a pair. Various optical tricks are used to pull the cus-
tomer's eye—and, indeed, the customer himself—into the store. At the
main entry (large photo) a kidney-shaped showcase rolls right out
onto the sidewalk and exterior showcases and planting are carried
into the store—right through the glass front which, during store
hours, is rolled out of sight. Thus, the window shopper is led into
the store without knowing it—the epitome of the open-front idea.

A second entry on this Wilshire Boulevard front features heavy red-
wood frames built in perspective to entice men into their half of the
store. Its front is a thin all-glass showcase which is revolved 90° dur-
ing business hours to open the store to the street. A third entry at the
rear, opposite a huge parking lot, is equipped with another disappear-
ing glass wall. By manipulating the three movable fronts, the store
manager controls the breeze which comes from the sea each afternoon
and, during hot weather, provides natural air conditioning.

Inside the store, the mezzanine, carrying rest rooms, lounge and
executive offices, is screened with a translucent glass front facing the
main entry. It is decorated with a back-lighted floral motif and serves
the dual purpose of attracting sidewalk observers and lighting the
center of the shop.

Although admirers of stark simplicity will probably raise their
eyebrows at the store's jungle-like decor, and its somewhat confusing
subdivision of interior space with huge floating planes, no one can
deny the store's success. Says the manager: "we are doing better than
twice the volume of business we anticipated."

Total cost: $159,000, excluding carpet and furniture. The three
store fronts cost $20,000, including the sliding glass panels at $1,100
each, the revolving showcase at $2,100 and the exterior display cases
at $5,655. Vertical scoring of plaster for decorative effect added 50
cents per sq. ft. of wall. Recessed ceiling spotlighting cost about the
same ($1.50 per sq. ft.) as regular commercial incandescent lighting
but required one-sixth as many fixtures and produced a better, more
attractive installation.

FINISHES AND EQUIPMENT: STRUCTURE—metal lath and plaster, Flag-
crete veneer. Interior partitions—scored plaster and scored wood with redwood
striping, gunmetal mirror top and clear mirror sides. FINISH FLOORING-
carpet and asphalt tile. WALL COVERINGS—cork insulation, Armstrong
Co.; Sanitas—Interchemical Co. FURNISHINGS: Chairs and tables—Paul
Frankl. Counters and display—Burton A. Schutt. METAL TRIM AND HARD-
WARE—Kawneer Co. ELECTRICAL INSTALLATION—Rudolph Wendel.
Wood nymphs—Mel Hoffman. Circus mural—Tony Duquette. Glass screens—
Mississippi Glass Co.
Half of the front opposite the rear parking lot is completely opened (by a disappearing glass wall) to the children’s department which features a depressed circus ring complete with a rug of saw-dust-like appearance and hobby horse chairs.

Cork and redwood walls give a rich, warm feeling to men’s department. Cork panels of various thickness (1 to 6 in.) and sizes cost only $175.

Photos: Julius Shulman
2. Glass front store in Philadelphia

OSCAR STONOROV & LOUIS I. KAHN, Associated Architects
CRONHEIM & WEGER, Mechanical and Structural Engineers
JOHN A. ROBBINS, INC., General Contractor
OWNER: Coward Shoe, Inc.

With a facade of large glass panels—immediately revealing the organization of the two sales floors within—this store uses surprisingly direct design to introduce the wares of a conservative chain of shoe stores to the conservative city of Philadelphia. The far-sighted owners, however, were planning on a 20-year basis and had no wish for a store that would be outmoded within a few seasons. The architect's formula made sound commercial sense in terms of their own business policy—"modern without tricks." Intelligent conservatism resulted, moreover, in a design bonus. For once, the neon name-sign is hung behind the glass wall where it can be clearly seen without disrupting the well-proportioned framing lines.

The very simplicity of the design is due, of course, to a whole bagful of architectural tricks. They were needed, first, to pare down an obsolete nine-story building to the present three floors (thus avoiding a fire-tower and outside stairs). Columns, walls, and all possible material of the old store had to be salvaged. Complete air conditioning, lighting and heating systems were introduced and integrated in a single duct running from front to back. Departments for men's, women's and children's shoes and accessories were all coordinated without rigidity. Decoration was limited, both by budget and conviction, to carefully-planned color schemes and handsome cabinet work. The draperies, drawn partway behind showcases on the first floor, manage to satisfy two entrance requirements that are usually found contradictory—an open front plus generous display space.

Another store-front puzzler—how to emphasize a glass door set in a glass wall—has been ingeniously solved by setting three spotlights directly above the door frame. These are reflected by sinuous teakwood doorpulls and a sparkling black granite panel bearing a small white marble plaque with the owner's name.

The glass front cost $14,000; the rest of the store—$81,000, excluding alterations to the building.

This open front stretches to unusual proportions revealing the second-story as well as ground-floor sales department. The three upper rows of glass panels (as shown in the vertical section above) are of tempered glass in accordance with fire regulations; the two lower ones are of heavy plate.
3. Steel front store in New York

SANDERS & MALSIN, Architects; DON REIMAN, Associate
KENNERLY CONSTRUCTION CO., General Contractor
OWNER: Coward Shoe, Inc.

Bargain design of the year is this ingenious, good-looking storefront. Its assembled panels of expanded metal lath on steel frames (see detail drawing), took only three men and one day's work to install. Its cost—including fabrication, finishing and shipment—was only $550! Another advantage of the paneled front is its flexibility: the panels may be refinished in different colors or temporarily replaced with panels designed to promote sales and seasonal trade.

The design of this store was not intended to gain prestige but to serve customers already convinced—it was a well-established chain store in need of renovation. Work had to start from the bottom up. The building's inadequate frame was bolstered by a load-bearing wall (8 in. brick) which separates sales and stock areas in the basement. Three stories were lopped off the old building and new sprinkler, air conditioning and heating equipment was installed. Inside this improved shell, the new store, its equipment, finishes and fixtures were completed at a cost of $65,000.

The existing floor plan was retained as extremely workable—men's and women's shoes on the first floor with separate entrances on adjoining streets; children's shoes in the basement. The addition of an accessories bar running behind the men's department allowed placement of an auxiliary women's entrance on the main street. Stairs down to the children's department were set right inside the principal women's entrance. Its separate basement location is satisfactory since 90 per cent of children's shopping is done on Saturday, leaving the department gloomily empty most of the week. The clean-cut severity of the store allows for the addition of other display cases and decoration later on. Straight chair rows, moreover, are efficient for salesmen who may be called on to serve six customers at a time.

second thoughts on FORUM's October reference number
by Architectural Editor Douglas Haskell

As FORUM's school issue went from concept into actual execution, it became more evident to those in charge of the assignment that there was a hiatus between some of the earlier and some of the later pages. We started off in the thought that the progressive architects of the thirties and forties had found a valid school form, and that the next assignment was to put it into efficient production at large scale. We ended in the belief that the fifties would produce a school form of their own, as different from the "finger plan" of the thirties as that was from the stacked-up monumental plans of the twenties. Starting off our case studies, we revisited the most remarkable of all U. S. schools of the past ten years—Acalanes High School, east of San Francisco—remarkable because of the foresight and consistency with which it set forth and carried out the advanced pattern of the late thirties, the so-called "finger plan." But, 20 pages further on, we introduced a scheme as different from this as it could be. It was not a shredded-out affair of one-room-wide finger wings, but a rectangle all compact and completely regular in outline. The one major similarity was that both schemes were only one story high and had the same list of classrooms and other facilities. Another contradiction: although the discussion throughout the magazine spoke most favorably of "temporary" programs, and said that the development of a superior "temporary" school was a major assignment, the "FORUM school" was outstanding for the fact that the structure, once built, could well stand where it was for a very long time, with changes in type of use taking the place of changes in structure. If a district changed from a residential to an industrial one, the school would not move with the children but could easily be changed over to light industrial or office use.

Dilemma in California

There is reason to believe that even in California the heyday of the spread-out finger plan type of school is past, even though some of the best practicing school architects of the state vehemently deny it. Finger plan schools—sprawling spread-out affairs with open corridors racing alongside single-depth strings of classrooms—will no doubt continue to be built in profusion. But not in the larger cities.
It turns out that one of the great necessary favoring factors is plenty of land—but in neither San Francisco nor Los Angeles is there plenty of land to be had. The sites which Consultant Nicholas Engelhardt was finally able to obtain in San Francisco when he came in to guide a major program indicate only that he was prepared finally to grab one horn of a dilemma. In order to get ample acreage for school grounds, he had to accept bad and expensive building sites. It will be surprising indeed, on some of those rocky slopes, if the architects do not have to reach for multi-story plans, not only to justify the expensive foundations, but to find space for the requisite classrooms.

Had Engelhardt chosen the other horn of his dilemma, he would have been compelled to condemn existing buildings—most of them row houses on compact 25 ft. lots—and to obtain his land at higher initial cost besides creating a problem of displaced persons. On those flat but more limited sites (which some of the best San Francisco architects would have preferred to see chosen), a school type of the sort forecast by FORUM would offer the nearest possibility of saving the advantages and economies of a one-story school while still conserving land as compared to the finger plan.

In Los Angeles there is a prevailing opinion that there is still plenty of land, and this is only because a big factor of general ecology is the responsibility of no one individual and passes unnoticed. In semidesert land reclaimed at great cost in irrigation, there is the same essential conflict between agriculture and urban development that exists in crowded England, where spacious garden cities collided with the needs of agriculture during the war. The orange groves that have been wiped out by developers cannot be replanted high on the sides of canyons; somewhere the process will have to come into balance.

In New York City, another dilemma

In relation to New York, FORUM made an error and is seeking to learn from it. By arithmetic which showed no flaw, FORUM came to the conclusion that one-story schools would be possible and economical even in Manhattan Island's expensive congested areas, because of the great saving in nonfireproof materials and simple lightweight construction. The school board replied quite correctly that, in view of the vast numbers of children per acre in the new dense 13-story private and public housing projects, it "would have to fill the Hudson River" to find the requisite space. "Who would not like to have one-story schools?" asked the board. What FORUM had actually stumbled on was a fact pertinent indirectly to schools and directly to congestion. The erection of these great building-canyon areas, to densities of 400 to 600 people to the acre, may be profitable to the proprietors and private and public housing projects, it "would have to fill the Hudson River" to find the requisite space. "Who would not like to have one-story schools?" asked the board. What FORUM had actually stumbled on was a fact pertinent indirectly to schools and directly to congestion. The erection of these great building-canyon areas, to densities of 400 to 600 people to the acre, may be profitable to the proprietors and may superficially appear to be the best way out for the city, but is a most costly undertaking for the community as a whole, in other words to the taxpayers, in terms of city services.

On the subject of the school plan, it seems that the dominant factor, overriding differences of climate and cultural temperament, is the increasing scarcity and costliness of land, especially in large cities. Where cities are sensibly consistent in their density, and density is consequently not too high, the one-story school of compact plan, such as FORUM offered for consideration as the school of the '50s, would seem to be the optimum plan for low cost and for maximum benefit to the children. But where special conditions obtain, it would be foolish to demand the exact same plan. On rocky slopes and narrow ledges in San Francisco, two- or three-story wings with balcony-type side corridors, would seem the most probable candidate. And for a congested area like New York's Manhattan, the appropriate researches have not yet been made.

