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# architectural forum



#### May 1952

MINIERPORE COLLEGE OF ART & DESIGN CORARY

Matisse chapel	A charming blend of modern art and architecture (below and p. 148)
Flexibility unlimited for CBS	Pereira & Luckman start a TV city of unknown dimensions ( p. 101)
Three stores	A stand-by bomb shelter a collaborative product of four design firms a new solution to the parking problem ( p. 124)
Factory of the future	Buckminster Fuller invents a floorless, automatic textile mill ( p. 136)
Challenge to architects	Gropius and Belluschi redefine the profession's role in the building operation (p. 111)
<b>Building engineering</b>	New ways to frame a steel buildingto lay a utility line to light a big officeto prestress concrete beams to roof a 75' span with lumberto sink a foundation ( p. 154)
Demonstration school	Effect of modern design and equipment on comfort and economy ( p. 114)



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#### THE MAGAZINE OF BUILDING

## architectural forum

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THE MAGAZINE OF BUILDING

ARCHITECTURAL FORUM Edition

THE MAGAZINE OF BUILDING

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The building houses new administrative, supply, and medical facilities, sufficient in area and equipment to serve the older hospital, as well as the new patient areas.

The foundation and frame are of reinforced concrete. Exterior walls are faced with brick. An unusual feature is an all-over grid on the east and west walls to protect windows from solar radiation. Concrete "eyebrows" above the windows (formed by extending the floor slabs) are combined with a cross-grid of aluminum louvers. Architects Stevens and Wilkinson estimate that this solarlouver grid saved its cost in air conditioning equipment.

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See our catalog in Sweet's Architectural File.

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# Who has it soft at Sinclair Oil?

In New York City's new 27-story Sinclair Oil Building, just about everybody has it soft. A Carrier Conduit Weathermaster\* Air Conditioning System sees to that.

The Conduit Weathermaster System lets each tenant dial the climate level he personally prefers. But even more important, he gets *better air conditioning* than any other system could give him. And this is true because the Conduit Weathermaster System *centralizes control* of temperature, humidity, ventilation, air movement and air cleaning.

For example, because all functions of year-round air conditioning are centrally controlled, dehumidifying may go on independently of the cooling – unlike various other systems – so occupants are kept comfortable even on the muggiest of days. There are no holes in the walls, or fans or motors in each room. No matter how the wind is blowing outside, building temperature and humidity are controlled on all floors – summer and winter. It's as comfortable on the 27th floor at Sinclair Oil as it is on the 2nd or the 15th.

There's more to the story, of course. The Carrier office nearest you will be glad to tell you the rest. Or our booklet, "Conduit Weathermaster System," will help you. Just write Carrier Corporation, Syracuse, N.Y.... for 50 years - the people who know air conditioning best.

\*Reg. U. S. Pat. Off.



Refrigeration for the new Sinclair Oil Building is supplied by four 275-ton Carrier Absorption Refrigerating Machines (similar to this one) placed on the roof.

849 Weathermaster room units (like this one) give individual, automatic control of climate, prevent drafts the year around.

#### FACTS ABOUT COPPER'S ECONOMY

Model showing food-cooling system with underground condenser grids of copper tubing.

#### copper tubes

#### form underground

#### refrigeration condenser

When discussing the refrigeration system of a planned new supermarket, the owner stipulated:

- 1-Low operating costs
- 2-Minimum use of city water
- 3–Dry basement storage facilities

The Charlton brothers of the Temperature Equipment Company, Hartford, met all 3 requirements very successfully and to the owner's complete satisfaction.

The system was devised so that earth instead of water is used as the cooling medium. Copper tube grids, installed in the ground before the concrete basement floor was poured, serve as the condenser, The surrounding damp earth efficiently absorbs the Heat from these display cases is disposed of through tubing buried below basement floor.

> Installing condenser grid in wet clay prior to pouring basement floor.

heat and enough warmth reaches the basement floor to prevent the accumulation of moisture on its surface.

In the first year of operation the owner estimates a saving of \$750 in water charges alone, plus the added savings afforded by the dry basement in eliminating moisture damage to stored goods. It's another example of the versatility of ANACONDA Copper Tubes for all types of plumbing, heating and refrigeration piping.

A complete description of this installation will be gladly forwarded on request. The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

### modern plumbing calls for **ANACONDA**<sup>®</sup> copper tubes

NO WINDOWS ....

but blenty of daylight!

A Wascolite Skydome daylighting system assures excellent natural illumination for the interior parts of *any* structure . . . regardless of the lack of windows or adjacency of windows. Skydomes are replacing clerestories and conventional skylights in bilateral daylighting schemes because of superior lighting efficiency and lower cost. Their use permits low ceilings and economical flat roofs, with consequent savings in steel and labor.

Maximum results with Skydomes are assured by Wasco Daylight Engineering Studies. A Study will show the best Skydome arrangement for your floor plan . . . the lighting level maintained, etc. No obligation, of course. For complete information, fill in and mail the coupon today.



DOUBLE-LOADED school corridors have undeniable advantages in saving heat and reducing travel between classes . . . but they usually give rise to daylighting problems. Architect James W. Vorhies of Miami, Fla., overcame this deficiency in the North Miami High School with Wascolite Skydomes. Three long, double-loaded corridors are abundantly daylighted by Skydomes in this unusually compact school.

See Mark	Wascolite Skydomes
Prefabricated Was- colite Skydomes are installed in minutes are weather- proof, shatter-resist- ant and maintenance- free come in three basic shapes and with clear col- orless or white trans- lucent acrylic domes.	WASCO FLASHING COMPANY 87 FAWCETT ST., CAMBRIDGE 38, MASS.         □ Please send folder on Skydomes.         □ 1 am inferested in a Daylight Engineering Study. 1 enclose a floor plan of our project and lighting requirements.         NAME         TITLE         ORGANIZATION         ADDRESS         CITY       ZONE

# Johnny is more alert



Bloom Township High School; Chicago Heights, Illinois, presents an interesting DRAFTISTOP installation with unit ventilators and cabinets level with the sill. All auxiliary cabinets are equipped with doors for neat appearance. Superintendent of Schools, Dr. Harold H. Metcalf; Architects, Royer & Davis; Consulting Engineers, E. C. Manthei Consulting Engineering Service.



**George Washington School;** Moline, Illinois, utilizes unusual treatment of clerestory lighting through means of corrugated glass for its deep classrooms. DRAFTISTOP unit ventilators were selected by Superintendent of Schools, Alex Jardine; Architect, M. R. Beckstrom.

No matter what we may think about "The Good Old Days" actual statistics show the typical schoolboy today is learning faster and better than his parents. Better teaching methods, better textbooks and better physical environment for learning all play important parts in making Johnny a more alert and healthier student.

The modern schoolroom has about as much resemblance to the schoolroom you and I knew, as the modern automobile has to the Model T. Seating, lighting, noise control and heating and ventilating have been dramatically improved.

Herman Nelson has played a key part in the development of the modern schoolroom by providing automatic heating and ventilating equipment that sets the pace for other advances.

The Herman Nelson DRAFT STOP system earns its name by overcoming the drafts caused by the big windows of the modern schoolroom — and at the same time providing proper heating, cooling and ventilation to keep the students healthy and alert. DRAFT STOP equipment is the approved solution for modern schools all over the country. If you are contemplating a new school building or a modernization program you should have full information about DRAFT STOP. Write Dept. AF-5, Herman Nelson Division, American Air Filter Company, Inc., Moline, Illinois.



**Eastern Suburban Junior High School;** Silver Springs, Maryland, has modern classrooms with vision strip and wall-to-wall DRAFTISTOP installation. A filler piece completes the harmony of the unit ventilator and cabinet installation. Cabinets have adjustable shelves for ease of handling various size materials. Assistant Superintendent of Schools, Dr. Richard E. Carpenter, Architect, Ronald Senseman.

# these days...





Write today for your free copy of the new Herman Nelson DRAFT|STOP Catalog and schoolroom heating-ventilating guide.



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L=LETTER TRAY



There's plenty of light and air in this new John Sutter School at Canoga Park, Calif. They'll also have plenty of heat, fast heat, *heat when they want it*, from their H. B. Smith Co. Cast Iron Boilers.

Installation of three eighteen-section oilfired No. 440 Mills Cast Iron Boilers in the new John Sutter School. Note that smaller boiler rooms may be used with H. B. Smith boilers.

# Modern Schools are Specifying H. B. SMITH Cast Iron Boilers

School Boards and Superintendents scrutinize very closely the equipment installed in the new schools they are building. First cost is important, but other factors are also given close study. Low maintenance costs; easy facilities for expansion should the school need to be made larger to meet an expanding school population; quick heat to meet the needs of regular school classes and irregular meetings; quick fuel conversion in emergencies — these are a few of the points that are given careful consideration.

Just such a detailed discussion of the facts led to the decision to purchase three No. 440 W-18 Mills Cast Iron Boilers for the John Sutter School illustrated. Other new California schools where Smith-Mills Boilers were chosen after examining competitors' claims are:

Venice Junior High School, Los Angeles — 3 No. 440 S-18 Mills Boilers

Belvedere Junior High School, Los Angeles — 3 No. 440 S-7 Mills Boilers

Precision made, easily and economically installed, Smith-Mills Cast Iron Boilers will deliver faster heat, more economical heat, greater heating efficiency. This is due to their unique design with vertical gray iron water tubes and longer flue travel, which turn more of the fuel burned into heat *used*.

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For complete information call the Reynolds office listed under "Aluminum" in your classified telephone directory or write direct.



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Above: St. Jude's Hospital, Montgomery, Alabama. Architect: James C. Maschi. Red Kalistron on dados and furniture, contrasting Kalistron above chair rail.

#### UNBELIEVABLE DURABILITY on our hospital walls and furniture ...

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That's the comment frequently heard about *Kalistron* installations. When walls, doors, columns or furniture are covered with Kalistron, they literally defy the wear and tear of "heavy duty" service. Years after installation, the Kalistron is still in excellent condition . unmarred, unscratched, with prac-

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Kalistron cannot chip, crack or peel; minimizes maintenance costs. Cleans easily with a damp cloth. In 28 standard colors: special colors matched. SEND COUPON BELOW for sample of Kalistron and nail-file. Test Kalistron yourself ... prove its unbelievable durability.



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Color fused to underside of transparent vinyl sheet . . . backed by flocking



St. Jude's Hospital, Montgomery, Ala. Walls covered with "Kalistron," made by U.S. Plywood Corporation





LOOK AT THIS new hospital corridor—walls and chairs radiating fresh warmth and cheer! And they'll stay bright and easy to clean for years—keeping maintenance costs at a new low!

That's because they're covered with Kalistron-a surface sheet of clear VINYLITE Brand Plastic with rich, brilliant color fused to the underside and backed by flocking. The strong VINYLITE Plastic-smooth, durable, readily cleaned - takes all the wear and abuse, protecting and enhancing the color.