There is another aspect of the school program—the time aspect—on which we stirred up the new ideas only to find, in the end, that we wanted something still better. The old idea of a school was something monumental and everlasting without change—an obsolete idea. The new approach has been to try for a superior temporary school, and so long as city development continues in its present day wild manner—whole towns of 25,000 to 50,000 people springing up, inside the city framework, virtually overnight—FORUM will continue to favor the development of decent and agreeable temporary schools in place of the shabby eyesores of the usual "temporary" program. But what fails to make sense is an unplanned and unreasoned rushing back and forth of people and neighborhoods forever. Still better than a building that can be moved as its use moves with the neighborhood is a building that can stay put and still remain useful over a long time.

Temporary schools or multi-purpose buildings

No one watching building operations over an extended period of time can fail to notice the strenuous efforts to conserve past labor (and the cost of it) by converting existing buildings not only from one to another arrangement within the same kind of use (as a brownstone house might be cut up into apartments) but, more important, the frequent conversion of an old building from one kind of use to an entirely different one (as a brownstone might be converted into a group of offices). The success of this effort has been mild at best. It is well enough to say, as advanced thinkers have said, that we would be better off if the old building had been so designed that it could either be moved away or reduced to scrap with high salvage value. But there is yet another possibility that might be even more economical. If we could think our way through the jungle of different uses and group these uses, we might find some large related groups among which an interchange would be relatively easy because of a major overlap of common factors. For example, schools and industrial offices and light industrial plants all provide for large numbers of people to work steadily under conditions favorable to close visual tasks. If a building were flexible enough designed in the first place, it might be convertible with relatively small loss from one of these uses to another. In that case, we would not need to worry about permanent building material's outliving a "temporary" school in which they have been installed under the theory of quick obsolescence, for fear the neighborhood might move and the school board have a large investment stranded. Instead, the building could stay, if the neighborhood changed from a residential to an industrial or commercial one, but the use of the building would change from school use to industrial or commercial use.

From schoolhouse to factory

If the plan drawn by Nowicki for FORUM is re-examined, it will be found that such conversion would be quite feasible. The "school" is built entirely of 24 x 24 ft. bays, well suited to commercial office or light industrial use, and the interior is entirely independent of windows for its lighting, and every partition is completely movable. Another advantage of the method of design is that the square bays, built as economical individual units, can be erected or removed individually at will. In other words, the entire site of the building becomes a vast checkerboard, on which any desired square or combination of squares can be put under shelter. So, in case conversion is made into office use, the interior area can be converted into a series of the most charming garden patios.

This idea of interconversion between one kind of building use to another is not to be lightly dismissed. We are already using the "loft" type as a basic type which is usable either for industrial or commercial purposes; the loss of functional refinement is offset by the economy. We might well start thinking through our building types, not as "schools, churches, auditoriums, offices, lots" but more abstractly according to numbers of people accommodated, "traffic flow, requirements of light and sound control, electric current" and all the other functional features. There might emerge some astonishing cross- combinations, such as Nowicki has hit upon in the case of his FORUM school, convertible to commercial or industrial purposes.
WAR MEMORIALS

A review of their first public showing

"Dignified . . . durable . . . somewhat monumental . . . with special care against the penetration of water . . . and against condensation . . . Chapels in raw climates should be heated"—these were the salient directives which produced the 15 memorial designs (six typical ones are shown) that will commemorate the soldiers killed in World War II. They will be erected within the next two years to mark the 15 permanent U.S. cemeteries throughout the world. The architectural firms privileged to execute this great task were chosen by the American Battle Monuments Commission, with the Philadelphia firm of John Harbeson as architectural consultant. Chosen architects were approved by the National Fine Arts Commission.

In November, the designs for these monuments were exhibited publicly for the first time at the Philadelphia Art Alliance, which had collected models and plans. Topography and layout of graves were shown, as well as the small undenominational chapels which serve to mark the axis of each design. The museum bulletin summed up the project in a somewhat cryptic sentence: "The war memorials exhibition," it said, "is the absolute expression of American architecture designed to memorialize our dead on foreign ground."

Some might find in these words a view too cynical and pessimistic—but no one was likely to claim that these cemeteries had matched the sad triumph of war by any comparable triumph of art. 

(Other reviews appear on page 116)
The four photographs on this page at first glance may seem to have as little resemblance in family as in scale. In descending order they are: a hangar in Chicago engineered by Ammann & Whitney (Aymar Embury, architect) in 1948; a recent chicken egg; a test factory bay erected at Biebrich in Germany in 1931; and Robert Maillart's famous Cement Industries Hall at the Swiss Exposition in Zurich, 1939.

What these structures have in common is the principal of their strength, which lies in shell concrete construction. Shell construction can be thin because its shape makes it very strong; the material used can be very light, with a remarkably low ratio of dead weight to span, because the distribution of the stresses is over the entire membrane . . . a piece of paper, flat, cannot support even itself, but when the same piece of paper is curved, and held in the curve, it is very stiff in certain directions.

The clear span of the hangar above is 257 ft.; its shell is 3\(\frac{1}{2}\) in. thick. The egg is as big as most chicken eggs and its shell is as thick. The test factory bay was 24 x 24 ft.; the thickness of the shell was 19/32 in. at the crown, increasing to 1 in. at the edges—and there are 50 people standing safely on it in the photograph. The Zurich Exhibition hall was 52 ft. 10 in. wide, 37 ft. high, and 70 ft. long. The shell thickness was 2\(\frac{3}{8}\) in.—tested to failure, it had to be demolished partly by explosives.

Historically the thin shell owes something to the great domes and arches of antiquity, but not very much. The Romans were, in their day, masters of concrete and of the arch but they never began to appreciate the spanning possibilities in the plastic nature of concrete. Some remarkable domes and vaults were built later of stone, but they were thick and heavy compared with what is possible with shell design. The dome of St. Peter's spans 131 ft., weighing 10,000 tons. The shell concrete domes in the market hall in Leipzig (1929) span 240 ft., weighing 2,160 tons.

Development of techniques in the use of reinforced concrete as a shell membrane, which started in Germany in the 1920's, have come a long way and have been proved in practice. Some concrete shells have been refined beyond the dimensions of the egg shell in thickness compared with span.
These techniques are not widely known in this country, however, where there is great opportunity to apply them in structures like assembly halls, markets, auditoriums, terminals, hangars, garages, factories, arenas, gymnasiums — any of the many single story buildings where there is a problem in spanning.

The three most usual types of shell concrete construction are domes, cross-barrels, and longitudinal barrels. Although there are invariably ribs in the longitudinal barrels, where the arch of the shell has a long span, cross-barrel shell roofs are composed of series of cylindrical barrels of comparatively short radius without ribs. Other types are rectangular shells curved two ways, and polygonal domes formed of cylindrical shells.

The technical advantages of shell concrete may be appreciated by comparing the design of a shell cross-barrel vault and the traditional vault. Almost all forces in a traditional vault are directed down and outward from the sides in thrust. The shell cross-barrel, on the other hand, acts lengthwise as a beam to a great extent — held in shape by stiffening ribs at the ends and edge beams — and so supports its own dead weight and any applied load with comparatively little thrust. Stresses are distributed . . . the analogy of the curved piece of paper is a valid one.

Longitudinally, tension occurs at the lower edge of the shell and compression at the crown, connected by shear in the barrel of the shell. When a shell barrel is cantilevered longitudinally, the stresses reverse themselves as they would in an ordinary cantilevered beam — there is tension at the crown and compression at the springings.

Shell domes can be remarkably flat, as compared with traditional domes. The dome built at the Electricity Works, Frankfurt A. M., Germany, in 1928, rises only 11 ft. on a span of 85 ft. The shell is 1 9/16 in. thick. The great advantage of shell construction is apparent.
in the fact that increased spans do not materially increase either the thickness required in the shell or therefore the total dead weight of the spanning roof.

More conventional skeletal spanning materials are very strong, but their own weight usually rises alarmingly as the span lengthens until they reach the limit of usefulness when they carry only themselves and cannot be loaded.

Advantages of shell construction to the building owner are immense. The list begins with maintenance.

Shell roofs do not have great steel trusses to be cleaned and painted periodically; the ceiling is clear . . . and, if the shell is located at the bottom of the stiffening ribs, the ceiling may even be entirely smooth. The absence of trusses also means that the full ceiling height can be utilized within the building.

The curved surfaces of shell concrete structures are easy to light artificially, making a good reflective surface with no shadows. Shells may be insulated against both heat and reverberation by the application of thermal insulation and sound absorptive materials; the thermal insulation sometimes is provided in the use of lightweight concrete as the structural material. The acoustics may be difficult in a space roofed by a single large shell. A series of smaller cross-barrel shells is often better.

The opportunities for natural lighting are excellent. Shell roofs may be pierced for glazing without interrupting the simple shapes, or can be planned to admit light by building various special shapes. One such shape, for continuous roof lighting, is the unsymmetrical barrel, with a north strip window. Cantilever or butterfly shell roofs can also be designed for continuous windows. Once the daylight is inside, the unobstructed curves of the shell roof make an excellent surface for reflecting and diffusing it.

But the biggest advantage to the owner of a shell concrete structure, especially among wide span structures like arenas, rollerskating rinks, hangars, and some factories, is the fact that his structure is a very good bet in a fire. Even if the building is burned out the structure likely will survive. Severe fires in a shell concrete textile factory in Buenos Aires and a shell concrete hangar in the U. S. both failed to collapse the structures, which almost surely would have gone down had they been conventionally steel framed.

Two wars have tested concrete shell structures. In the Spanish Civil War, the famed shell roof of the Fronton Recoletos in Madrid was hit by a shell which knocked a 6 ft. hole in it, but left the structure still standing, otherwise unaffected. A team of assessors sent to Germany by the British Ministry of Works in 1946 reported that shell concrete was the most impressive modern building form found in Germany, according to Building Digest, the English magazine. Many of the barrel vault roofs examined had been damaged by bombing, but demonstrated the high resistance of shell concrete to blast. Although damage was sustained by buildings in heavily-hit areas like Essen and Hamburg, the structures survived.
Clear span, 340 ft.—that is the record of this enormous shell concrete hangar just completed at the Rapid City Air Force Base in South Dakota for the U. S. Army Air force. It will house for repair two of the army’s huge B-36 bombers, or six B-29’s. Length of the hangar is 300 ft., leaving a covered area of 102,000 sq. ft. uninterrupted by columns. The crown of the hangar is generally 5 in. thick but commencing 60 ft. from the springing lines increases to 7 in. at the spring line—the diagramatic cross section of this vast structure at the top of the page shows the shape of the barrel, if not its scale. Reinforced concrete stiffening arches are spaced 23 ft. apart, resting on heavy 14 ft. long pedestals which double as partitions in the flanking service wings. Engineers for this $1.8 million hangar, and a twin now under construction in Limestone, Me., are Roberts & Schaefer, who have designed shell structures in the last 16 years roofing a total of almost 10,000,000 sq. ft. Their biggest single job, in area covered, was the general depot (air view below) at Columbus, Ohio, for the Army Quartermaster Corps. Built in 1941, it covers 2,676,000 sq. ft.

The concrete design of the depot was originally bid as an alternative to a basic design of steel trusses with wooden decking; the concrete shell cost only about 1 cent per sq. ft. more than the low bid based on steel and wood deck. Each warehouse unit is approximately 180 x 1,600 ft. The roof structure for one of these complete units was constructed in 38 calendar days.

When future architecture historians settle down in their libraries to write about shell concrete in the U. S. and the rest of the world, economic differences may not be so evident as they are today. But it is the economic
situation which for some years has held the U. S. behind other nations in the development of highly refined designs in shell concrete.

The U. S. has more materials but does not have so much time. In other countries this situation is reversed in varying degrees. They have less of industrial materials like steel, and their labor-time is much cheaper. So it has been to their economic advantage, but not ours, to build with painstaking precision in order to conserve. Since it is estimated that spanning even small areas with shell concrete uses only about 40 per cent of the steel necessary to frame the same spans completely in steel, shell construction has been worth a great deal of study abroad.

There are three major time-consumers in the more complicated shell concrete techniques as opposed to other structural methods: design, placing of steel reinforcing, and formwork.

A good example of the first is the fan-shaped double-curved concrete shell roof of architect Vilhelm Lauritzen’s broadcasting station concert hall in Copenhagen. The design calculations for this roof reputedly required the full time work of four engineers for six months. Design procedures in this country for less complicated shell structures have been well ironed out, however, and the design-time problem is not excessive for many types of shell structures.

Placing the reinforcing mesh and bars for delicate shell structures has also been in the past a time-consuming operation of importance. (See photos and partial chart for reinforcing for domed market hall in Algeciras, Spain right below.) But engineers now are overcoming this objection also in the U. S.; use of welded wire mesh has reduced the number of bars necessary and cut down on time for this part of the operation.

The formwork has been the biggest obstacle to making shell concrete structures comparatively as economical in the U. S. as they are abroad. Photograph (right) of forms for the Hayden Planetarium built in New York City in 1934, one of the country’s first shell structures, are an indication of the care which must go into their shaping. Below are photographs of formwork for Maillart’s exhibition shell at Zurich, and the shell after removal of forms (see also page 101). It is doubtful whether the financial problem of such domed forms and intricate barrel forms, used only once, will soon be overcome in the U. S.

The problem of forms for simple barrels has been mastered, however, through use of traveling formwork, standard practice in constructing hangars like the immense structure at Rapid City. In this system a wooden form is built large enough to cast one or two bays at a time, and the shell of the structure is poured progressively section by section. The economy of this construction depends principally on repeated use of the formwork. The movable timber formwork at Rapid City was 50 ft. long, 340 ft. wide, and 90 ft. high, and cost about $85,000 to build, including the skin. It involved 280,000 board feet of timber weighing 500 tons. (A windstorm completely demolished this scaffolding during the job, and delayed completion of the hangar four months.) An even more efficient type of formwork is now being planned, using steel arches instead of scaffolding.

The three deterrents to shell construction in the U. S. are not unconquerable. Now that the time-money equation is being tampered with by our engineers, prospects
Experimental prefabricated house, cross section above, has precast shell concrete roof with no beams, spanning 42 x 25 ft. Side walls are concrete frame with prefab insulating panels made of pressed corn fiber. Kitchen-bathroom unit of steel frame construction is placed near the center of the house, with separate subroof and ventilating stack up through shell roof. Precast concrete panels are joined with bolts.

are good for much more of this type construction, taking further advantage of European developmental work. Here are two examples of favorable cost factors in concrete shell construction, and of the use of shell concrete not in monumental structures, but to meet common building problems. That is not to say that either of these projected buildings are prosaic solutions.

The model (see cross section left) is of a prefabricated house now being tested in Colombia, South America. Its architect, Alvaro Ortega, has used a very light shell roof over the simple structure, which is designed to sell for $2,500. (Future issue of FORUM will feature details).

The rendering is of an Athletic Practice Building for the University of Wisconsin, designed by Amman & Whitney, who were given the first annual award for the development of reinforced concrete design by the Concrete Reinforcing Steel Institute this year for their work in shell concrete. The engineering firm made a cost study (condensed below) of various methods of constructing the required 190 x 400 ft. clear span. Included in the cost estimates are roof framing, roofing and insulation, abutments and foundations, and additional end and side wall areas required in the different layouts. Concrete shell construction was the choice. Another job now under construction, an arena in Montgomery, Ala. (Forum April 1949) is an even more convincing demonstration. Comparative roof bids were taken on alternate designs in structural steel and reinforced concrete. The steel bid was $599,000; concrete bid was $577,500. Time for completion was 500 days for concrete against 730 for steel, a saving of 230 days in the use of shell concrete.

Continuation of events such as these may shortly work a great change in the American roof line, as shell concrete takes a firm place in U. S. building.

### COMPARATIVE COST ESTIMATE OF METHODS OF ROOFING FIELD HOUSE, UNIVERSITY OF WISCONSIN

<table>
<thead>
<tr>
<th>FRAMING TYPE</th>
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<tr>
<td>LAMINATED RIB</td>
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<tr>
<td>ARCHED TRusses</td>
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</tr>
<tr>
<td>STEEL</td>
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<tr>
<td>ROLLED BEAM</td>
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<tr>
<td>SHELL</td>
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<th>SECTIONS</th>
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**Note:** All figures are exclusive of contractors profit, insurance and contingencies.
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Nagin sums up the prefabber's financing picture succinctly: "We can make our houses in a hurry, we can erect them in a hurry but we can't finance them in a hurry." For both himself and his dealers, the question of arranging financing in a mortgage pattern geared almost completely to orthodox house construction is a crucial one. The great virtue of the factory-built house—speed of erection—is its greatest handicap when it comes to mortgage financing. In simple terms, Reliance wants to be paid for each house 30 days after it leaves the factory. But Dealer Lawrence can't pay for it until a mortgage is processed through the local FHA office—a process which takes anywhere from six weeks to three months.

Up to now, GI loans have formed the basis for most Reliance sales. In the Washington area, Lawrence gets a VA $10,500 appraisal on his house which equals the sales price and permits him to sell to veterans with no down payment except for minor settlement charges. A VA mortgage is only helpful, however, once the house is on the site. Unlike FHA, the VA program offers no means of providing money for site development. This means the dealer-erector must put up his own money for the streets and utilities as well as the slabs. And most dealers don't have that kind of money. To assist its dealers over this hurdle, Reliance has established a revolving site development fund with some of its RFC loan. In order to keep the bookkeeping straight, the dealer sets up a separate subsidiary company to prepare the sites and erect the houses. Reliance headquarters at the factory advances the subsidiary sufficient money from the fund to complete the site work. When the dealer gets his money at the mortgage closing, he pays his subsidiary for the site work and Reliance for the house. The payment to the subsidiary then goes back into the Reliance's revolving fund, and the cycle starts all over. The net result is that the erector-dealer gets some capital to help him along during the crucial days between the time he begins preparing the site and the time the sale of the completed house is closed.

However, neither the VA with its diminishing GI market nor this small revolving fund is going to be sufficient to help Reliance mass-produce enough houses to pay off its RFC loans and start making real money. One possible aid: Section 102-A of the Sparkman bill, now on the Senate calendar for consideration when Congress re-convenes in January which includes funds for financing the marketing of prefab houses.

Because of the molasses-slow pace of mortgage financing on the houses, the Reliance factory last month had an inventory of 70 houses, all on firm order from buyers. To correct this situation and prevent a slow-down of the production line, the company is out hustling for big-order business from public agencies. It already has a 350-house firm commitment under Pennsylvania's veteran's housing program and hopes to participate in the Federal government's new military housing program. Moreover Reliance is dickering with a big New York syndicate which claims it can market the house at a record sales price of $6,500.

In anticipation of a break-up of the mortgage blockade, the production line next month will shift to a two-bedroom house for the economy-housing market (see plan, above). This 728 sq. ft. house, designed for shipment on a single truck, will have an F.O.B. price of under $3,500, and, when erected on an East Coast lot, should make housing news with a sales price well under $6,000.
when you're working on
Truscon Metal Lath Products

Bill Scullz of Morelli Brown Plastering Co., Inc., knows how easily you can lay on the plaster and do a bang-up job with Truscon Metal Lath backing you up. He's one of the gang that did such beautiful plastering in the Astoria Housing Project shown here.

Tons of Truscon Diamond Lath, Corner Bead and Galvanized Tie Wire went into this tremendous group of apartments, assuring fine appearance of walls and ceilings for many years.

Truscon Diamond Lath is a flat metal lath, uniformly expanded throughout the entire sheet. Its use is almost universal, for it is adaptable for practically all classes of work—as a base for walls, partitions, ceilings, as a reinforcement for stucco, as a protection for steel beams and columns, and for protecting hazardous points in wood frame construction—such as ceilings under inhabited floors, especially over heating plants and coal bins, around flues, and back of kitchen ranges, stair wells, and under stairs. Diamond Lath has more openings in a given area, with a proportionate increase in the area of steel. The increased proportion of steel gives the sheets great rigidity. They are easily handled and quickly erected, and less time is taken in applying the scratch coat and truing up the wall than with ordinary diamond lath. The small openings prevent excess penetration of plaster, thus minimizing droppings. The larger number of openings permits the formation of more keys to give efficient bonding of the plaster to the lath. Write for catalog on Truscon Metal Lath and Accessories.
who simultaneously enter and leave their offices on the building's first 20 floors. (The lower 42,000 sq. ft. floors are occupied by as many as 500 employees each.) The largest moving stair installation in the world, it is said to have eliminated 16 elevators which would have occupied more space and would have cost more to install, operate and maintain. An alternate method of reducing the need for vertical transportation facilities—the staggering of employees' hours—was apparently vetoed as impractical. (The 7th floor is a huge company-operated cafeteria; the 8th is occupied by an employee's lounge, library, store and other recreation facilities.)

- Heating coils are embedded in the sidewalks to achieve automatic snow and ice removal (see Forum, Sept., p. 12).
- A public address system throughout the building may be used to "pipe" music to any individual department.

Architects & Engineers: Cram & Ferguson. General Contractor: Turner Construction Co.

Selling wax with architecture

Frank Lloyd Wright's famous Johnson Wax building in Racine has proved such a public relations booster for the manufacturer that he has commissioned Wright to add to the attraction. Last month the new attention-getter neared completion. It is a 156 ft. research and development tower comprised of 15 square and circular office floors of brick, concrete and glass tubing stacked alternately atop one another and supported by a central stem containing elevators and utilities—see photo, left, above.

As it must to all buildings . . .

The historic Hollywood Hotel in the movie capital is slated for demolition and replacement by a $10 million business center to include a hotel, press building, apartment building and retail mart. Architect William L. Pereira is designing the new "Hollywood Center."

* * *

In New York City the historic Flat Iron Building is to have its base "lifted." As shown in the combination photo-rendering above, Architect George Cooper Rudolph and Associate Designer Basia Benda are dramatically modernizing the Flat Iron's point with a new store for the Walgreen drug store chain.