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Resilient flooring materials based on VINYLITE Brand Resins are also notable for their striking decorative features and long service life. They, too, have the unique qualities that make VINYLITE Brand Resins and Plastics so useful for scores of products in defense and basic industry.

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> Here's a new, quick and economical method of protecting steel columns with Truscon Self-Furring Diamond Mesh Lath and plaster. Official tests at the Underwriters' Laboratories in Chicago prove that this new construction method will keep steel columns from twisting and buckling for more than 4 hours in a flaming building!

> Here's how it's done. Self-Furring Truscon Diamond Mesh Lath is wrapped around the column, corner beads are attached, and gypsum perlite plaster is applied to a thickness of 13/4

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plaster

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Armstrong's De Luxe Asphalt Tile offers an unusual opportunity to meet the challenge of budget limitations. It has quality features that make it an unexcelled flooring value at the lowcost level. A unique manufacturing technique produces its distinctive swirl marbleization and gives it exceptional strength and flexibility.

Showrooms The Admiral Corporation, Chicago, Illinois Harper Richards, Architect

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Off-ceiling" lighting is attractive

Creative design added spaciousness and beauty to this confined building interior with an unusually high ceiling. Modern, flexible lighting systems and more freedom in architectural design techniques are the basic ingredients.

In the Anglo California National Bank's office at Hayward, California, the architect cleverly planned a second working level to minimize the high ceiling. An off-ceiling (or suspended) lighting system became an integral part of this design. Individual working areas are more than adequately lighted (over 40 footcandles) with good, comfortable lighting.

Open office spaces and carefully selected decorating colors help provide "spill-over" light for the main area; a device that might be used in many office buildings where the problem is one of high ceilings and limited space.

Westinghouse Type CC, 8-foot slimline fixtures with plastic sides were selected. Low in first cost, they are economical to install and maintain, since a minimum number of fixtures are needed. This is only one of a wide variety of lighting systems designed by Westinghouse for flexibility in planning. Send for B-5254, "Lighting Sets the Stage" and see an analysis of our complete commercial line. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-04307











DARTFORD MOTOR COURT, Green Lake, Wisconsin. Architects: Auler, Irion & Wertsch, Inc., Oshkosh, Wisconsin.



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# SHIELD of MODERN FIRE PROTECTION



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Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers • Built-In Smoke and Heat Fire Detecting Systems Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems



END OF BAN on recreational construction was announced to US Chamber of Commerce committee lunch May 15 in Washington by NPAdministrator Henry Fowler (center), who is flanked by (I to r) NPA's Frank Creedon, President Lawrence F. Lee of the Chamber, lumberman Norman P. Mason and architect Ralph Walker.

## Controls Crumble: CMP Rules Relaxed; Reg. X Easing Expected

Construction controls this month began what looked like a lingering death. When the National Production Authority relaxed its ban on commercial building in mid-March, the agency expected a flood of office, store and warehouse projects to come off architectural shelves. Results, however, proved disappointing. For two weeks there was an upsurge of applications. Then requests tapered off. By the end of April, NPA was considering only 600 projects (worth about \$700 million). And half of them involved recreational or entertainment projects, which were banned.

Were clients hesitating because of the turmoil set off by the steel wage row? Or was it financing problems, the business lull, or high taxes? Whatever the reason, NPA's next move was obvious. The US Chamber of Commerce's construction mobilization committee—anxious to spread confidence in a big construction year of 1953—provided the platform for NPAdministrator Henry H. Fowler to unfold the biggest cutback in restrictions under the Controlled Materials Plan since it was imposed on the building industry last October 1.

Effective July 1, CMP Regulation 6, the basic construction controls order, will be amended to:

▶ Revoke the ban on recreational construction. Builders of such items as dance halls, race tracks and swimming pools will be permitted to selfauthorize 5 tons of carbon steel (including up to 2 tons of structural), 200 lbs. of copper and 250 lbs. of aluminum per project per quarter.

▶ Raise self-certifiable amounts of materials for commercial building (starting Oct. 1) to 25 tons of carbon steel (with no limit on the portion of structural), 750 lbs. of copper and 1,000 lbs. of aluminum per quarter.

Revoke restrictions limiting aluminum to industrial and public utility construction, thus permitting use of the metal in all types of construction. From July 1 to Oct. 1, 250 lbs. of alum-

#### IN THE NEWS

Among the next 19 pages are reports o significant developments:	n these
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Military seeks \$3 billion for construction	p. 57
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Norfolk slum clearance milestone	p. 61

inum may be self-authorized for commercial building.

▶ Reclassify from CMP's commercial to industrial category projects involving transportation, and public utilities, water and sewage systems, administration buildings, garages and service buildings for industrial projects when owned and operated as part of the industry. This would give such construction more metal by self-allotment.

Let chemical plant builders self-authorize 2,000 lbs. of stainless steel per project per quarter.
Permit the same use of finished conversion steel

already permitted for foreign and used steel.

Structural for housing. NPA's M-100 housing order will be loosened, too, Fowler announced. After July 1, homebuilders may self-authorize 1,500 lbs. of new domestic structural shapes and 250 lbs. of aluminum *in addition* to their earlier allowances of steel and copper.

Matching the looser NPA grip on steel, copper and aluminum, the Federal Reserve Board began removing the financial brakes on construction and other businesses. On

#### WASHINGTON DIARY

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- 4/23 DPA reports approval of fast tax write-offs for 8,922 facilities to date, representing investment of \$17.9 billion.
- 4/24 NPA removes second-quality carbon steel from list of controlled materials.
- 5/1 DPA allocates less copper during March and April than at any time since inception of controls due to production decline.
- 5/6 President Truman nominates NPAdministrator Henry H. Fowler to succeed Manly Fleischmann, who resigned as Defense Production Administrator.
- 5/15 NPA lifts ban on recreational building, increases permitted amounts of steel, copper and aluminum for commercial and home-building, decontrols lead, bismuth, cadmium and antimony.
   5/19 NPA allots controlled materials for 1,069
- 5/19 NPA allots controlled materials for 1,069 commercial, religious, entertainment and municipal projects. Cost: over \$337 million.

May 5, the Fed abandoned the Voluntary Credit Restraint program. Two days later, it buried Regulation W. The next step would be modification-though probably not outright repeal-of Regulation X, for commercial building-a step demanded by many a realtor and mortgage broker (AF, Apr. '52, p. 41). Washington insiders forecast the Fed would raise the loan-to-value ratio from 50 to 66%. If it eases Regulation X for commercial building, the Administration would find it hard not to do the same for housing, too. At mid-month, HHFAdministrator Raymond Foley (considered the most reluctant to yield of the officials involved) declared that lower down payments on homes above \$12,000 to match those ordered by Congress on under-\$12,000 homes "may be ordered quite soon." The first step, however, would be a hardship exemption for unsold houses.

Industry appreciated government's efforts at decontrol, but thought them neither quick enough nor complete enough. Easing of Regulation X on commercial loans to 60% would do little for the bulk of projects, which depend on 75 to 90% loans. Aluminum producers had joined steel men in voicing fears of an impending glut. Even Ex-Mobilization Boss Charles E. Wilson, who lately had been urging continued controls, now declared: "The controls program is a dead duck."

Timid solons. If it were not an election year, Congress could be expected to let almost all economic controls die when the Defense Production Act expires June 30. Things being as they are, however, the Senate Banking Committee voted at midmonth to continue rent control and materials rationing through June 30, '53, to keep price-wage controls until next March 1 (although stripping the Wage Stabilization Board of its dispute-settling authority). In effect, this set a ceiling on defense powers of the future. On the Senate floor and in the House, the bill might be further watered down, but not strengthened.

## AFL Leader Warns Jurisdictional Strike Wave Could 'Set Labor Back 20 Years'

Across the US, strikes by AFL building tradesmen were rising so alarmingly that Secretary-Treasurer Joseph D. Keenan of the Building and Construction Trades Department was moved to suggest caution. His particular target: jurisdictional strikes. The onetime director of Labor's League for Political Education warned a meeting of the Illinois Building and Construction Trades Council that by wildcat walkouts and jurisdictional disputes labor unions are "literally cutting themselves out and if they don't stop bickering, labor will go back 20 years—and it will be hard to get back on top again."

AEC work slowed. One of the nation's sore spots of interunion strife lay just over the Ohio River from Illinois—at Paducah, Ky., where F. H. McGraw & Co. has experienced 38 work stoppages in 16 months of building the Atomic Energy Commission's \$500 million gaseous diffusion plant. Many contractors regard St. Louis as another. Carpenters and laborers have long been involved in a squabble over work assignments, such as who should carry fabricated forms from point of fabrication to point of erection. Not all the blame should

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**NEW YORK:** Midtown skyscraper received whopping 5,000-ton steel allotment. The \$13.5 million structure will rise 21 stories above Madison Ave., yield 226,000 sq. ft. above ground floor, assume familiar Manhattan cake-mold profile. Architect: Sylvan Bien.

be laid on unions. Says Keenan: too many employers dodge their responsibility of choosing the trade to do each job.

Bombs and lockouts. The Wage Stabilization Board's advance approval of a 221/2¢ an hour wage hike for construction labor had also helped launch a big wave of strikes overpay and welfare demands. Biggest was a walkout of 12,000 San Francisco region carpenters demanding a 15¢ an hour pay hike and a 71/2¢ welfare fund. After 39 days, retaliating contractors shut down all their construction in northern California. In Detroit, a strike of 15,000 AFL carpenters halted work on many a defense plant. Brewster Lumber & Supply Co. continued making deliveries. Someone planted a bomb on the roof which blew the office to shreds.

#### COPPER PRICE row cuts off Chilean ore flow to US

Because Chile and the US could not get together on a copper price, one-third of the US copper supply was cut off this month. Chile wanted at least  $33\frac{1}{2}\phi$  a lb, for its red metal. The US declined to change the fixed price it had been paying:  $27\frac{1}{2}\phi$ . Now Chile will put its entire output on the free market and officials think she won't find it too easy getting her price.

Unless Chilean-American diplomats find some point to compromise on their 6¢ difference, the US will have to begin thinking about either withdrawing copper from its strategic stockpile or halting shipments to exporters and consumer goods manufacturers.

#### GREEN LIGHT: NPA okays 2,668 commercial projects in Mar., Apr.

During March and April, NPA flashed the green light for 2,668 commercial, religious, entertainment and municipal projects. Their total cost will exceed \$1.06 billion.

It was a major shot in the arm for sagging commercial construction. Scores of long-delayed projects came off architectural shelves (*see photos, below.*) Many a client who had delayed planning a new structure was encouraged to go ahead now that steel and aluminum seemed plentiful again for nearly all construction. California won the biggest slice of approvals (319 projects worth \$208 million). Biggest categories:

Retail stores	\$223	million
Offices and lofts	167	million
Churches	164	million
Public administration bldgs	90	million

#### LONG-STIFLED COMMERCIAL BUILDING BOOMS AGAIN



**DETROIT:** Sprawling, \$18 million Northland Shopping Center designed by Victor Gruen got 1,672-ton steel allotment through second quarter, 1953. Focal point of development is three-story J. L. Hudson Department Store, to be surrounded by single-story shops in green, parklike setting, covering 184 acres of the 450-acre site.