Meeting of merchandise and museum

An entente cordial between art and business has been established by the Museum of Modern Art in New York and the Merchandise Mart in Chicago. Under a program called "Good Design," the sponsors will select and set up three exhibits of home furnishings a year (in January, June and November) at the Mart, whose 4,023,400 sq. ft. of floor space lay claim to the title of world's largest commercial building. All new or radically improved home furnishing designs are eligible for submission, to be judged according to "usefulness . . . production methods and materials . . . and the progressive taste of the day." "Good Design" cards of approval will be issued to all manufacturers whose products are chosen for exhibit.

Offices without windows

Contractor Walter C. Guest of Anderson, S. C. is so pleased with the many windowless plants he has built for the south's new textile manufacturers that he is now building completely windowless offices for his own staff.
A SINK FOR ANY TASTE

A PRICE FOR ANY BUDGET

SEE CRANE

As to the name, there is no question . . . your own customers have established Crane as the favorite name in plumbing.

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THE HOMEMAKER. This compact sink is ideal for small kitchens—basin, drainboard, and plenty of storage in a 42" space. Outlet accommodates General Electric Disposal.

CRANE KITCHEN SINKS range all the way from 38" to 72" in width, include such popular features as retractable hose spray . . . swinging mixing spout . . . finger-tip Dial-ese controls.
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An ideal surfacing material, combining beauty with durability — that’s General Electric’s Textolite, now distributed by Roddiscraft.

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FOR LONG ROOF LIFE

Shenandoah Life Insurance Company uses COPPER and Common Sense!

On the new home office building (right) for the Shenandoah Life Insurance Co., Inc., Roanoke, Va., this specially designed cupola (left) and the hipped roof are covered with over 40,000 lbs. of copper for lasting protection. Gutters, coping, facia and inside drains are also constructed of copper. Architects and Engineers: Smithco & Boynton; General Contractor: B. F. Parrott & Co., Inc.; Sheet Metal Contractor: Valley Roofing Corp.

Monumentally situated on a high knoll in Roanoke, Virginia, the new home office building for the Shenandoah Life Insurance Co., Inc. is an inspiring combination of functional design and architectural beauty. This building's all-copper roof and cupola have made history in Virginia's construction field. Gutters, coping, facia and inside drains are also all of copper—and all constructed in accordance with the scientific principles of sheet copper construction developed in the Revere Research Laboratories.

You will find complete information about these new principles in Revere's 96-page manual entitled Copper and Common Sense. This book is filled with data that enable you to design or install roofs, gutters, flashing, etc. that give extra years of service. By making full use of these data you can always be sure of fine and durable sheet metal construction based on sound engineering principles.

This book has been widely distributed to architects and sheet metal contractors, and probably is in your office files. Be sure to refer to it; and if you do not have a copy, write for one now on your office letterhead.

Revere products—including Sheet and Roll Copper, Lead-coated Copper, Thru-Wall Flashing, Reglet and Reglet Insert Flashing, Vertical Rib Siding, Copper Water Tube, Red Brass Pipe, etc.—are handled by leading distributors throughout the country. A Revere Technical Advisor will always be glad to consult with you without obligation.

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An outstanding feature of Richards-Wilcox Classroom Wardrobes is that the entire unit is designed to avoid overcrowding. The hat and coat racks accommodate eight or ten pupils for each door. Note slate blackboards mounted on wood doors.

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U.S. WELCOMES AUGUSTE PERRET

For almost 50 years, reinforced concrete has had a constant and powerful champion. Auguste Perret, dean of French architects, was undoubtedly the first to demonstrate, not only the versatility of this material but also its drama and delicacy. The great success of his efforts was celebrated last month at the University of Illinois by a photographic exhibit of the most noted of his many designs. In conjunction with this exhibit the French government sponsored a U.S. visit for Perret—the first the 75-year-old architect has made here.

To U.S. architects and engineers who have shown increasing interest in reinforced concrete, the great variety of Perret's work becomes more and more important. From his first building in Rue Franklin (1903), Perret has been a pioneer in testing the possibilities of the concrete slab. The Ecole Normale de Music, in Paris, showed its adaptability for excellent acoustics (it has been termed by musicians "a Stradivarius"); the docks of Casablanca introduced the thin concrete slab for roof construction; the Notre Dame Church at Raincy (interior view at right above) showed its unexpected dignity in decoration as well as construction.

Since the war the services of Perret have been more in demand than ever and he has now been put in charge of reconstructing the port and city of LeHavre, which were almost completely demolished by bombs. One of its apartment units is shown below. The reserve and restraint of much of Perret's design (coldness, it has sometimes been called) is partially due to the demands of concrete itself. It also reflects, however, Perret's sympathy with classic traditions and forms. His chosen goal is that most difficult one in art—"to create from new materials buildings that would seem to have existed always."—S.K. (Continued on page 120)
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Ask the Trane sales office in your area for a copy of “Merely a Matter of Air,” which covers the ABC’s of skyscraper air conditioning in general, from bulky central systems to ductless UniTrane.

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Data bulletin DS-420 is for architects and engineers... “Merely a Matter of Air” is for the non-technical reader.
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A far-sighted program has been undertaken in New York City—its aim, to acquaint high school students in that troubled town of the planning problems and possibilities which they will soon have to face. A thoughtfully-planned exhibit of text-panels, photographs and four handsome models will tour the city's 54 high schools, remaining a month at each school. This five-year plan was made possible by the tripartite cooperation of the New York Chapter of the A.I.A. which awarded its Brunner Scholarship to defray expenses; the work and ingenuity of Olindo Grossi (Chairman of the Department of Architecture at Pratt Institute) and a group of his students;

"Living in the City" group contrasts open super-block with tight brownstone strip.

Office space in the city is ideally separated from industry by green belt.

and the New York City Board of Education which will ship the exhibit from school to school and coordinate its showing with the curricula of various student groups.

In planning the exhibit, Mr. Grossi and his assistants have admirably avoided talking down to their audience. Teachers and parents will admire and learn as much from the show as will the students for whom it is primarily intended. "Living in the City" (top photo) contrasts the familiar block of brownstone houses with a spacious, safe, well-balanced super-block. "Living in the Country" illustrates the various factors that compose a suburban community—industry, stores, school, housing of various types. A large shopping center and a group combining a modern factory and a park-surrounded office building (lower photo) complete this view into the world of tomorrow.

(Continued on page 121)
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Are you ignoring the "WEARING PARTS"... when you design a building?

Don't forget floors when you design for permanence. They receive more wear and more abuse than any other part of a building. When floors become worn the whole building looks shabby.

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WRIGHT RUBBER TILE
FLOORS OF DISTINCTION

The exhibit was greeted by immediate enthusiasm which spread its influence to 35,000 other New Yorkers via television (Chuck Tranum's Manhattan Spotlight). At last hearing, local colleges were signing up the show for summer months when high schools would be closed.—S.K.

SCHOOLS WILL SEE THE WARES OF SWEDEN

Consul General Lennart Nylander and Gov. Richard Sandler (former Prime Minister of Sweden) look at panels portraying Swedish life.

Actual chairs, textiles and china pieces allow students to feel and experience the use of Swedish wares, as well as see them.

Sweden, too, launched an exhibit this fall in New York secondary schools. "The A-B-C of Sweden," assembled and financed by various departments of the Swedish government, began a five-year circuit this October—with a two-month stop-over at each school. Ten compact room-corners will bring young Americans into immediate touch with the fine and assured design which has been admired here for several decades. More than 60 designers and manufacturers contributed to its collection of furniture, lamps, textiles, china and silver. Eleven photo-mural panels supplement these actual objects by giving a glimpse into the manufacturing, farming and seafaring activities most characteristic of Swedish life.

This exhibit (as well as the architectural one described above) is circulated by the School-Museum Program of the New York Board of Education, headed by Charles F. Beck. Originally planned to handle exhibits drawn from nearby museums, it has intelligently broadened its scope to include as wide a field as possible. Student-practice in analyzing the design and utility of these products of Sweden, and in comparing them with similar articles sold locally, will provide first-rate object lessons in everyday craftsmanship.—S.K.
Furnishings by Chairmasters Inc., New York, N. Y.
Installation by Lewis Equipment Co., Albany, N. Y.
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Architectural concrete buildings like this that are designed and constructed to resist any weather conditions maintain their original good appearance and remain structurally sound indefinitely. Such durability is the result of applying the well-defined principles and procedures of quality concrete construction.

The beauty and durability of architectural concrete also make it ideal for apartments, hospitals, schools, factories, office and commercial buildings. Having long life and requiring little or no maintenance, architectural concrete renders low-annual-cost service, the true measure of construction economy. That's important to owners, investors and public officials.

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FLUORESCENT LAMPS WITH NEW PHOSPHOR cover wider range of spectrum for truer illumination of colors.

For eleven years the popularity of fluorescent lighting has grown like Topsy. High lighting efficiency, long life, coolness and operating economy are reasons. Its biggest shortcoming up to now has been the coldness of the quality of light because fluorescent lamps on the market are weak at the red end of the spectrum. But General Electric's recent development of a special fluorescent powder—the DR phosphor, composed of double-activated calcium phosphate—moves against that dis-

FLUORESCENT LAMPS WITH NEW PHOSPHOR cover wider range of spectrum for truer illumination of colors.

For eleven years the popularity of fluorescent lighting has grown like Topsy. High lighting efficiency, long life, coolness and operating economy are reasons. Its biggest shortcoming up to now has been the coldness of the quality of light because fluorescent lamps on the market are weak at the red end of the spectrum. But General Electric's recent development of a special fluorescent powder—the DR phosphor, composed of double-activated calcium phosphate—moves against that dis-

advantage. Revealing a wider range of the color spectrum, especially in the red tones, these lamps treat red roses and the human complexion much more kindly than previous phosphors. Householders who have confined their use of fluorescent lighting to the kitchen and shopkeepers who have hesitated to inflict efficient but unflattering light on products and customers will be able to adapt these new lamps to living room and salesroom.

By adding the Deluxe Warm White and the Deluxe Cool White to two lamps already on the market—the Standard Cool White and Standard Warm White (formerly known as Cool Tint and Warm Tint but renamed to simplify specification)—GE believes they have a line which meets all general lighting needs. Here is how the new lamp line is planned:

In working areas—factories, offices, schools, most stores—where highest lighting efficiency, cool atmosphere with reasonably good color rendition are desirable. Standard Cool White is recommended; for warmer atmosphere, the Standard Warm White. The latter combines the color impression of filament lighting with the modern appearance and efficiency of fluorescent, and so is best for minimizing color contrast between light sources in combination fluorescent-incandescent systems.

Where color needs are the primary consideration. Deluxe Cool White is said to be most suitable. Although the lighting efficiency of this lamp is not as high as the Standard Cool, its influence on atmosphere is the same and its over-all color rendition is far superior. Although emitting less light than Standard Warm White, the Deluxe Warm offers vastly improved color range. It is particularly applicable in social environments where appearance of colors and people have utmost importance, such as in beauty shops, restaurants and homes. Two decisions therefore govern the consumer's choice of lamp in this line: does he want a warm or cool atmosphere and does he prefer high lighting efficiency or optimum color rendition. The Deluxe lamps in 40 watt sizes are scheduled to join the Standard on dealers' shelves in January.

Manufacturer: General Electric Co., Nela Park, Ohio.
HIGHLY EFFICIENT FLUORESCENT SUN LAMP emits healthful ultraviolet rays without heat or glare.

Bringing simulated sunlight indoors to an entire classroom, office or factory is now feasible—and economically so—with this Westinghouse development. By transmitting a continuous concentrated band of mid-ultraviolet radiations (rather than an established wavelength as do other types of sun lamps) through a special glass tubing, the new fluorescent lamp renders the closest duplication of the sun's ultraviolet rays yet attained in a commercial sun lamp. Because it produces only a cool blue light and the invisible 2,800-3,200 Angstrom band (the most effective region biologically) it cannot cause the discomforts of hot and glaring lamps. It may be adapted for personal or space irradiation. Used for individual exposure and sun tanning, the lamp's long tubular shape gives broader, more uniform coverage. Installation for large areas can be controlled so that the intensity of ultraviolet is maintained at just below the level at which reddening of the skin will occur during a specified period, such as a workday. No special controls are needed; the lamp is identical in dimensions and electrical operation to a standard fluorescent bulb. It starts and restarts immediately without any warm up period and is said to last 4,000 hours, about four times as long as other sun lamps. Retail price for the 20 watt lamp is about $4.50 and a 40 watt size sells for $7.

The first fluorescent fixture for large area use to incorporate Westinghouse's sun lamp is the Sunlighter, produced by Leader Electric Co. In this fixture the sun lamp, which gives a soft light of low visibility, is combined with two lighting lamps. Specular Alzak reflectors direct the ultraviolet rays over a large area. Price is somewhat higher than comparable conventional fluorescent fixtures.


SPACE SAVING DISHWASHER, CLOTHES WASHER, SINK COMBINATION costs less than separate units.

Ideally suited for basementless homes where the kitchen must be a compact work center, Thor's new Automagic sink combines three essential functions. It washes dishes automatically, washes and dries clothes, and serves as a utility sink. In addition, when closed, it provides work table and storage space. Designed to take hard wear, the sink top is acid-resistant porcelain enameled steel.

A single dial conveniently located at the sink top controls both dishwashing and clothes washing operations, Equipped (Continued on page 130)
Marble gives substance to the magic of good design. It is a practical, economical material, noiseless underfoot, safe, sanitary. No other material so completely unites essential, enduring beauty with long life and low maintenance.

The adaptability of Marble to every new trend in good design and its appropriateness for every type of building, makes Marble unique among flooring materials.

Write Managing Director for latest literature on Foreign and Domestic Marbles.
Dept. 39-E

Marble Institute of America, inc.
108 FORSTER AVENUE, MOUNT VERNON, N. Y.
J&L Junior Beam Roof Purlins

Save Time and Money

On Steel Installation at Warren, Ohio

Light-weight, easy to handle Junior Beams give better job in less time at lower cost

J&L Steel Junior Beams for roof purlins for industrial structures save both time and money. This was clearly demonstrated recently in a building designed for Standard Transformer Co., Warren, Ohio, by Keich & O'Brien, architects, fabricated by J. A. McMahon, Ltd., Niles, Ohio, and erected by Warren Engineering Co.

As the building progressed, the purlins were bolted directly into place without any secondary handling or joining operations. Sag rods were installed and bolted in position, and steel roof decking was welded directly to the beams.

The speed of erection, elimination of secondary operations and ease of handling the light-weight Junior Beams, effected considerable savings on steel installed.

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From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in otiscoloy and sallion (aluminum steels).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

J&L Junior Beams are available through your favorite steel warehouse—or through J&L warehouses at Chicago, Cincinnati, Detroit, Memphis, New Orleans, New York and Pittsburgh.

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Send for descriptive literature and engineering data on J&L Junior Beams and J&L Junior Beam floors.

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Please send me complete data on J&L Junior Beams and Junior Beam floors.

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COMPANY ____________________________

ADDRESS ____________________________________________
IT HAPPENED IN LOUISVILLE!

In 1929, four International-Van Kannel revolving doors were installed at the Starks Building in Louisville...three at the street level and one in the basement. All replacing swing doors. Each of the doors has given uninterrupted service for 20 years.

This long satisfactory experience made revolving doors a natural selection for the recently modernized street entrances. Architect Joseph H. Kolbrook chose International-Van Kannel stainless steel crystal model revolving doors—with matching swing doors and trim—as the ideal modern entrance.

Incidentally, the 1929 basement wood revolving door was not replaced and still gives highly efficient service...even though it was under water for 3 weeks during the 1937 flood.
"the more expensive the house...

the more important
the roof...

writes Pennsylvania builder about choice of Dubl-Coverage Tite-Ons for swank Main Line development

"When homes sell for between $19,000 and $35,000—roofing materials must meet two key requirements," writes Stephen Schifter, Inc., Upper Darby, Pa. 

"First is appearance... the shingles must look as if they belong on an expensive house. Second—they must provide the trouble-free service expected from quality roofing materials.

"On both counts, Dubl-Coverage Tite-Ons filled the bill. Their basket-weave beauty is in keeping with the finest traditional architecture. And their proved wind and weather resistance promise more roofing years for the home- owners dollar.

"Builders like us prosper to the extent we keep home-owners happy. So, from our point of view, also, the choice of Tite-Ons was an ideal one.”

More and more builders are coming to the same conclusion. Wouldn’t it be smart to check the Dubl-Coverage Tite-On story yourself?

The RUBEROID Co.
Executive Offices: 500 Fifth Ave., New York 18, N. Y.
Building Materials for Home, Farm and Industry
PRODUCT NEWS

ROCKWOOL INSULATION WITH ALUMINUM FOIL costs little more than ordinary batts with paper backing.

Combining two noncombustible materials—a 2½ in. thickness of rockwool and pure aluminum foil—in one highly effective insulation. Seal Foil is priced competitively with ordinary full thick batts. The foil backing not only acts as a good vapor and condensation barrier but, equally important, stops 95 per cent of radiated heat. Because it does not tarnish, the aluminum will not lose its reflective qualities. Passage of conducted and convected heat is effectively halted by the specially compounded rockwool. The batt itself is clean, odorless and verminproof. It will not settle, pack down or cake. One man can tack or staple about 2,000 sq. ft. of this lightweight material in a day.

Manufacturer: Seulite Insulation Mfg. Corp., Waukesha, Wis.

WATER HEATERS now manufactured by Avco in tabletop and round models.

Electric water heaters designed for efficient and economical operation through thermostatic control have been added to the Crosley appliance line made by Avco Mfg. Corp. Both custom and deluxe heaters will be available in tabletop and round models. Prices will range from $89.95 to $189.95 in the round units and from $129.95 to $154.95 in the tabletop models. All heaters are completely automatic, equipped with controls that keep water at exact preset temperatures. Immersion type heating elements heat the water directly, and a thick blanket of glass fiber insulation between the storage tank and outer jacket greatly reduces heat loss. The tanks are of extra heavy duty steel manufactured under a special galvanizing process. Custom models are equipped with a magnesium anode rod that combats corrosion. Both tabletop and round types are attractively styled and finished in durable baked enamel. Tabletop models are available in 30 and 40 gal. capacities. They have recessed toe space and a porcelain work surface. The round tank models are made in 12, 20, 30, 40, 52, 66 and 82 gal. capacities. Both types are available with single or double heating elements.


(Continued on page 134)
The Bank of Nova Scotia Building will add still another note of modernity to the fast changing skyline of Canada's commercial and financial capital. And its elevatoring will add an advanced note of electronics to tenant service. For Otis AUTOTRONIC Traffic-Timed ELEVATORING is the only system that is timed to the 6 traffic patterns of the entire business day. It is the only system that measures passenger waiting time during rush hours, and automatically gives special service to the "forgotten man." It reduces passenger waiting time during all types of traffic.

In addition, Otis AUTOTRONIC Traffic-Timed ELEVATORING is dramatic. A passenger merely "touches," not pushes, an electronic directional arrow in the landing fixture. The arrow glows, the call registers, and a car arrives promptly—as if by magic.

Otis Booklet B-721-A explains how AUTOTRONIC ELEVATORING will increase the service prestige of NEW and MODERNIZED buildings and help to hold tenants at profitable rentals for years to come. Otis Elevator Company, 260 11th Avenue, New York 1, N. Y.

35 other NEW and MODERNIZED office buildings, hotels, banks and department stores have also bought this entirely new concept of elevatoring.
MAGNETIC CATCH holds cabinet doors firmly shut, releases them gently, good for 250,000 openings.

Designed for small hinged doors, Magnecatch is ideal for new cabinet equipment or for replacing weary mechanical catches. An Alnico magnet, working on a simple phosphor bronze spring mounted in a 2 in. rustproof housing, is the heart of the latch. When the door is closed the magnet contacts a small disc and grips it firmly, but releases easily when door is opened. Installation consists of setting three screws. Price for the Magnecatch is $1.25.

Manufacturer: Engineering Achievements, Inc., 1227 Tchoupitoulas St., New Orleans 13, La.

SIMPLE MAGNET LATCH AND PLATE cannot stick or fail to hold small doors shut.

Another lifetime magnetic fastener, Leco-Latch, consists of an ice-cube size polished metal latch and strike plate. This inobtrusive catch costs only 80 cents and is also very easy to install on cabinet and other small doors. It is available through local lumber dealers.


(Continued on page 136)
THE Finest IN WOODWORK BUILT, FINISHED AND INSTALLED BY ONE GROUP OF CRAFTSMEN

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1428 West Twenty First Street, Chicago 8, Ill.

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Serving Architects, Designers and Contractors For Nearly Half a Century

The beautiful new reredos in the First Congregational Church of Los Angeles is a striking example of the complete job of cabinet-work that Woodwork Corporation does. The entire structure was built in the Woodwork shops precisely to the architects' specifications. In the completely equipped Woodwork Finishing Department skilled craftsmen gave the reredos the richly beautiful finish the designers specified. Woodwork Corporation's factory-trained experts installed the job as carefully as it was built and finished.

By thus controlling and coordinating construction, finish and installation, Woodwork Corporation assures more efficient service as well as more beautiful work. For Woodwork's one-group control eliminates errors and delays and guarantees completion of work on schedule. Whether your plans call for custom woodwork on a large or small scale, you will be interested in knowing how economically Woodwork Corporation can serve you. To find out, simply send plans and specifications. An estimate will be promptly furnished.

WOODWORK CORPORATION, LOS ANGELES. ARCHITECTS, ALLISON AND BIBLE, LOS ANGELES

REDOS, FIRST CONGREGATIONAL CHURCH, LOS ANGELES. ARCHITECTS, ALLISON AND BIBLE, LOS ANGELES

The beautiful new reredos in the First Congregational Church of Los Angeles is a striking example of the complete job of cabinet-work that Woodwork Corporation does. The entire structure was built in the Woodwork shops precisely to the architects' specifications. In the completely equipped Woodwork Finishing Department skilled craftsmen gave the reredos the richly beautiful finish the designers specified. Woodwork Corporation's factory-trained experts installed the job as carefully as it was built and finished.