**HOUSTON:** Now that materials were becoming plentiful again, architects Cowell and Neuhaus applied for a CMP allotment for this \$100,000 library on March 6, got approval back by mail April 1 from the US Office of Education. Library, a gift from Shell Oil Co. to suburban Pasadena, will have brick and limestone exterior, aluminum doors, air conditioning. Pasadenans figure Shell donated the library as a subtle reminder to their city not to look a gift horse in the mouth. Pasadena has been thinking of annexing nearby land on which Shell's refinery stands, which would hike Shell's taxes.



STARTING TALK TO NATIONAL HOUSING CONFERENCE, TRUMAN JESTS WITH (R TO L) SEN. CHARLES TOBEY, TOASTMASTER JOE HOLLAND, NHC PRESIDENT LINN

## Public Housing Fight Heats Up: Truman Makes Personal Plea for 75,000 Units

Since the House of Representatives voted in March to limit public housing starts to 5,000 a year, a repeat performance of 1951's Congressional battle over public housing has waxed noisier week by week. Last year, the Senate compromised between what President Truman asked (75,000 units) and what the House voted (also 5,000) by setting public housing starts at 50,000. In conference, the figure stuck, became law. Public housers, only now getting well underway with the 810,-000 units the 1949 Housing Act authorized for six years, will build all 50,000 of these by June 30 for their biggest year to date. With the Senate again confronted by a Truman demand for 75,000 units and a House vote for 5,000 units, Capitol Hill observers figure a compromise is sure. But whether the final figure written into the Independent Offices Appropriation Bill will be 50,000 or 25,000 remained uncertain enough this month for the shouting to reach a new crescendo.

Lobby conference. To pro-public housers, the 21st annual meeting of the National Housing Conference was fortuitously timed. Four hundred strong, NHC delegates met May 5-6 in Washington's Statler Hotel, where (as NHC's able Executive Vice President Lee F. Johnson explained) sessions were cut shorter than usual to allow as much time as possible for delegates to make a pitch with their legislators for a bigger public housing program.

Some Congressmen needed little buttonholing. They were already at NHC's smooth-flowing sessions. Conference speakers included Sens. Hubert Humphrey (D, Minn.), Charles Tobey (R, N. H.), and Paul Douglas, (D, Ill.), Representatives Albert Rains (D, Ala.), Eugene J. McCarthy (D, Minn.), Charles B. Deane (D, N. C.) and Hugh B. Mitchell (D, Wash.). While all seven spoke ardently in favor of public housing, some injected a few notes of friendly criticism. For instance, Douglas, rebuking public housing authorities who chafe at the high site cost of slum areas, called public housing without slum clearance "a cowardly program because it surrenders part of our cities to a cancer in the center."

Who's for what. Between speeches, NHC's Lee Johnson revealed results of an effective stroke of public housing promotion. To announced Presidential candidates, Johnson had written seeking their views on public housing, slum clearance, redevelopment. From W. Averill Harriman and Sen. Estes Kefauver he received forthright endorsements of NHC policy. Said Harriman: "It is essential that the limitations placed on new homebuilding are fair to all our citizens and give them equal treatment. We cannot do that by cutting public housing down to next to nothing." Harriman added that the "great new challenge" for the "whole housing industry" was to discover how to bring down the price of homes to levels "people of moderate means" can afford.

Said Kefauver: "I believe that the humanitarian program to rid our communities of slums and to assist the families of low incomes to obtain an opportunity for better living is essential to the preservation of private enterprise." . NEWS .. NEWS .. NEWS .. NEWS

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From Candidate Robert A. Taft, coauthor of the '49 Housing Act which set up the nation's public housing program, NHC received a warm endorsement of public housing. But Taft refrained from commenting on the bill on which he soon should vote. Wrote Taft: "The general theory that the government has a duty to assist the lowest income groups . . . is accepted in every State of the Union, and it does not involve any departure in principle from that which we have pursued during the 150 years of the life of the republic."

Sen. Henry Cabot Lodge, campaign manager for Gen. Dwight D. Eisenhower, ducked NHC's pitch. Wrote Lodge: "I have always been a supporter of a sound housing program (but) it would be quite impossible for me to speak for either General Eisenhower or for those who are actively engaged in his campaign."

'First class job.' The conference saved its biggest punch for the windup banquet. Delegates (and nine visiting Congressmen) heard President Truman flail away bitingly but unspecifically at his old target, "the real estate lobby," in



PUBLIC HOUSERS: Opening session of National Housing Conference meeting in Washington heard Sen. Hubert Humphrey (3d from left) warn delegates: "If you're expecting the Senate to restore this (public housing) cut, there's nothing up to now that indicates it will." Others (I to r): Executive Director John Ihlder of National Capitol Housing Authority; Director Nathaniel S. Keith of HHFA's slum clearance division; NHC President Olin Linn; Chairman Leon H. Keyserling of President Truman's Council of Economic Advisers; NHC Executive Vice President Lee F. Johnson. Keyserling called 5,000 public housing limit "folly." SWFWS.



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what he called a "whistle stop speech." Said the President in his first appearance before a housing group: "The real estate lobby has been trying to choke public housing to death by cutting off appropriations. That seems to be the policy now, trying to hamstring the government by cutting off appropriations. They are trying to choke the Executive Office to death and they are about to ruin the national defense program by cutting off appropriations. . . . I'm going to continue this fight with everything I've got. I'm going up and down the country as a private citizen and I'm going to tell them what this country means, from precinct to President. I'm going after those fellows hammer and tongs . . .

After begging support from NHC for other Truman programs "because we might as well do a first class job of lobbying while we're at it," the President swung again at the real estate lobby ("a selfish lot") and departed as he arrived-to a standing ovation.

Ask FHA probe. The conference adopted 17 resolutions which:

Asked Congress to approve the full 135,000 public housing units next fiscal year.

Urged a Congressional investigation of charges that FHA and VA housing programs have involved "favoritism," "excessive speculative profits," and "improper financial and administrative practices." (This arose from a mud-slinging speech by New York attorney Charles Abrams who charged, "FHA is the reason for the antipublic housing lobby.")

Deplored "reduction of space standards" in recent housing and urged Congress to require FHA and VA builders to give a warranty.

Urged increasing use of vacant land for federally aided redevelopment projects (Sen. Paul Douglas remarked that this would violate the intent of Congress in enacting the program).

#### WAGES: BLS figures show .6% rise; plasterers gain most

Union wage scales in the construction industry climbed slowly during the first quarter of 1952. The Bureau of Labor Statistics, in its quarterly survey of 85 cities, found pay rates rose only 6/10 of 1% between January and March and only 9/10 of 1% the quarter before that-compared to 2% during last spring quarter's bargaining season. Average pay of a building worker (\$2.47) now stood 20% above the pre-Korean level and 93% above the June, 1939 mark. BLS's figures:

TRADE	WAGE RATES			
	A	pril 1, 195	2	
	low	average	high	
Bricklayers	\$2.48	\$3.08	\$3.50	
Carpenters	1.85	2.56	3.25	
Electricians	2.00	2.80	3.30	
Painters	1.50	2.50	2.83	
Plasterers	2.25	3.03	3.50	
Plumbers	2.10	2.77	3.15	
Laborers	.88	1.68	2.41	



## A Good Dean Is Hard to Find, Cry Hard Pressed Architectural Schools

The end of the 1951-'52 academic year this month and next finds a crop of "job available" signs on the desks of US architectural school chiefs. A survey by House & HOME of 23 schools found four deanships had just been filled, four are vacant now and at least two more will be vacant within a year. The American Institute of Architects estimates the turnover will be even higher: deanship changes in almost onethird of the 38 (out of a total 66) US collegiate architectural schools approved by the National Architectural Accrediting Board.

Why mass vacancy? The AIA blames the "deans wanted" situation on two causes: Lack of funds to provide more endowed chairs and induce capable architects to come to the campus from private practice. For Denver University, this problem grew so acute that it decided to close its entire school of architecture permanently after this term.

An increasingly great student enrollment in architectural schools-16,000 currently, almost as many as the 19,000 AIA members. "Many of them look upon architecture as a sort of liberal arts degree. They will go into the construction business with Papahave no intention of practicing architecture at all," one AIA official said. And, since tuition rarely meets academic cost, greater enrollment means a greater deficit for the university to make up.

Back from retirement. Today when an architectural school dean reaches the age where he feels he deserves pasture many a college must beg him to stay on-at least to teach half-time. An extreme sample: last year at the University of Virginia, Prof. Frederick Disgue was recalled from retirement in accordance with instructions in the will of Dean Edmund S. Campbell naming Disque as his temporary successor. Here are the vacant deanships:

At Harvard, Joseph Hudnut steps out as dean of the faculty of design in July, a position he has held since 1935; and famed

Walter Gropius, who has been chairman of the school of architecture since 1938, is due to retire next year.

At Carnegie Institute of Technology, B. Kenneth Johnstone will return to private architectural practice this summer after seven years as college of fine arts dean.

At Miami University, Oxford, Ohio, the top office in the department of architecture has been vacant since Leicester B. Holland died in February.

At the University of Colorado, the department of civil and architectural engineering will be split July 1 and university administrators will need somebody to head a new department of architecture and architectural engineering.

At Western Reserve University, the school of architecture will be abolished sometime after June '53 and absorbed by a new division of visual arts. Dean Francis R. Bacon will be 65 next year and expects to step out. Western Reserve is looking for a full-time head of the department of design for this fall and, with Bacon's retirement next year, will then be needing some one to head up the new division of visual arts.

Shift at Princeton. One school which has managed to fill a vacant deanship is Princeton University. Last month, officials announced that Robert W. McLaughlin Jr., New York architect, will succeed Sherley W. Morgan this fall as director of Princeton's school of architecture.

Architecture department heads will probably retire within the next three years (although this is as yet unconfirmed by the departments) at: University of Minnestota, Rice Institute, University of Michigan, Virginia Polytechnic Institute, Georgia Institute of Technology, Illinois Institute of Technology, Yale University, Kansas State College and, since Professor Disque has only temporarily been recalled from retirement, at University of Virginia. Great man school. In considering new appointments, universities might ponder



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the views of Architect Alfred Shaw. Wrote Shaw in a recent *AIA Journal*: "Exposing the dullness or brilliance of the mine run of architectural students to only one man's guidance may not be the best scheme, no matter how great his reputation may be." Instead of the "Great Man" school now prevailing at Harvard, Yale and Illinois Institute of Technology, Shaw suggested that a professional educator head the architectural school, aided by a permanent staff to teach such fundamentals as drafting, structure and materials. To this he would add four to six visiting architects to provide changing inspiration and criticism.