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Product News

Ceiling Space Now Pays Dividends

With the Famous Palmer Gas Fired Suspended Heater

Architects, builders, distributors and dealers all agree this is the finest, most efficient unit heater ever produced. Truly "the design of tomorrow." Palmer is equipped with automatic controls and embodies exclusive high performance features. Customers receive "heating comfort plus" without so much as lifting a finger.

Yes, with a Palmer suspended heater, ceiling space pays dividends in trouble-free heating efficiency, appearance and economy. Dividend-wise, Palmer will pay you too and many-fold. Simply specify Palmer. There's a model and size for every heating need.

Write for free literature today Dept. F-2.

Palmer Manufacturing Corporation
Manufacturers of the famous Sno-Breeze air coolers
Phoenix, Arizona

Low Cost TV Antenna Coupler eliminates metallic maze on apartment house roof tops.

Working on a party wire principle but allowing for individual channel selection the Telecoupler provides a means of operating a number of television sets from a single antenna at a reasonable price. The Model S-501, listing at $99.50 not installed, is effective in almost all TV receiving locations. It feeds up to eight television or FM sets and three of these units may be cascaded to serve 24 sets from the same antenna. The system, recommended for garden apartment installations, provides a high degree of isolation between two adjacent sets without appreciably diminishing the signal obtained by any one receiver. Consuming no more power than a 20 w. bulb, it may be installed at any location between the antenna and television receivers. For convenient installation in vertical type city apartment buildings. 24 Telecoupler Jr. units may be placed in individual apartments. Installed cost of this model, the S-502, ranges from $35 to $50 each, depending upon the number used and complexity of the installation.

Manufacturer: Television Equipment Corp., 238 William St., New York 7, N. Y.

(Continued on page 135)

Just Line Radiiluxxe Equipment for every Institutional Need

Whether your specifications call for some special type of equipment or for a standard size stainless steel sink, we can fill your needs.

Our many years' experience in the fabrication of built-to-specifications stainless steel equipment for hospitals, schools, laboratories, mass feeding institutions and industrial plants is your assurance that your equipment will be precision built to your requirements.

Write today for Literature F-12 and send us your specifications. We will gladly submit Details and Estimates.

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Architectural FORUM December 1949
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Mo.st cntliisiastic boosters for Alcoa Industrial Roofing and Siding are the contractors who have erected it; the plant owners who have tried it. They have found through experience and cost analysis that aluminum-clad buildings are quick and inexpensive to erect; that exterior maintenance costs are practically eliminated.

Alcoa Industrial Roofing can't rot, warp or shatter. It needs no protective painting. Light in weight, it goes up fast, makes for lighter dead load. Tough, corrosion resistant, it will support heavy live loads; will last for years without regular maintenance or heavy upkeep costs.

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This free book gives detailed information on engineering and erecting buildings using Alcoa Industrial Roofing and Siding. Call your nearby Alcoa Sales Office or write, ALUMINUM COMPANY OF AMERICA, 1866 Gulf Bldg., Pittsburgh 19, Pennsylvania.

Here are the Details
THICKNESS: .032 inches.
LENGTHS: 5, 6, 7, 8, 9, 10, 11, and 12 feet.
WIDTHS: Roofing sheet, 35 inches. Siding sheet, 33 1/4 inches, coverage 32 inches.
CORRUGATIONS: ¾ inch deep. 2.67 inches, crown to crown.

Load-Carrying Capacity

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PRODUCT NEWS

UN5TDNE

LAMP LINE features flexibility, moderate prices.

In these lamps, Greta Grossman has adapted two pleasing forms in four different ways. The coordinated line consists of a shell shaped wall fixture with flexible arm, a similar desk model, another desk lamp with shell on gooseneck plus a bullet shade on a swivel joint, and a floor model with both forms on adjustable arms stemming from an elongated metal rod. The goosenecks are brushed chrome and shades and bases are finished in subtle smoke gray to blend with most contemporary interiors. Wall and desk models with single shell are priced at $14.95 each. Desk lamp with both shell and bullet shades sells for $23; floor model for $35. Having almost limitless flexibility these fixtures may be positioned to offer either direct or indirect light. Because of their simple components, electrical or mechanical failure should be negligible.

Manufacturer: Greta Magnusson Grossman, 1659 Waynecrest Dr., Beverly Hills, Calif.

(Continued on page 140)

OUTSTANDING MANUFACTURING OPPORTUNITY

Dunstone ties in with today's demands for smart, colorful, low cost masonry for homes and other buildings. As a local manufacturing business it has broad market possibilities and opportunity for excellent returns. We supply all necessary plant equipment. Write for "Blueprints for Profit".

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poured on the job

Poretherm, a high-grade, permanent insulating cellular concrete is poured on top of asbestos cement boards, laid on Sub Purlins. This makes a fire-proof roof deck—weight, only 10 lbs. per sq. ft., provides the same heat insulation as 1 1/2 inches of cork, at lower cost. Write today for complete information.

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Dunstone has special appeal for builders who are masonry minded but cost-conscious. For Dunstone is not only the ultimate in quality and eye-appeal, but is available at a lower-than-lumber price. Low cost being due to its being made in a chain of local plants from local basic materials. Write for new brochure "Tomorrow's Silhouettes—Today".

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USES CHASE COPPER TUBE FOR RADIANT HEATING!


Big jobs... little jobs, Chase Copper Tube has the advantages that mean fast, economical installation... dependability! For instance: you reduce costly, time-consuming connections because Chase Copper Tube is available in coils up to 100 feet long. Its flexibility means quick, easy hand-bending! And no fittings are needed at bends.

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LOW COST
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Send for FREE book "Suggestions for Designing RADIANT PANEL HEATING with Copper Tube."

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The RUSCO Prime Window

... the only ready-to-install window unit that provides year-round, all-weather window conditioning

RUSCO gives you the most complete unit ever offered... glass, screen, weather stripping, wood surround... with or without Insulating sash... all in one factory-assembled unit... ready for quick installation... costs no more than you're paying today

Now... for the first time, you can specify and use a factory-assembled window unit that is extremely practical, durable and trouble-free... it is simple to install... that reduces field painting and installation costs... that provides for year-round safety, convenience, comfort and economy.

The Rusco Prime Window is the result of over 12 years of field experience... it is an adaptation of the basic engineering principles that have made Rusco all-metal, self-storing combination windows today's most widely accepted unit of its kind.

RUSCO LEADS IN DESIGN, CONSTRUCTION AND ADVANTAGES... All working parts of tubular Armco Steel, hot-dipped galvanized Ingot Iron Zinggrip... Bonderized and finished with baked-on outdoor enamel... All installation members of toxic-treated wood... Waterproof felt weather stripping assures weathertight closure... Requires no field painting... All glass and screen panels removable from inside... No weights, balances or cords... Smooth, trouble-free operation... Automatic positive locking in closed or ventilation positions... Easier window cleaning... Available with or without self-contained insulating sash... Complete unit offers the combined, year-round advantages of windows, screens, storm sash and weather stripping.

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DEPARTMENT 7-AF129 • CLEVELAND 1, OHIO

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LADDER ATTACHMENT provides comfortable and safe footing on any style ladder.

This practical new device affords a wider, more comfortable footing on ordinary ladders. It can be adjusted to any style or size ladder in less than a minute without any tools. The platform, or step, is 7 in. wide x 11 in. long and is made of sturdy 1/2 in., 5-ply water resistant plywood. Bolted securely to heavy gauge steel that fits over the rung of the ladder, the Add-A-Step is held in place by a steel rod which may be inserted to tilt the step to any desired angle. A safety lock fits over the rail of the ladder, giving additional stability to the step. Factory tested to carry 500 lbs., the apparatus retails at $3.75.

Manufacturer: Machinery Sales & Equipment Co., 626 Broadway, Cincinnati, Ohio.

WORM FEED STOKER has oil level cup to warn of water in the gear case.

Because water in the gear case impairs lubrication and is often the reason for stoker failure, Brownell developed its Type F stoker with a channel running from the bottom of the case to an oil level cup. If water accumulates, it forces a... (Continued on page 142)

PROVE IT FOR YOURSELF

One job will prove how fast Dur-O-Wal works — how inexpensive it is — how you can be sure of crack-proof walls.

ADD STRENGTH OF STEEL TO EVERY MASONRY WALL

With concrete block, the most widely used wall-building material in America today, builders must be alert to avoid cracks which sometimes occur in walls. The answer to this problem is new, patented Dur-O-Wal, the steel reinforcing material that makes block or tile walls crack-proof. Low-cost Dur-O-Wal gives masonry walls a backbone of steel. For lasting satisfaction on every job, recommend Dur-O-Wal. Write or wire for free sample, Dur-O-Wal, DE.

Color Bodies Block Co., 478 12 Ave. N. W., Color Falls, Pa.
PERMAGLAS WATER HEATERS CANNOT RUST
BECAUSE GLASS CANNOT RUST

The diamond-tough inner surface of A.O. Smith Permaglas Water Heater tanks provides the strength and durability of steel plus the rust-resistance of mirror-smooth glass. This glass-surfaced steel will not crack or chip under even extreme shipping, installation, and operating conditions. Extreme thermal shock will not crack or chip the special glass. Actual tests, plus the performance of hundreds and thousands of installed units, prove it. That's why a Permaglas Water Heater provides completely satisfactory hot-water service.

A.O. Smith
HOT WATER MAGIC
FOR
HOUSE BEAUTIFUL'S
1949
PACE-SETTER HOUSE

Permaglas Automatic Gas Water Heater selected for this model home

The House Beautiful magazine 1949 Pace-Setter House, East Orange, N. J., designed by Emil A. Schmidlin, is plentifully supplied with automatic hot water by a basement-installed 75-gallon Permaglas Gas Water Heater. It will not need replacing every few years because its tank, of glass-surfaced steel, cannot rust.

FOR HOT WATER MAGIC
GAS has got it!

A. O. Smith Corp., Dept. AF-1249
Water Heater Division, Kankakee, Ill.
Without obligation, send us full information on A. O. Smith Water Heaters:
☐ Gas  ☐ Electric  ☐ Both
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Atlanta 3 ▪ Boston 16 ▪ Chicago 4 ▪ Clayton 5, Mo. ▪ Philadelphia 3 ▪ Denver 2 ▪ Detroit 3 ▪ Houston 2 ▪ Los Angeles 14 ▪ New York 17 ▪ Dallas 1 ▪ Midland 5, Tex. ▪ Phoenix ▪ Pittsburgh 19 ▪ San Francisco 4 ▪ San Diego 1 ▪ Seattle 1 ▪ Tulsa 3 ▪ International Division: Milwaukee 1 ▪ Licensee in Canada: John Inglis Co., Ltd.
PRODUCT NEWS

CHOOSE FROM TWO of the finer acoustical tiles

1
Fir-Tex Perforated Acoustical Tile
The serviceability, economy, cleanliness, paintability, and washability of Fir-Tex Perforated Acoustical Tile have made this type one of the most popular. Made of sound wood fibers, felted and pressed into rigid tile. Exposed surface perforated for maximum acoustical properties.