#### LUMBER MANUFACTURERS pick Bodine as executive head

In a mellow mood, the National Lumber Manufacturers Association met last month in St. Louis (where it was founded), to celebrate its golden anniversary. Reconciling the explosive differences between Southern and Western lumbermen over selection of a new executive vice president, the directors picked Leo V. Bodine, 42, of St. Paul, Minn., well known industry figure and vice president of Weyerhaeuser Sales Company, for the post at a reported \$35,000 a year. "To get a man all factions could agree on," NLMA had considered tapping another industry.

In general sessions, conventioners reviewed the group's half century of achievements, found them substantial. Biggest victory: standardization, the main reason for the organization's formation in 1902. It was a NLMA committee working with the Department of Commerce that "provided the basic work which has led today to the universal use of standard grades and sizes throughout the country." (Anniversary pronouncements notwithstanding, the battle for uniformity is by no means won.) Other organization gains: tailor-made lumbermen's insurance; adequate credit information; extensive promotion including important research on building codes and waste prevention.

For the future, the accent was on research. Nobody was worried about the supply of timber. If present trends continue, said President John B. Veach of Asheville, N. C., "trees will be running out of our ears...But," said he, "I am wor-ried about our markets...." His suggestions: do a better selling job, intensify research and product development. Other speakers echoed him. Thundered Omar Hilton, president of Bradley Lumber Company, Warren, Ark.: "Any industry, or member thereof, ignoring science, belittling research, and dogmatically clinging to old established practices . . . definitely is on the way to the industrial graveyard." He called for all-out support of research.

### BUILDING STEEL: revalued military demand hints oversupply

Like mythology's magic pitcher of milk, the nation's steel supply-though theoretically consumed and consumed-refused to run dry. Despite the banking of fires in anticipation of one strike and, subsequently, three days of actual work stoppage (resulting in a 21/2 million ton loss and spinning the production rate down to 52.1% of capacity), the National Production Authority announced fresh relaxations of civilian metal restrictions. Biggest reason for the seeming anomaly was that the long overdue deflating of DPA's estimate of the military metal take left far more steel available for civilian users under CMP than the brief shutdowns lost. Symptoms of the situation:

▶ A healthy stockpile when Phil Murray and Big Steel first started growling ("Steel inventories are at a higher level than at any time since World War II," reported one Cleveland mill boss).

▶ The steel mills actually approaching the 85 million ton production increase sought by US defense chiefs (Pittsburgh officials reported new capacity was coming in at the rate of one million tons a month).

▶ A decrease in the large tonnage, particularly in structural shapes, needed for plant expansion (when five steel companies applied for a total of \$401 million in defense loans for expansion purposes the Defense

#### MATERIALS, BUILDING COSTS



WHOLESALE PRICES of building materials rose a scant 0.1% from March to April, calculated BLS. Rumblings of wage increases were heard, but these were not enough to cause a major upturn in building cost indexes.

Production Administration shook its head: no more additional capacity is needed).
Dwindling demand for steel by appliance manufacturers who were suffering a severe sales slump (Chicago reported the most plentiful steel were the rolled strips and sheets used for making stoves, refrigerators and all appliances).

▶ Final dissipation of the gray market (Cleveland warehousemen blamed a break in their prices on gray marketeers getting so scared they dumped their stocks).

For contractors, the most heartening news on steel came from Douglas Darby, chief of NPA's steel division. Said he: "Supply and demand for structurals are about in balance at present and by the end of summer there should be an oversupply." Darby hoped loosened building curbs will soak up the oversupply as it occurs.

William H. Olson

EWS ... NEWS ... NEWS



LOCKHEED PLANT: thin walls save dead weight, increase floor space

Lockheed Aircraft Corp.'s clean-cut \$3,160,000 engineering building, opened last month at Burbank, Calif., has spandrels of crenelated steel decking (only 3" thick including insulation) between its bands of sealed windows. Architect Welton Becket says the technique saved 800 tons of dead weight, increased floor space by thousands of sq. ft. Of flat-slab construction, the four-story building has a steeltruss roof. This makes interior columns on the top floor superfluous, permits a floor-size room for the engineering and drafting departments. The basement was built with 12" thick walls, no direct access to outside and air conditioning to double as a bomb shelter. Lockheed plans to house 1,800 employees here, plus a battery of tabulating machines. Movable interior partitions permit flexible use of the building's 165,000 sq. ft.





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## Atlas Officials Tell Senators Air Base Debacle in Africa Not Contractors' Fault

Fortified with a 17-page report, spokesmen for the Atlas Constructors this month gave the Senate Preparedness Subcommittee a fact-filled denial of misdoing in the costly construction of five US air bases in French North Africa.

Chorused J. B. Bonny and Lyman D. Wilbur, Atlas top executives and fellow vice presidents of Morrison-Knudsen, Inc. (one of Atlas' five partners): "We did the best work that could have been done under the whiplash of time and the circumstances surrounding it."

Specifically, they said the cost to the government had not reached \$300 million (as earlier witnesses had stated) but, as of Apr. 1, \$160 million. What's more, Atlas accepted the North African assignment on a fixed fee of 1.78% of cost—a fee that did not include the interest Atlas pays on its financing capital (\$7.5 million has been invested by the companies so far), salaries above the government's \$15,000 ceiling, and many expenses.

Handicaps. Bonny and Wilbur told the committee Atlas had to make the first two air bases operable before blueprints and specifications had been fully evolved. Despite this, planes got off the runways 83 days after ground was broken. Said Bonny:

"This committee has heard reports describing the construction work in North Africa as substandard and mediocre . . . that plans and specifications were ignored or overlooked . . . We did exactly what the district engineer directed us to do.

"We categorically deny that mismanagement has existed and we challenge the competency of those who have so accused us [Col. Harry Reed, chief of Army Audit; William J. Cassidy, Army Audit Moroccan representative; Joseph Connolly, ex-subcontractor inspector; and John W. Leahy, ex-Atlas employee discharged at the request of the local district engineer]."

**Conflicting testimony.** Since both sides testified under oath yet were in contradiction, Sen Lyndon B. Johnson (D, Tex.), committee chairman, declared he was turning the testimony over to the Department of Justice "for appropriate action."

Although the committee was still a good month away from its final report, two things seemed predictable:

Future hearings would focus on a new angle: stateside purchase of supplies and equipment, a previously unexplored field.

Some members of the committee would urge approval of a recommendation from



ATLAS' WILBUR (L) AND BONNY

the Army Audit Agency: hasty joint ventures by contractors are not too efficient, make pinning down responsibility difficult; a better solution would be to assign the job to the best contractor in that particular field, let *him* form a chain of command of as many subcontractors as he requires. In that way, much of the uncertainty of who was doing what would be eliminated.

#### MILITARY CONSTRUCTION: Pentagon seeks \$3 billion

Though the military spending program was long past its honeymoon in Congress, the Pentagon this month optimistically asked for \$3,027,752,000 for military public works for the 1952-53 fiscal year. The lion's share (\$1.5 billion) would be for facilities to start the Air Force expanding from 95 to 143 wings. But ultimately, insisted Air Secretary Thomas K. Finletter, the expansion will require \$5 billion worth of new bases. Much of the money in the '53 bill would go for new strategic bomber bases in nations of the free world bordering Soviet lands. Said Finletter: "We are . . . spending large sums for construction of overseas bases in countries where, due to political instability, our position is uncertain . . . There is no alternative . . . We cannot have our eggs in too few baskets."

111 Army, Navy projects. For the Army and Navy, the Defense Department asked less, but still enough to cover some 60 new Army and 51 new Navy construction projects in the US including considerable family housing. The requested authorizations (in millions):

	INSIDE	OUTSIDE	CLASSIFIED	
	U. S.	U. S.	PROJECTS	TOTAL
Army	\$178	\$68	\$26	\$273
Navy	174	35	29	238
Air Force	860			1,510

To an air-minded Congress, the uneven distribution was simply good securityprovided close scrutiny did not disclose evidence of padding. But legislative hackles rose over the Defense Department's request for a flat \$1 billion slush fund in addition to the project authorizations for "collective defense" facilities abroad. Part of this would represent the US share of costs agreed on at the Lisbon meeting of NATO nations in February. Regardless of the Defense Department's bland explanation that much of this construction was secret, it was apparent Congress would ask searching questions.

Economy drive. Some Congressional leaders were already talking of cutting the program in half. Others thought it could be sliced even more. Last September, Congress authorized a whopping \$5.8 billion in military construction. Although only \$2.9 billion of this was ultimately appropriated, economy minded Congressmen argue that even this amount is still unspent. (Unlike other types of appropriations, construction appropriations do not expire at the end of the fiscal year. They are good until spent.)

Private building circles viewed the huge program with mixed feelings. It meant good business for several years for some segments of the industry, but it also would tend to postpone a full return to a normal market where civilian projects do not play second fiddle to military work.

### ANTITRUST: metal lath makers held guilty of price-fixing

US Gypsum Co. and nine other manufacturers of metal building lath were found guilty of price fixing by a Federal Trade Commission examiner this month and ordered to desist. The group makes virtually all the US metal lath.

FTC said price-fixing began in 1932 when US Gypsum issued manufacturing licenses to all but one of the other companies.

NEW	CON	STR	JCTIO	N A	CTIV	ITY
(expend	iture	s in	millio	ns c	of de	llars
	Ap	ril		Firs	t 4 m	onths
Type	*51	'52	Change	'51	'52	Change
		PR	IVATE			
Residential						
(nonfarm)	898	846	-5.8	3,489	3,041	-12.8
Industrial	152	205	+34.9	559	822	+47.0
Commercial	125	87		496	322	-35.1
*TOTAL	1,691	1,656	-2.1	6,409	6,104	-4.8
		P	UBLIC			
Industrial	67	112	+67.2	186	369	-1-98.4
Military	56	145	+158.9	150	517	+244.7
Residential	42	59	+40.5	138	254	+84.1
*TOTAL	697	815	+12.4	2,240	2,801	+25.0
GRAND						
TOTAL	2,388	2,471	+3.5	8,649	8,905	+3.0
* Minor co of parts. Da	ompone ita fror	nts not	shown, r, Comm	so tota	al exce epts.	eds sum

**NEW CONSTRUCTION EXPENDITURES** ran ahead of last year's outlays for both April (4%) and the first four months of the year (3%). Total private building, however, dipped slightly this April compared to last, while public construction romped ahead 17% for the same period, and 25% for 1952 to date.

## SCHOOL BUILDINGS

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Harvey Firestone Memorial Library, Princeton University, Princeton, N. J. Architects: O'Connor & Kilham

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## Architects Hear Psychiatrists' Frustrations Over Design of Nation's Mental Hospitals

Reversing the usual analytical procedure, US Public Health Service architects got members of the American Psychiatric Assn. on the couch at a special meeting in Washington last month, let doctors reveal their frustrations with mental hospital construction.

The point of discussion was a big one. Over half the US hospital beds today are for the mentally ill. The bulk of these, some 439,000 beds, are run by the states and represent a \$256 million investment. Most of today's mental hospitals were built in the last half of the 19th Century. Some are 100 years old. Capital improvement appropriations have been sporadic. Most engineers and architects lack experience in building neuropsychiatric hospitals.