2
Dantore Incombustible Acoustical Tile
For sheer beauty, Dantore tile can be put at the top of the list. Its fissured fissured fissured surface provides character and distinction as well as unexcelled acoustical properties. Being incombustible, Dantore tile is ideal for use in such public institutions and buildings as hospitals, schools, hotels, theatres, restaurants.

SPRING-CUSHIONED DOOR-STOP prevents damage to woodwork.
Anyone can mount this neat little gadget on baseboard or door to prevent the noise and damage that result from doors being slammed open. Measuring 2 1/2 in. long by 1 in. in diameter, the new door-stop has a soft rubber bumper and an internal spring. It is available in brass, nickel or chromium finish, and retails at 49 to 69 cents. It should prove useful in offices and hospitals as well as homes.


(The Technical Literature, page 146)

The Sunny South Comes North
BY THE MAGIC OF PHOTOMURALS
When you check in at Delta's Windy City office you can almost feel the soft balmy breezes and brilliant sunshine of the deep South...beautiful Photomurals portray so invitingly the scenes of the Southland that even Delta's super-speed equipment seems slow to the eager passenger! That's the power of the Photomural...and it can be applied to a multitude of purposes...one of which will serve your needs amazingly well.

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KAUFMANN & FABRY CO.
DEPT. FL. 425 SO. WABASH AVE., CHICAGO 5, ILL.
Before you specify your next floor...

See NEW Rubber Tile by the makers of Kentile

All Rubber Tile is not alike...

New Rubber Tile by the makers of Kentile gives more luxurious beauty...more practical advantages at no extra cost...exclusive features in color and design. Molded under great pressure, this rubber tile is unusually tough, remarkably resilient. It resists chipping, cracking, marring...does not support combustion. Dirt, moisture cannot penetrate the smooth non-porous surface.

IMPORTANT: Rubber Tile by the makers of Kentile contains no oils...no ingredients to dry out and leave the tile brittle.

NEW!

Exclusive Colors

in rich vibrant tones created and harmonized by Carl Foss, nationally recognized color expert. No other rubber tile can offer you all these beautiful colors...delicately veined, marbled, elegant effects...

Exclusive Themetile

Only Rubber Tile by the Makers of Kentile offers these decorative low-cost factory-made inserts, suitable for a wide variety of installations...unmatched for giving a "custom-made" touch to the floors you specify.

TECHNICAL DATA you'll want to keep on file...

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FEATURE STRIPS

1" Wide, 36" long          3/4" wide 3/8" thick 3/8" thick 3/8" thick 3/8" thick
Black, Red, Green, White, Yellow

EDGING (Black Only)

Double beveled edging...36" long, 3/8" thick, 3" wide
Single beveled edging...36" long, 3/8" thick, 1 1/2" wide

COVE BASE

(Black, Onyx, Connemara, Rouge Royal, only) 42" long, 3/4" high, and 6" high (black only)

THEMETILE

9" x 9" Tiles

Fish, Green and Yellow
Dots, Yellow and Red
Petals, White and Red
Ivy, White and Green
Spoon and Fork, Red and White

FOR FURTHER DETAILS CONTACT THE OFFICE NEAREST YOU

DAVID E. KENNEDY, INC., 58 Second Avenue, Brooklyn 15, N. Y.

350 Fifth Ave., New York 1, N. Y. • 705 Architects Bldg., 17th and Sansom St., Philadelphia, Pa. • 1211 N.B.C. Bldg., Cleveland 14, Ohio • 225 Moore St., S.E., Atlanta 2, Ga. • Kansas City Merchandise Mart Inc., 2201-5 Grand Ave., Kansas City 8, Mo. • 1440 11th St., Denver 4, Colo. • 4532 South Kolin Ave.,

Chicago 32, Ill. • 4501 Santa Fe Ave., Los Angeles 11, Calif. • 452 Statler Bldg., Boston 16, Mass.
Whatever a house may cost, it will not be a real home unless it is comfortably heated. So, in Honeywell national advertising we are urging home builders to consult you about their heating system while plans are in the blueprint stage.

Here are some of the Honeywell controls and control systems that can be selected, depending upon the size and type of home.

**CHRONOTHERM**

*Electric Clock Thermostat*

Every home should have the convenience and economy of automatic clock thermostat regulation. Chronotherm automatically switches to lower fuel-saving temperature at bedtime. Then in the morning, before the family gets up, it restores daytime comfort temperature. Chronotherm will save 10% or more fuel and will give far greater heating comfort and convenience.

**ELECTRONIC MODUFLOW**

*Control Systems*

The new Honeywell Electronic Moduflow control system will give an entirely new conception of even, continuous heating comfort. Electronic Moduflow combines the magic speed and sensitivity of electronics with the Moduflow principle of continuous heat flow. It does away with drafts and cold floors caused by intermittent heat supply.

**ZONE CONTROL**

In larger homes and ranch-type homes, more uniform temperatures will be obtained throughout the house by an Electronic Moduflow system with two or more thermostats located in different sections of the house. In basement recreation rooms, for example, a separate thermostat will maintain just the desired temperature without affecting the rest of the house.

**RADIANT PANEL HEATING**

Because of its extreme sensitivity and dependability, an Electronic Moduflow control system will insure best results from radiant panel heating installations.

For further information about Honeywell Controls and Control Systems, contact the Honeywell branch office in or near your city. Or, mail the coupon for the 3 free booklets, "Electronic Moduflow;" "Electronic Moduflow for Radiant Panel Heating;" "Zone Control and Individual Room Control."

---

**Photo/Ad Description**

Minneapolis-Honeywell Regulator Company
2600 Fourth Avenue South
Minneapolis 8, Minnesota

Please send me the 3 free booklets on Electronic Moduflow and Zone Control.

Name:
Address:
City: Zone: State:
ARCHITECTURALLY, Stainless Steel offers infinite possibilities that up to the present have been only meagerly exploited. That is because many architects still regard Stainless Steel as a luxury material, which it emphatically is not. The important thing to remember is that Stainless Steel is probably the most permanent of all building materials. While it has decorative values that are universally recognized, its functional versatility, its long-time economy, its ability to reduce maintenance to the very minimum should not be overlooked. With Stainless Steel, first cost is virtually final cost.

U.S.S Stainless Steel has intrinsic merits that give it many unique advantages: Its lustrous corrosion-resistant surface withstands exposure to heat, cold, weather, and time itself. It is easy to clean and keep clean. It offers rugged resistance to abuse and wear. Decoratively, U.S.S Stainless Steel harmonizes well with other materials, but, more significantly, it can be used to obtain a freedom of design not possible with other materials. Its high weight-strength ratio permits its use in light, easily transportable structural forms similar to those developed for airplanes and streamliners. Its light-reflecting properties can be used to advantage in combination with artificial interior lighting to provide wall surfaces of quickly-changed color. Its superior properties make it ideal for curtain wall construction or in panel frames for radiant heating and radiant cooling of rooms.

For these and similar applications, U.S.S 18-8 Stainless Steel—a perfected, service-tested Stainless—is available in the widest variety of commercial shapes, forms, and sections, and in the standard finishes used for architectural purposes. Our stainless steel specialists will gladly cooperate with you in developing your designs to include U.S.S Stainless most economically.
SYLVANIA'S "Flexi-Module" LUMINOUS CEILING

Features an exclusive "STAR" suspension system!

EASY AND INEXPENSIVE TO INSTALL

Adjustable hangers for the louver units are easily attached to ceiling or concrete slab on 32" centers. Sylvania's wide experience has resulted in design of special "STAR" suspension units (see inset) that permit quick louver adjustment from below. Straps of hanger assembly are adjusted to nearest inch. Final height adjustment is made by screwing up on threaded bolt. Requires no expensive subframe of channels or other devices to be leveled or installed!

FLEXIBLE

The Sylvania system is simplicity itself—beautiful 32" x 32" aluminum louver units consisting of cells 3" x 3" remain rigid even when cut to fit around pillars or to fill in at the end of a row.

EASY TO MAINTAIN

Less expensive to maintain than a plaster ceiling. Non-static aluminum is dust-free... and special plastic coating protects from fingerprints! Mirror effects (specularity) are eliminated.

MAIL COUPON FOR FULL DETAILS!

Sylvania Electric Products Inc. 
Advertising Dept. L-7012 
500 Fifth Ave., New York 18, N. Y. 
Send full particulars on Sylvania "Flexi-Module" Louvered Ceiling.

NAME ________________________________________________________

ADDRESS ____________________________________________________

CITY __________________________________________________________

STATE ___________ ZONE ____________________________

TECHNICAL LITERATURE


To find out the most practical procedures for presentation in this manual on the application of steel reinforced stucco and plaster, leading contractors and tradesmen were consulted. Building associations and research tests conducted by the publisher also served as information sources. The method evolved is a guide for builders, lathers and plasterers said to insure a durable attractive economical finish job. It is not a radically new approach; rather, a combination of recommended practices. In presenting the Keystone System of stucco application, the book reviews—detailed drawings and photographs—good building design and construction; procedures for applying reinforcement; ingredients, mixing, application, curing and texturing of stucco. Also described and pictured is the Keystone System of plaster reinforcing.

The text points out that such reinforcement is a means of counteracting stresses which develop from normal movement of lumber, building framing and vibration. Builders are cautioned that a good plastering job cannot be better than its base. Basic steps advocated are: (1) check structural soundness; (2) apply reinforcement for insured durability; (3) use best suited mixtures properly proportioned; and (4) finish the plastering job with care.


Properties and uses of Armco's stainless steels, enameling iron, Zingrip and Zingrip-Paintgrip for commercial and home building are fully described in this booklet. Sections on each of these special purpose steels illustrate their interior and exterior applications. Laboratory and field test summaries included in the booklet indicate that the Zingrip coating has greater atmospheric corrosion resistance than regular galvanized sheets with equal weight coatings. Also contained is a list of sheet metal products used in the home and a mailing card for obtaining additional information.

WOOD. Idaho White Pine. Western Pine Assn., 510 Yeon Bldg., Portland 4, Ore. 64 pp. 8½ x 11 in.

Properties and characteristics of Idaho White Pine, and its uses in commercial and residential building and in industry are thoroughly reviewed in this book. Full page photographs of typical pieces of each grade are featured, together with descriptions of each piece. Other pictures illustrate the diverse applications of the various grades—from roof sheathing to fine cabinet work. The book also presents an interesting series of photographs taken annually for sixteen years from the same camera spot showing the natural regeneration of a desolate burned timber area into a thriving young forest.


Following a brief picture story on the deleterious effects of hard water and the economies and benefits of softened water, this booklet presents complete information on the design and application of the manufacturer's water-conditioning equipment. Products covered include zeolite water softeners, water treating chemicals, water conditioning systems for boilers and processing, taste and odor removers, and aerators.

(Continued on page 148)
Announcing — the Newest in Siding

WELDTEX SIDING

ARCHITECTS: Now you can give your homes smart, modern beauty at reduced cost.

You've already seen the fine effects that have been obtained with Weldtex® when used in large panels. Now, that same beauty, that same durability, that same uniqueness, is available in Weldtex Siding.

In Weldtex Siding, the warmth and beauty of natural wood have been augmented by grooving the surface with deep, irregularly-cut striations. These cut-in grooves lend a third-dimensional quality to the surface, breaking up the flat plane and creating pleasant highlights and shadows.

MANY PRACTICAL ADVANTAGES

But Weldtex Siding has important practical advantages, too. There is no objectionable grain-raising or checking. Expansion and contraction are minimized because the striations relieve surface stress. Joint lines are invisible. Face nails are concealed by the deep-cut grooving.

And, the wide 4-foot panels go up fast. Only 20 panels cover a square. Savings as much as $60 per small house have been reported (based on a reduction of 70% in labor costs).

Best of all, the finished job is weather-tight, with a minimum of seams. Weldtex Siding takes paint and other exterior finishes perfectly, making a beautiful job which adds to the value of any house.

FHA APPROVED

Weldtex Siding is approved by FHA on Federal Housing jobs. Write for more information and folder showing typical installation details.


UNITED STATES PLYWOOD CORPORATION

55 West 44th Street, New York 18, N. Y.
PLUMBING FIXTURES. Kohler Plumbing Fixtures for Industrial Plants, Public Buildings, Clubs, Schools. Kohler Co., Kohler, Wis. 28 pp. 8½ x 11 in.

Compiled as a handy reference book for architects, contractors and plumbers, the publication is divided into sections, each dealing with one type of fixture or fitting. Some of the items treated are lavatories, wash sinks, closets, drinking fountains, service sinks and brass fittings. Each fixture is pictured, catalogue numbered and briefly described. This booklet should serve as a useful supplement to the extensive 75th anniversary catalogue issued by Kohler last winter.


Penn's full line of ventilators for all types of buildings are described in this pamphlet, which utilizes half-tones and diagrams to illustrate applications of the seven styles manufactured. Also presented are capacity tables, dimensional data charts and exhaust capacities for each piece of equipment.

DUST FILTERS. Industrial Dust Control by Sty. W. W. Sty Mfg. Co., 4700 Train Ave., Cleveland 2, Ohio. 23 pp. 8½ x 11 in.

All industrial processes producing any kind of material in powdered form create dust, and in many instances this dust is a definite economic loss if not collected. Sty's bulletin gives this and other reasons why dust-free plants are desirable. It presents engineering data covering dimensions and capacities of the manufacturer's dust filters. These filters operate like a multiple vacuum cleaner with a number of filter bags. Over 100 different kinds of dust collected by the filters are listed in the publication. It is illustrated with typical installations in industry.

(Continued on page 150)

THE EIGHTH OF A SERIES IN THE INTEREST OF MORE EFFICIENT USE OF STEEL, A VITAL AMERICAN RESOURCE.

USE PROPER STEEL STRESSES AND SPECIFY LACLEDE MULTI-RIB REINFORCING BARS

Concrete reinforcing steel design stresses of 20000 psi (f) are based upon old type plain bars with 40000 psi maximum yield strength.... A safety factor of 2 or the elastic limit.

Laclede Multi-Rib Reinforcing Bars designed for high anchorage are produced in steel grades with more than 60000 psi yield strength. Retaining the elastic limit safety factor of 2, a design stress with Multi-Rib high strength reinforcing of 30000 psi is justified.

Sound engineering design dictates efficient use of materials... so why waste every third bar?

* IN EXCESS OF ASTM A302 REQUIREMENTS AND THE LATEST A.C.I. RECOMMENDATIONS.

LACLEDE STEEL COMPANY
St. Louis, Mo.
Don't give them anything to "Grouse" about!

Customers being people, they'll "grouse" unless you give them what they want in the new homes you build. Include the kind of cooking equipment more people want—modern Electric Ranges!

The trend to Electric Cooking is proved by the fact that another million American families switched to it last year.

So build houses that are modern today and will stay modern for years to come. During construction, include wiring for an Electric Range, leading to a range outlet in the kitchen. An Electric Range, like electricity itself, is now a "must" in every modern home!

The first fluorescent fixture catalogue issued by Sylvania in two years, this publication contains more than 60 photographs of commercial, industrial and troffer fixtures, starters, lamp-holders and starter sockets with complete descriptions of each. Three sections—industrial, commercial-residential and troffers—make up the catalogue and each may be detached as a separate unit. A supplement, How to Plan a Fluorescent Lighting Installation, covers fixtures for specific purposes, and methods for determining the number required and their most advantageous arrangement. A chart shows the amount of illumination needed for 80 typical lighting applications from store showcases and window displays to professional offices and dental chairs.


Take your cue from your carpet is the theme of this full-color booklet on planning room interiors. Slanted toward decorator and feminine readership, it suggests that the carpet is the basic costume to be selected first and that curtains, window coverings, etc. should be chosen with the carpeting always in mind. Swatches of several Magee carpets are included in the booklet to stimulate decorative ideas and aid in carrying them out. A novel feature of the publication, graphically illustrating the versatility of carpeting, is the juxtaposition of contemporary and traditional settings on the same carpet. A color coordinating chart combines various patterns, colors and textures.


For Built-in Breezes

Valuable Planning Help...

For Built-in Breezes

Valuable Planning Help...

For Built-in Breezes

Valuable Planning Help...

For Built-in Breezes

Valuable Planning Help...

For Built-in Breezes

Valuable Planning Help...

For Built-in Breezes

Valuable Planning Help...

For Built-in Breezes
Show your Clients these 3 modern Automatic Anthracite Heating Units

They save up to 52% annually on fuel bills

1. Automatic Anthracite Stokers—
   Installed in an existing boiler or furnace, or in new houses, automatic hard coal stokers deliver plenty of heat quickly . . . save up to 52% on fuel bills . . . eliminate fuel worries.

2. The Revolutionary Anthratube—saves on fuel bills . . . its proved efficiency is over 80%. This scientifically engineered boiler-burner unit, with "Whirling Heat" and other revolutionary features, produces quicker response, superior performance than units using other types of fuel. Fully automatic.

3. Anthra-Flo furnace-burner unit
   - An entirely new type furnace-burner which features a simple burner mechanism, attached by two bolts with all working parts easily accessible. Fully automatic, coal feeds direct from bin across single stationary perforated plate . . . ashes discharge by gravity into container within unit. Available for steam, hot-water and warm-air heating systems.

TODAY YOU CAN OFFER YOUR CLIENTS modern automatic heat with Anthracite equipment.

You can show your clients how to save money . . . as much as $100 to $200 every year and yet have plenty of heat—even heat—and no worry about future supplies or deliveries.

For complete information about (1) new anthracite stokers (2) revolutionary Anthratube or (3) Anthra-Flo, just fill in and return the coupon below.

ANTHRACITE INSTITUTE
101 Park Ave., Dept. 12-A, New York 17, N. Y.

Please send me more information on
1. New Anthracite Stokers
2. Revolutionary Anthratube
3. Anthra-Flo furnace-burner unit

Name __________________________
Address _________________________
City __________________________ Zone ______ State _______

PLEASE PRINT
Send today for your free copy of the rules of the Chicago Tribune’s Fourth Annual BETTER ROOMS COMPETITION

$25,000.00 in 145 Cash Prizes

ranging from $100.00 to $1000.00 each

for the best ideas for furnishing and decorating seven types of rooms

ALL ENTRIES MUST BE RECEIVED BY 5 P.M. OF FEBRUARY 20, 1950

In order to bring to readers again this year a full range of ideas for furnishing and decorating various types of home interiors, the Chicago Tribune is conducting its Fourth Annual Better Rooms Competition, offering $25,000.00 in 145 cash awards for the best ideas submitted.

Just as the Chicago Tribune’s competitions in 1947, 1948 and 1949 brought out a wealth of fresh and interesting ideas in this field of high popular interest, so the 1950 competition has been designed to set new standards in home interior fashions.

Here is your opportunity to plan one or more typical rooms just the way you would like them to be. And here is your chance to win cash and nation-wide recognition for your efforts.

After the prize winners have been chosen, the Tribune, just as it has in previous years, intends to reproduce the winning ideas, or adaptations of them, in full color in the Chicago Sunday Tribune.

Everyone is eligible to compete, except employees of the Chicago Tribune and subsidiaries, members of their families, and of the Jury of Awards, which, as in the past, will be composed of recognized authorities of high standing in the field of home furnishing and interior decoration.

For complete information to help you prepare your entry, send today for your free copy of the rules which will be sent to you postpaid. The closing time is February 20, 1950. So don’t delay. Fill in the coupon below, paste it on a postcard, and mail today.

FILL IN AND MAIL TODAY!

BETTER ROOMS COMPETITION
Chicago 11, Illinois

Without cost or obligation to me, please send by postpaid mail to me at the address below complete details and rules of the $25,000.00 Chicago Tribune Fourth Annual Better Rooms Competition.

My Name.................................................................................................................................

Address..................................................................................................................................

City ......................................................... State.......... Zone Number (if any)........

(Please PRINT plainly in pencil; ink may blot)
Hauserman Movable Steel Interiors are

COMPLETELY INCOMBUSTIBLE

Hauserman Movable Steel Interiors assure adequate fire resistance from baseboard to roof. Steel for frames and panels... glass for through vision and borrowed light... rockwool insulation for sound absorption and soundproofing... mineral board or steel for top fillers... all are totally incombustible. Hauserman Movable Steel Interiors increase the fire safety and reduce the fire hazard in any building.

In Addition, Hauserman Interiors assure efficient utilization of all floor areas for the life of the building. Hauserman Movable Steel Walls are quickly and easily moved whenever new floor layouts will promote operational efficiencies... often in a matter of hours. Whenever Hauserman Walls are moved, all units are completely re-used.

There are Many Reasons why Hauserman Movable Steel Interiors are used in the smaller as well as the larger buildings in America. Among these advantages are: 60 Beautiful Colors and Authentic Wood Grain Finishes—Rigid Construction—Excellent Sound Control—Earlier Occupancy—Rock-bottom Maintenance Costs—Ease of Servicing Utilities—Ease of Adding Wires and Outlets—Incombustible Materials—Easy to Move.

Let Us Help You with your interior wall and ceiling problems.

THE E. F. HAUSERMAN COMPANY
6718 GRANT AVENUE • CLEVELAND 5, OHIO
Branch Offices in Principal Cities—See Phone Book

Specialists in Service—We assume undivided responsibility for complete interiors... shop drawings, building measurements and installation. We supply all products complete with hardware, wiring accommodations and all accessories. Our experienced erection crews are on call for alterations and additions. Our engineers are always at your service.

FREE CATALOG TO HELP YOU PLAN
You'll find interior walls and ceilings to meet your exact requirements in Hauserman Catalog 49. Write for it on your business letterhead today.

HAUSERMAN
MOVABLE STEEL INTERIORS
WALLS • WAINSCOT • RAILINGS
ACOUSTICAL CEILINGS • COMPLETE ACCESSORIES
For every commercial, industrial and institutional need
**SPECIFICATION AND BUYING INDEX**

The advertising pages of FORUM are the recognized market place for those engaged in building. A house or any building could be built completely of products advertised in THE VOUVM. It is engaged in building. A house or any building could be built completely of products advertised in THE VOUVM. It is possible to open these pages only to those manufacturers whose reputation merits confidence. This THE FORUM does.

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