Needed: more amenities. The psychiatrists agreed on one principle: environment is a tremendous factor in speeding a mental patient's recovery. They asked architects to look into three elements of design:

▶ Lighting: which for safety may be placed only in the out-of-reach ceiling, yet now is often so far away as to prevent patients from reading.

▶ Locks: which now are so outmoded that the institutional clanking at the end of a room is enough to set a whole ward on edge.

Plumbing: so antiquated in many institutions that the original firms are no longer around to perform the proper repairs.

Humanizing the old "snake pit" environment could not be overstressed by the doctors. One Canadian psychiatrist said a patient of his was well enough to go home after merely being *moved* from an old institution to a new one.

**Big building program.** Since most state hospitals are overcrowded 30 to 60% and many have no provision for separating child patients from the aged, the doctors felt sure a "vast" building program was not only imperative but imminent. When the necessary funds are available, psychiatrist-architect co-operation is essential. Without it (as in a hospital now under construction) such unhappy planning occurs as bedding 125 elderly women, all ambulatory but dismissed as "suicidal," in a single room.

Said Dr. Paul Haun of Winston-Salem's Bowman Gray School of Medicine: "We know a competently designed building can do the same job with from 20 to 30% fewer employees as one of more haphazard planning."

How large? On the question of how big

neuropsychiatric hospitals should be, architects could take their choice of conflicting expert opinion. Dr. Mesrop A. Tarumianz, superintendent of Delaware State Hospital, said a capacity of more than 2,000 beds was too great for one administration to handle. He also thought hospitals should only be built for 30 to 40 years use—changing treatment methods will outmode them beyond that time.

Dr. Harry J. Worthing, director of Long Island's Pilgrim State Hospital, whose 14,000 beds make it the world's largest, differed. Said he: "A large institution can offer more in the way of special services and equipment; a larger gathering of patients offers more possibilities for aiding research."

#### MAIMONIDES Hospital to undergo \$100,000 alterations

When San Francisco's \$1,250,000 Maimonides Hospital was completed a little over a year ago, its airy, balconied design won critical acclaim throughout the architectural world (Feb. issue '51). But this month, Maimonides' administrators were preparing for a \$100,000 alteration job on architect Eric Mendelsohn's exciting steel, glass and concrete work.

First off, explained Maimonides President Charles Wollenberg, the hospital couldn't obtain liability insurance because the balcony railings were considered too low for safety. That was solved by locking all the balcony windows, leaving the sun-drenched balcony space something that could only be pined for. The next thing that troubled the hospital was economics. Most hospitals run on the basis of one staff member for each 30 beds (some go up to 42). Maimonides, with 87 beds, found its floor plan required a staff member for each 16 patients. To Wollenberg, this was extravagant. Now San Francisco architect Wayne Hertzka has been engaged to push out the wards' steel walls to include the  $6\frac{1}{2}$ ' x 100' balconies. This will mean a gain of 45 beds. Thus Wollenberg figures the remodeling will save Maimonides \$40,000 annually.

Other changes which Hertzka has been commissioned to do: create additional hospital storage space to permit the bulk purchase (and consequent savings) of drugs and general supplies; design a ventilating system to counteract the heat when sunlight pours in on the wards through the full-length balcony windows.

#### BUILDING RESEARCH expansion recommended as AIA project

Building research got another big public boost last month from Dr. Clifford S. Rassweiler, Johns-Manville vice chairman and research chief. Speaking to 375 persons at the AIA's middle Atlantic regional convention at Philadelphia's elegant Bellevue-Stratford Hotel, Rassweiler urged architects as the designers and intellectual leaders of the building industry to sponsor and push the idea of an expanded research program in that part of the industry which is actually concerned with building houses. He suggested these other areas where greater industry participation in research would be valuable: assembly of materials into finished buildings; determination of minimum structure and equipment requirements to give safety and low-cost maintenance.

In another address, voluble New York realtor William Zeckendorf lambasted Philadelphia's much ballyhooed redevelopment plan (AF, April, '52). Said he: "I would like to know a less imaginative, more unintelligent way of planning a city than that." Principal target of his criticism: relocation of housing in midtown slum areas. Such potentially valuable real estate presumably could be redeveloped with nonresidential buildings, while the slum dwellers would doubtless relish a move to less crowded, greener areas, said Zeckendorf.

Photos: Jules Schick



**REGIONAL AIA CONFERENCE** participants included New York realtor William Zeckendorf, President J. Roy Carroll of Philadelphia AIA chapter, past President Alfred Bendiner and First Vice President Beryl Price.



Producers' Council Chief A. N. Lane (I) and Clifford Rassweiler, who urged more building research.



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### SEPARATE BIDS: bills before Congress would change contracts

For years, controversy has simmered in half a dozen states over their laws requiring separate bids from mechanical subcontractors on public construction. But general contractors, who swing less political weight than a combination of labor unions and subcontractors, have generally failed in their attempts to convince legislators that such laws raise the price taxpayers must pay for public works.

This month the fight made its debut on a national level. A Senate judiciary subcommittee began hearings on a bill sponsored by Sens. Kilgore (D, W. Va.), Sparkman (D, Ala.) and Ferguson (R, Mich.) and aimed against bid shopping and bid peddling on federal construction jobs. It would:

1) Require general contractors on federal jobs in lump sum bidding to name their mechanical specialty subcontractors (plumbing, heating and electrical work) and the amounts of their bids. The general contractor would be required to use these subs if he won the award unless others qualified to do the work submitted lower proposals. But if such a substitution were made, the savings would have to be passed along to the government. 2) Limit the same type of subcontracting operations on cost-plus-fixed-fee assignments to subs with a satisfactory record of experience. This would prevent general contractors from doing this part of the work themselves unless they could show that they had built up a mechanical specialty organization of their own with a demonstrated capacity for performance.

Generals opposed. The Associated General Contractors, Army Engineers and Public Buildings Service ganged up against the measure. No one criticized the bill's lofty purpose. Objections focused on the cost and drudgery of the immense amount of policing work involved. At the committee hearing, Commissioner W. E. Reynolds of Public Buildings Service complained: "You can't legislate morals." Maj. Gen. G. J. Nold, deputy chief of Army Engineers, said the bill would create more trouble than it would eliminate.

Proponents comprised spokesmen for specialty contractor groups who have long plugged for cleaner practices on government work and Dan W. Tracy, president of the AFL International Brotherhood of Electrical Workers. Electrical contractor Charles W. Moseley of Charlotte, N. C., who fired the main blast for the National Electrical Contractors Association, said that better subcontractors in many cases refuse to bid on government work because of the prevalence of bid shopping.

House bills go further. A number of similar bills have been introduced in the House. One significant modification was incorporated by House sponsors who include Reps. Henry M. Jackson (D, Wash.) and George H. Bender (R, Ohio). Their bills would give the government bid-letting agencies discretionary authority to extend separate bid protection to non-mechanical subs. To general contractors, this seemed the ultimate in glorifying subs at their expense.

## Slum-Infested Norfolk Becomes a Model Of How Title I Redevelopment Can Work

When Norfolk, Va. (pop. 210,000) completed its pace-setting plans for redeveloping almost a third of its downtown area from slums into a complex of public housing, new highways, stores, and industrial sites (May issue '50, p. 132), even some men in HHFA's redevelopment program scoffed privately that it would never work.

First final deal. Last month, however, Norfolk was still a pace setter. On April 15, the city became the first in the nation to execute a final loan and grant contract with HHFA under the Title I slum clearance section of the 1949 Housing Act. For Norfolk's starting project, the US will donate \$3.7 million, lend another \$7 million to speed demolition of 127 acres of Negro slums and rehousing of some 2,900 families. In place of the squalid, unpainted shacks will rise 750 units of public housing (the first of which will cost \$8,160 per unit for the structural work), light industry and commercial structures, and a major realignment of downtown streets to help break traffic snarls that were driving away trade.

At actual leveling of slum buildings, Norfolk was as far in the lead among US cities as it was with money raising. Bulldozers and wrecking crews had flattened 270 buildings which covered 24 acres. Observed Frederick Allen of New York, whose firm drafted Norfolk's plans: "It's a unique operation, which, through circumstances, has really put Title I on the map." Solving the biggest problem, relocation of 2,900 families, Norfolk found to its surprise more of them could afford to buy than there were homes for sale. Public housing will accommodate 2,100 relocatees, 1,350 of them in city fringes on open land.

Salesmanship wins. Success of Norfolk's redevelopment rises chiefly from the energetic devotion with which its backers sold the idea to the city. Says Allen: "The program has been two-thirds public relations, and one-third technical." One result: the Norfolk Redevelopment and Housing Authority so far has won 60 condemnation cases from balky slum landlords, has another 70 in court. Not a single landlord has tried to challenge the legal validity of the Redevelopment Act, a step which could conceivably bog down the whole program. Says Housing Authority Director Lawrence M. Cox: "We believe it has not been challenged so far because the majority of citizens want this program . . . We are not testing our wings on open land projects. We initiated the program with the projects we thought most likely to succeed."

Norfolk had not only confounded the skeptics but also earned the right to be ranked as *the* example of what the slum clearance program of the 1949 Housing Act can mean in all its multiple phases.



### MILITARY CONSTRUCTION: Air Force to standardize hangars

For Air Force planes that grow bigger and bigger, Philadelphia's Kuljian Corp. has designed the biggest hangar the Air Force ever ordered. A double cantilever roof span permits a floorspace measuring 600 x 250' with shops in the center. Doors 60' high, with push-button control, will have canvas panels to permit large planes to crawl in with only their nose or tail protruding. The hangars, which come in three basic sizes, will be adaptable with a few modifications to any of the Air Force's climatic locations.

With similar intentions of standardizing design, the Army recently unveiled "emergency" plans for 245 types of buildings which would be required for a camp housing an infantry division. Intended for use in case of hasty mobilization, the designs call for slab floors, short and abundant mill cuts of lumber.



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## PEOPLE: Wilson's walkout starts controls personnel exodus; Blough is Big Steel heir apparent; Huber to be ASCE head

Following Mobilizer Charles E. Wilson's departure from Washington, the job relinquishing of top-rank business leaders in



FLEISCHMANN

the defense set up reached exodus proportions. Just as he had promised, Defense Production Administrator Manly Fleischmann announced he was returning to private law practice in Buffalo June 1. Succeeding him, yet hold-

ing on to his old job, is Henry H. Fowler, National Production Authority chief. And Fowler is reported anxious to resume his private law practice in September. Other departures: Henry Kaiser aide H. Clay Bedford, production bottleneck breaker for the Secretary of Defense, to become president of Chase Aircraft Co.; Harold R. Boyer, DPA aircraft production board chairman, to a top job with General Motors. The exodus, plus a growing disinclination by private business to send in replacements, could only have one effect: to hasten the demise of controls. Unless industry supplies the experts who can make controls technically realistic, controls will break down, and government cannot possibly hire enough men to enforce defense regulations in detail.

"Ungrateful country-you shall not have my bones," cried Charles-Edouard Jeanneret-Gris when his native town, the Swiss watchmaking capital, La Chaux-de-Fonds, thought his modern houses most ungemütlich. That was 45 years ago. But today his Swiss houses still look as modern as they did in 1907 and Charles-Edouard, better known as Le Corbusier, has made goodbeyond the Alps. Now, all forgiving, Corbu means to utilize plans he once drew for La Rochelle, in France, and revitalize his native La Chaux-de-Fonds. Scheduled to tower with the Alps: two apartment buildings holding 5,000 people. On their roofs will be enough public garden space to permit summer camps, observatories and a helicopter landing field. Below will be living quarters, libraries, stores and workshops.

Having reached the 65-year retirement age, Irving S. Olds left US Steel's board chairmanship after 12 years as top man, resumed private practice with his New York law firm, White & Case. Benjamin F. Fairless, 62, the coal miner's son who has been US Steel's president since 1938, became board chairman as well. Younger (48) **Roger M. Blough**, also a White & Case alumnus, moved up from executive vice president to vice chairman of the board, thus becoming heir apparent to Steel's No. 1 job.

Stopping off at AIA's Washington headquarters, the Octagon, to present a candelabra, Andrew G. Henderson, president of the Royal Institute of British Architects, offered a recipe for building a bomb-resistant hospital: pick a site with minimum vulnerability (the one he designed near Glasgow is between two hills), then build well supported floors with curtain walls that can be blown out. Providing the patients have sufficient warning to evacuate, this fuse-plug concept will then confine damage and save the major part of the building. Henderson declared this is as near as you can get to a bombproof building. On general design, Britain's Henderson was succinct: "Our architects have had to become modernists through necessity only by such an objective approach can we achieve the maximum economies."

San Francisco engineer Walter L. Huber, 67, was nominated for president of the American Society of Civil Engineers in



HUBER

1953. Nomination is tantamount to election. Huber, a graduate of the University of California, is a former ASCE vice president, a former district engineer for the U. S. Forest Service. He was structural engineer for San Francisco's famed

garage under Union Square, has been consultant for numerous hospital, military and dam projects on the West Coast.

When the American Institute of Architects holds its annual convention banquet in New York City June 25 "Fellowship," the AIA's highest degree of membership, will be conferred on 39 architects. They are:

Max Abramowitz, C. Storrs Barrows, Max Foley, Robert Hutchins, Robert McLaughlin, James O'Connor, Alfred E. Poor and Antonin Raymond, (Continued on page 66)

Mrs. William Michels



#### FIRE AT TALIESIN: FLLW organizes milk-can brigade to fight flames

Taliesin Fellowship's current crop of 60 architectural students, wintering in New Mexico, will find a pressing assignment when they return to their summer campus at Spring Green, Wis. Reason: a rubbish and grass fire Apr. 26 spread to the oak-beamed roofs of Frank Lloyd Wright's famed Hillside School, destroyed about a third of the seven-building campus, including a theater building, the central section of a Tshaped school building and (pictured above) sleeping quarters of half the student body over the store dining room (the other half sleep at FLLW's "Taliesin" home a quarter-mile away).

FLLW, who had returned only a few days before from a triumphal tour of Europe (H&H, Mar. '52, p. 63), directed volunteer firefighters from neighboring dairy farms, who imported water with milk and cream cans. The flames were controlled in 2 hrs. Wright carried no fire insurance (he considered the stone walls and oak beams highly fire resistant) to make up for the estimated \$50,000 to \$75,000 in damage.

"Taliesin" itself has weathered two previous fires: one set by a crazed butler in 1914 in which FLLW's wife, two children, and four friends were killed; another in 1928. The architect considers his 50-year-old school buildings irreplaceable, plans to put up tents for his unhoused students.



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AMERICAN BRIDGE BEGINS erection of the steel framework for the cover of the Franklin D. Roosevelt Drive at the UN Headquarters. Eventually the entire drive from 42nd St. to 48th St. at East River will be covered. In the right foreground steel framework for the Meeting Halls Building can be seen. When completed, this building will extend, by cantilever construction, over the drive to the edge of the river.

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N ow that the UN Secretariat Building is completed, American Bridge is erecting the Meeting Halls Building and cover for the Franklin D. Roosevelt Drive, General Assembly Hall and North Parking Space. When finished, these structures will contain 18,600 tons of fabricated steel framework, in addition to the 13,800 tons which went into the Secretariat Building.

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After two marriages (one ending in widowerhood, the other in divorce) Los Angeles realtor **Percy T. Martin** died at 76 with definite ideas on human conduct. His \$515,-000 estate, filed last month, provided \$300 monthly and rent-free homes to a 48-yearold spinster and a 50-year-old widow *if*: "they never drink or smoke, remain unmarried and unengaged, refrain from any immoralities . . ."

NAMED: Benjamin F. Fairless, US Steel president, as recipient of the John Fritz medal, "the highest award in engineering," for "championing the free enterprise system"; John W. Root, Chicago architect (Soldier Field, Palmer House, Daily News Building), as a chevalier of the Legion of Honor for his services to architecture and the promotion of Franco-American understanding; Carl D. Franks, veteran executive of the Portland Cement Assn., as the PCA's executive president; John P. Riley, New York City school construction co-ordinator, to honorary membership in the AIA; William S. Parker, Boston architect, as recipient of the AIA's Edward C. Kemper award for his services as consultant on contract procedure; Reginald J. S. Pigott, Gulf Research & Development Co. engineering director, as recipient of Columbia University's 1952 Egleston medal for distinguished engineering; Robert Moses, New York City construction co-ordinator, as an honorary member of the AIA and as recipient of Brazil's highest honor, the Southern Cross, for his studies of that country's land and water utilization; Charles E. Bennett, president of Pittsburgh's Manufacturers Light and Heat Co., as president of the American Gas Assn.; Admiral Edward L Cochrane, head of the Federal Maritime Board, as dean of Massachusetts Institute of Technology's school of engineering; (Continued on page 68)

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NEWS ... NEWS ... NEWS ..

Duncan Campbell, former chief mediator for the Federal Works Agency, and Laurence E. Seibel, former Labor Department attorney, as members of the 12-man Construction Industry Stabilization Comm.

The only dignitary missing when Manhattan's Lever House was dedicated last month was the man who persuaded Lever to move its headquarters from Boston to New York, ex-Lever President **Charles S. Luckman**. Resuming his original training as an architect and now a partner in the flourishing Los Angeles firm of Pereira & Luckman, Luckman happily told friends: "I can finally sleep without taking pills."

DIED: Robert A. Nordblum, 70, New York and Boston financier who engineered the sales of Florida's Boca Raton, Palm Beach, Biltmore and Whitehall hotels and California's Hotel Del Coronado, Apr. 12 in New York City; Clinton K. Yingling Jr., 55, US Public Buildings Service structural engineer who determined the amount of structural repair work needed in the recent White House remodeling, Apr. 19 in Washington, D. C.; C. Laurence Warwick, 63, longtime (34 years) secretary of the American Society for Testing Materials and pioneer in standardizing engineering materials, Apr. 23 while presiding at an ASTM banquet in Philadelphia; Charles E. Mac-Quigg, 67, Ohio State University dean of engineering, Apr. 24 in Columbus; Harry Thoens, 72, real estate consultant to the Woolworth dime store chain, Apr. 24 in New York City; Harry T. Kendall, 69, board chairman of the Weyerhaeuser Sales Co. whose leadership in the industry had earned him the title "Mr. Lumber," May 2 while attending a conference of the US and Canadian Chambers of Commerce at White Sulphur Springs, W. Va.; Leo H. Cleary, 58, electrical engineer who designed lighting for the Senate and House Office Buildings and the Williamsburg, Va. restoration project, May 3 in Washington D. C.; Chester N. Godfrey, 74, Boston architectural authority on Gothic forms and co-designer for New York's Cathedral of St. John the Divine, chapels at West Point and Princeton and the Boston University campus group, May 5 in Boston; Francis G. Mc-Kelvy, 68, board chairman of the Alpha Portland Cement Co. and onetime chairman of the Portland Cement Assn., May 7 in Easton, Pa.; Allston Dana, 67, civil engineer and designer of New York's George Washington, Triborough, Bronx-Whitestone and three Staten Island-New Jersey bridges, grandson of poet Henry Wadsworth Longfellow and author Richard Henry Dana, May 12 in Harrisburg.



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#### LETTERS

#### **NO MORE RIVETING?**

#### Sirs:

Your excellent article on riveting (AF, Mar. '52) throws much-needed light on a fastening device which promises eventually to make field riveting obsolete. As an enthusiastic advocate of the high tensile steel bolt, I feel that it is unfortunate that so few architects and eengineers are familiar with its advantages. For example, I have found that as soon as the subject is broached, someone invariably asks if it isn't true that bolted joints have poor fatigue properties and poor resistance to loosening under vibratory loads. A great many are apparently completely unaware of the fact that these are two of the very features in which high tensile bolted connections are superior to riveted connections.

Until now the primary application of high tensile bolts to buildings has been where quiet erection is an important consideration. They have also been employed in places where clearances do not permit the use of riveting equipment. In such applications they often are designed to act in combination with rivets placed elsewhere in the joint, instead of being used to supplant entirely the use of rivets!

Although it is inevitable that the future will see an increasingly widespread use of this comparatively new fastening, it is unfortunate that more are not taking advantage of it now. While building code restrictions are a formidable obstacle, they will melt under sufficient pressure. The enthusiasm of those who have actually utilized high tensile steel bolts, together with more articles such as "No More Riveting?" in our technical press, should help considerably to remedy this situation.

> HOWARD SIMPSON Ass't. Prof. of Structural Design Dept. of Bldg. Engineering & Construction Mass. Institute of Technology Cambridge, Mass.

Sirs:

Your article "No More Riveting?" is a definite contribution to our construction arts. The advantages of bolting steel are carefully and lucidly analyzed.

Such an article tends to accelerate an already marked trend, that is, one in which the architect takes comprehensive inventory of the technical potentials governing solutions of his problems. During the last generation, these potentials had been tending to escape the architects, a priori considerations.

Let's have more of these articles,

R. BUCKMINSTER FULLER Cornell University College of Architecture Ithaca, N. Y.

Sirs:

Although there is a scarcity of riveters for field work, the steel industry has a very heavy (Continued on page 78)

343-C

U.

S.

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#### LETTERS

investment in riveting machines in the shop. Shop riveting therefore will be with us for a good long time, until these machines can be amortized and the shop routine changed as newer methods develop. From this standpoint, one advantage of high strength bolts is that it is a little easier to combine shop riveting with field bolting than with field welding, particularly because it is hard to use the field welding technique to its full benefit.

The major handicaps are control of workmanship and greater danger of rusting in steel work exposed to the elements. It is obvious that the amount of torque applied to bolts must be carefully controlled, which may not be too easy to do. Also rounded rivet heads offer considerably less opportunity for water to collect and seep into joints than do bolts with their angular shapes and washers.

Looking into the future, it is quite possible that the present rather crude technique of field riveting will be highly improved, possibly by introducing some of the welding elements, so that field riveting may die a little harder than some are inclined to believe.

> FRED N. SEVERUD Severud-Elstad-Kreuger, Consulting Engineers New York, N. Y.

Sirs:

I have read your article "No More Riveting?" with considerable interest.

The use of high strength bolts or rivets in multiple bolted or riveted joints may not be a safe procedure because it intensifies the high concentrations of stress in the main plates at the first row of bolts. Since this feature has always been a point of overstress in riveted designs, the switch to high strength bolts may well be "the last straw that breaks the camel's back" by making these overstresses so high that the main material will be unsafe at the same point.

As long as the rivets are made of material that is softer and more ductile than the main plates, the end rows of rivets simply slip and the overstresses are limited by the ultimate strength of the rivets in shear.

This action is evidenced by the loosening of the end rivets in connections of members that are subjected to heavy reversals of stress, but since the actual failures occur only in the rivets at normal design stresses it has caused no great concern.

As the bolts are made stronger, however, they soon reach a point where the bolts will no longer slip or fail and then the equalizing deformations are forced to occur in the main plates.

Thus while failures can occur in a few of the end rivets in any multiple riveted joint without being critical, it does not follow that it will also be safe to prevent such failures by using such high strength bolts as may endanger the main section.

(Continued on page 82)

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THE MAGAZINE OF BUILDING





Architects: Sims, Cornelius & Schooley, Columbus, Ohio



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★ All quotes taken from Mr. Wright's address before the Pacific Coast members of the American Society of Architectural Hardware Consultants and the National Contract Hardware Association at the Arizona Biltmore in Phoenix, Arizona.

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#### LETTERS

It is unfortunate that so many riveted and bolted designs have been made by so many people who still naively believe that the distribution of stress in a multiple riveted joint is equally divided among all the rivets.

This age-old argument was a moot question over two generations ago when designers first began to desert their more expensive, but well designed, pin connected truss joints in favor of the cheaper multiple riveted joints.

The wisdom of changing from a single large pin to multiple smaller pins as a method of transferring stresses, however, has never been satisfactorily demonstrated; and while many research and testing programs have been undertaken in regard to this subject, the proof doesn't seem to be forthcoming and at the present moment it seems unlikely that friction will ever be seriously relied upon to replace the need of having real mechanical connections.

The fact that these changes have come about is purely economic and, except for the single row bolted joints of low efficiency, I am forced to believe that the use of bolts and rivets has been a temporary expedient that will soon be abandoned in favor of welding practically everything as soon as we learn how to weld.

> NED L. ASHTON Department of Civil Engineering State University of Iowa Iowa City, Iowa

#### **HOSPITAL OF IDEAS**

Sirs:

The Anderson Hospital in Houston, designed by MacKie & Kamrath, Architects (AF, Feb. '52), is good architecture in the complete sense and your article about it was very well written.

It appears that MacKie & Kamrath and Dr. Clark have evaluated, resolved and adapted many progressive ideas that have been controversial for a good many years and, wherever possible, the team has shown spirit and courage in every nook and corner they could find....

W. L. PEREIRA Pereira & Luckman, Archts. & Engs. Los Angeles, Calif.

Sirs:

We studied with great interest your presentation in the February issue of the Anderson Hospital in Houston, Texas. We have been in on this job almost from its inception and feel that it is a project of great merit and commend you on the space which you gave to it in the FORUM.

> MARSHALL SHAFFER, Chief Technical Services Branch Div. of Hospital Facilities Public Health Service Washington, D. C. (Continued on page 86)

Dormitory Bldg., St. John's University Collegeville, Minn. Architect: R. V. McCann COLLEGE DORMITORY with "built-in" MONEY SAVER

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#### LETTERS

#### Sira

You admit to more than one kind of organic architecture when you say architects MacKie & Kamrath of the Houston Cancer Hospital (AF, Feb. '52) subscribe to the one brilliantly pioneered by Frank Lloyd Wright. And you readily point out one of the main drawbacks of this "kind" of architecture: the inability to

Photo: F. Wilbur Seiders



MacKie & Kamrath's Hospital

maintain its principal characteristics-"sweeping horizontal planes and lines that tie a building to its natural setting"-in a tall slablike building.

If the solution logically arrived at (a mere assumption, of course) is that of a tall flat slab, why the attempt to fight it as "the flatbosomed geometry MacKie & Kamrath were likely to get if they didn't watch out"? Or does FLLW propose preconceived solutions, i.e., no flat slabs, in his kind of organic architecture? Perhaps MacKie & Kamrath should have looked less at the master's solutions and more at his writings.

As you say, "whether they planned it or not," MacKie & Kamrath have arrived at a solution (to my mind and eye, successful) which is a blending of organic and abstract design. But surely not alone organic.

There exist only two kinds of architecture today, the bad and the good. And even the good architecture is not always perfect, organic or otherwise.

> A. P. DE ALBUQUERQUE, Architect Belem, Para, Brazil

Sirs:

I have reviewed with great interest your article "Hospital of Ideas" (AF, Feb. '52). It is extremely well presented. . . .

**ROBERT W. CUTLER**, Architect Skidmore, Owings & Merrill New York, N. Y. (Continued on page 90)

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#### LETTERS

#### **ST. ANTHONY'S CHURCH**

Sirs:

It was a thrill and pleasure for us to see our parish church, St. Anthony's, so beautifully illustrated and written up in the Feb. issue of the FORUM.

We little dreamed last year in making our plans for this modern building that it would arouse so much interest and favorable comment from so many different directions.

Because of the leading position your magazine holds in the architectural field, we feel highly complimented that you considered our building worthy of your attention.

> REV. LEO A. HOBSON, Pastor St. Anthony's Church West Vancouver, B. C.

#### **ONEONTA CHURCH**

Sirs:

For the Oneonta Congregational Church, Marsh, Smith & Powell have produced their usual competent design.

It is unfortunate that most church architecture, like much of the religious thinking of today, is so far removed from our lives.

> J. P. CLARK Clark & Frey, Architects Palm Springs, Calif.

Sirs:

The three most outstanding contributions of the Oneonta Congregational Church to modern Protestant church architecture, all missed in your presentation of this building (AF, Mar. '52), are the open chancel, the fellowship Narthex, and the complete union of function and symbolism. . .

HENRY DAVID GRAY, PH.D., Minister The Oneonta Congregational Church South Pasadena, Calif.

#### CORBUSIER'S APARTMENT

Sirs:

Le Corbusier's Marseilles apartments (AF, Mar. '52) are of tremendous importance. Not because they prove or disprove any "all" theories. "All" theories are those that say all men should live in tall apartment houses rising out of parks, or all men should live in individual houses on one (1) acre of land. Corbusier's apartments are important because many families should enjoy living in them, because they should have a liberating influence on many future apartment projects and because they show that the urge for "plastic" forms cannot be suppressed even by a man who knows the logic of applied, simple geometry. Good for Monsieur Le Corbusier!

> RICHARD M. BENNETT, Architect Loebl, Schlossman & Bennett Chicago, Ill.



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\*Architect - Arnold A. Arbeit; Fabricators - Chairmasters, Inc.

Boltaflex fits the severe modern lines of this bench to a "T". (Note Formica paneling.)



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See Bayley in Sweet's. Complete catalogs on Aluminum Windows, 17a/BA; Steel Windows, 17b/BAL; SAF-T-GARD Hospital Detention Window, 17b/BAY.





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GENERAL



Photos: Ezra Stoller-Pictor

## **CBS TV CITY STARTS**

#### and the question arises immediately: What is a television studio?

**The answer:** a thoroughly flexible and expandable production space . . . even more flexible and expandable than any hospital, school, or factory—and an invaluable model in design technique for any other indeterminate building program.

> On these pages is the first good look at what will be the biggest urban business development (25 acres, upwards of \$35 million) since Rockefeller Center was built around radio. But this new project's demonstration of design for a new degree of flexibility is unparalleled even by "Radio City," because the quality of uncertainty was just about the only sure specification which could be made in the desperate need for TV studio space.

> The only way to establish anything, the Columbia Broadcasting System decided, was to start building, so CBS—first among the big producers—is attacking the problem. To see why and how, turn the page.

LOCATION: Hollywood, Calif, PEREIRA & LUCKMAN Architects & Engineers WILLIAM SIMPSON CONSTR. CO. General Contractor



TV City when completed

#### Why a television city?

Even today the Columbia Broadcasting System's fast-sprouting television branch produces more hours of visual entertainment in a month than all the Hollywood motion picture studios together turn out in a year. Yet CBS, like the other big networks, does not have any TV studios that were intended as TV studios: in New York City, the present production center, CBS is producing shows in former concert halls, in radio studios, in warehouses, in rented theaters, in odd locations scattered all over the city—everywhere but in TV studios, because there are no TV studios.

This is fantastically expensive even in that land of fantasy, the entertainment world, and the expense is all the producers'. A family may pay \$130 for a television set and 60¢ a month for electricity. But to fill the screen of their set with, for example, a half-hour of Lucille Ball costs the sponsor \$32,000. Just 15 mins. of Perry Como costs \$12,000 to produce. Expenses to sponsors on TV are towering so far above radio's foothills that many sponsors are gasping for air. But how can costs be cut?

By cutting traffic costs and eliminating repetitive production costs, say the production experts, and that means centralization. You must be able to store TV scenery and move it economically back into service, not reconstruct sets every time you have a show. You must be able to schedule rehearsals in small studios, then move the cast smoothly and confidently into the final arena. You must trim duplicating sets of technicians from the payroll. You can't hop across New York City from theater to concert hall to radio studio for shows ("Today you practically have to take a taxi to get to the men's room," says one TV performer). To cut overhea'd there has to be an established TV routine.

In October CBS moves into its first 400,000 sq. ft. of new studio in Los Angeles, and this is just the beginning of a taxiless routine that is expected to utilize  $2\frac{1}{2}$  million sq. ft. of studio before TV City is completed. CBS also knows that other businesses are going to be attracted to this entertainment mecca, so a 600' long office building is included in the 25-acre project, with supplementary stores and restaurants. It will be the entertainment world's version of the shopping center.

Basically its success will be measured by the yardstick of production capacity, and the mark set for the first unit now in construction is high. Starting in October CBS will produce 28 hrs. per week of finished entertainment in the four new studios, compared with the  $591/_2$  hrs. per week which are being produced in 18 improvised studios at the present.

Essential expandability of the plan is illustrated by the relatively small amount of the final scheme which is occupied by the first building (shown in dark tone on plan below). Total number of studios would provide one for every half hour of a 12 hr broadcasting schedule, and enough office space to house headquarters of central CBS administration for the whole country. The long narrow office building, restricted in height by L.A. earthquake regulations, would probably be divided horizontally in sections down its length adjacent to those studios under each office block's direct supervision.





Future office building 600' long will cut across the expansion and traffic axis of the studios, but will not break traffic pattern. Perched on stilts (and built on a platform which is also on stilts) it exemplifies in its design the architects' scrupulous care to keep present and future circulation paths clear. Studies of office buildings at top of page and below vary from master plan in exterior but retain massing and insistence on clear circulation.

But this architectural enterprise is also significant in several other ways:

**Geographically** because it indicates that the TV industry, now jammed into New York City, will follow the talent to Hollywood. In forming a new building pattern because a new building type will here be defined for the first time. (Recently the Federal Communications Commission thawed its TV freeze, and will approve the licensing of 2,000 new TV stations, many of which will need studies.)

**Dramatically** because the cheaper that basic TV costs can be made, the better can TV be. (One TV executive said recently, "The reason you see so much murder on TV is that murder is all we have studio space for. All you need is a victim, and a murderer, maybe a rope, and a dark corner. Give us room and maybe we'll be able to afford something else.")

But this building program will be of most immediate importance as a demonstration of flexibility in the design of any structure.

Pereira & Luckman worked out some broad principles in designing their answer to the big \$8 million question of the first four CBS TV studios, and they are principles which are appropriate to any expanding structure:



1 Make the production spaces big ... the television production studios in this first building are  $130' \ge 110' \ge 42'$  high.

**2** Design them so they can be made still bigger without knocking out any bearing walls . . . at the end of each of these studios will stand a cellular steel wall which can be struck almost as easily as a set, if the studio has to be extended.

3 Invent a three-dimensional circulation scheme, which can expand with the project instead of being outgrown by it . . . in this job there is circulation underneath and up into the studios as well as between and around them.

But here are some of the uncertainties in detail which Pereira & Luckman had to face, and from which they had to form TV City: They didn't know how many studios ultimately would be needed, so they are starting with four, planning to expand to 24 ("In fact," said Luckman, "we approached the problem not from any particular number of studios, but rather from a total area.") This expansion necessitated shrewd planning not only spatially, but also structurally. Architects' choice for the material to wall the expandable ends of the enormous studios was steel decking, which beat out other demountable materials in rigorous cost comparisons.

▶ They didn't know how big the studios should be or how many different sizes of studios they should provide. This meant they had to make it possible to slice the big studio pies with demountable partitions into many small complete pies (see p. 108).

They didn't know about audience participation—would it continue to be an important factor in TV? So, to start, they are building two studios which can take audiences and two which cannot—and in the two which can the audience floor is countersunk below the performing floor level so it can easily be filled over if audiences don't stay in TV (see p, 108).

▶ They don't know how high lighting intensities they will need, especially for color TV, thus necessitating two precautionary provisions: extra wiring—which was fairly simple—and extra air conditioning totalling 100 tons per studio to meet the increased heat load of the brighter lights—which was not simple (see p. 109).

▶ They didn't know what part of the big studio will be used as a stage more than other parts, so the complete studio had to be stage equipped, with overall overhead rigging. Structural problem: an overpowering design load of 103 lbs. per sq. ft. of area on a 130' span. Air conditioning problem: how to follow the lights with air conditioning to drain off their heat before it melts the make-up off the performers' faces. Solutions: tremendous "work horse" trusses, and "elephant trunk" air conditioning ducts (see p. 109).

They didn't know whether the shop and set-building wings will have to grow at the same rate as the studios, or whether an expanding inventory of sets will change the ratio. So the shop and service areas had to be designed for expansion both horizontally and vertically—or perhaps not at all, a puzzling circulation factor in the ultimate expansion scheme. This unpredictable growth meant also that there could not be a common wall between the shop and studios: if the final heights of the shop building were to be indeterminate, two separate walls were necessary to guard against unequal vibration in the event of an earthquake (see p. 110).

They didn't know whether CBS will move its main offices from New York City to Los Angeles, requiring great expansion of office space. Or whether production techniques might change radically. (This has happened even before the first four studios are complete; the film library was expected to take little space, but now a building 100' long x 60' deep x 100' high is under discussion.)

So, on a problem as elusive as the ocean tide, CBS architects Pereira & Luckman are floating a solution as adaptable as a raft.

#### The first building

The structure CBS is now putting up in Los Angeles eventually will stand at the core of the final development (see master plan, p. 103); now it is a not-very-small miniature of the final scheme, with traffic patterns and circulation ready to expand out all over the lot. (This 25-acre lot had to be assembled complete even in these early stages of planning because Los Angeles building regulations require expansion to be horizontal. A cramping 100' height limitation is imposed because of earthquake expectancy.)

Sitting on a platform supported by 1,673 deep concrete piles, this first building has four studios, but can be split into more if necessary. The studios are built like handball courts, with a lot of space between two sturdy concrete walls. Space can be added in three directions: 1) by taking the metal panel walls off the ends and lengthening the "handball court," 2) by adding studios to either side, or 3) in the case of administration and service wings, by adding stories up to the 100' limit.

Besides the lessons to be learned from the expandable concept of this structure, there are good demonstrations of traffic control both in and around this building, which will keep up with the structural expansion. Interior circulation in the studios is vertical. At the lowest level, beneath the platform, is the operating level, for the storage of properties and scenery which has to be available immediately to studios above. Backstage, with dressing rooms etc., is also downstairs. TV performers of all categories (generalized in the industry under the term "talent") can drive into lower level parking spaces, and go directly to dressing rooms, avoiding crowds, which enter on the platform level. This comfort and convenience is considered a valuable lure in the network rivalry for talent.

On the main level is the high studio space and a central corridor. Horizontally, this is planned so incoming and outgoing sets and scenery can use several different routes with access from either side, and avoid cross traffic.

The top level is rehearsal hall, hung up away from traffic on the second floor between studios. Prepared casts will move downstairs to the studios and meet their finished scenery coming up. Says Pereira of the scheme: "Unlike motion pictures, television is faced with the problem of producing quality work at lowest possible operating costs. We felt that the real distinction was the matter of time."



#### CIRCULATION:

Performers enter on ground level, rehearse on top level (diagram far left). Scenery from central source can be brought in either side of studio (diagram near left).



East elevation of initial building with temporary walls (for future expansion) indicated in tone.





This is a studio under construction, looking down between permanent walls to open end which will be closed in with demountable wall. Water is pooled now in audience pit.



A closer look at the loadless framing of the temporary end wall. See page 109 for detail.

Early progress photo is remarkably clear statement of "handball court" construction with ends left loadless for future expansion




Audiences will circulate around building on this platform, keeping clear of inte.ior traffic.





Glass wall at end of craft building takes no load but its own, can be dismounted for expansion.

As studios on platform are added, additional service space is gained under the platform.



In west elevation, tone indicates demountable walls of studio ends



More recent progress photo of same view as large photo below







Transverse section through studio wing of initial building

# What to do with an audience

In the section above the studio to the right of the central service corridor is one of the pair which were designed to accommodate audiences. with seating "dug" into the floor. In plan *right*, at somewhat enlarged scale, the seating arrangement indicates the unconventional distribution of space in TV as compared with other theaters. The emphasis here is all on production.

Three cameras are trained on most TV shows, so a middle runway (see photo) is necessary—splitting audiences—who still are considered essential to spark some types of TV shows.

The audience section (350 seats) is dished below performing floor level for two reasons:

1. The spectators won't get in the way of the cameras or get too interested in them, at the expense of the performers.

2. If future TV developments make spectators obsolete, the dish can be filled to make a bare flat floor.

Portable control booths and sponsors' booths are being designed so they can be shifted if partition walls are moved. Below is one of the giant studio areas under construction.





# Work horse trusses

Studio trusses are 130' clear span and are real work horses. Besides supporting the long span of roof, they will have hung from them a batten system, mechanical and electrical equipment, and air conditioning supply ducts (four central station air conditioning systems will be on the roof).

The battens are a grid system of pipes spaced 3' on centers, 90' long, in 30' sections. They can be lowered to within 6' of the floor so technicians can hang and adjust lights, scenery, drapes, etc. The battens can then be raised to the required height for any particular scene, up to 28' off the floor.

The studio truss is designed for a load of 103 lbs, per sq. ft. of floor area, arrived at by this arithmetic: 12 lbs. psf live load, 60 lbs. psf dead load, 10 lbs. psf ceiling load, 15 lbs. psf grid load, plus mechanical equipment. Load breakdown for the smaller rehearsal hall trusses: 12 lbs. psf live load, 66 lbs. psf dead load, 10 lbs. psf ceiling load, and 16 lbs. psf grid load.

In photo right studio area is being roofed in. This end of the studio will be walled with demountable cellular steel panels. To appreciate the scale of this structure, note dimensions on detail drawing far right. The truss is a full 11' high. Even the space under the platform is unusually high ceilinged.







#### Elephant trunk air conditioning ducts

Air conditioning load is figured at 100 tons per studio, and will be low-velocity air carried in ducts near the roof. Because the source of most of the heat in the studio will be the bright lights, and these lights may be stationed anywhere in the studio, it was important to plan for flexibility in air conditioning too. The solution (see drawing) is a flexible duct design consisting of long canvas trunks leading down from the big ducts. These trunks will be terminated by diffusers, and will be directed close to the banks of lights to cool them before their heat annoys anyone. Like the other equipment the air conditioning trunks will be held in position by the grid.

The elephantine extensions of the air conditioning system can be removed from the high duct with ease, and conventional diffusers put in their place. Electrical wireways which also ride the battens eliminate a large amount of extension wiring; wherever lights are placed there is also a place to plug them in.



TV CITY

Because the building has to be expandable on three sides, earthquake considerations were intricate. Functionally it could be conceived as one structure, but seismically it had to be treated as two units because the service portion is potentially a six-story building while the studio portion is only two stories, presenting a problem of different periods of vibration which could cause serious structural damage in the event of a shake (see drawings).



This problem was solved by providing a double wall separated by a 5" air space between the service unit and the studio building, which in turn became a central longitudinal wall of the total building.

But *stiffness* against earth trembles was also required, and this was more difficult to attain.

Since one transverse wall was located near the rear property lines and was permanent, the designers had two walls with



which to resist four possible lines of earthquake forces. A third shear wall in the transverse direction was then located within the building (*see drawing*) where it would not restrict internal operations.

With three of the four required walls established, the problem was to find a fourth, and the search was a creative one. The concrete roof and floors are the answer; they are designed as stiff diaphragms to help resist the horizontal forces of an earthquake, and this is accomplished by reinforcing them heavily (*see photo*) and also by bringing into play the steel purlins or beams to act as web stiffeners. When subjected to compressive stresses, the slab's tendency to buckle will be counteracted by these web stiffeners, which have a positive connection to the diaphragm.

Otherwise the building is spanned rationally, with separate solutions appropriate to the separate spans. A flat slab is used where the bays are approximately 24' square and continuity in two directions can be developed. Pan and joist construction is used in the service building where the bays are rectangular. Slabs and beams are used in the exterior walkway around the studios where the bay spacing is not uniform; the architects also had appearance in mind, because this will be exposed to public view.

Photos : Esra Stoller-Pictor



Roof and floor have extra heavy reinforcing because horizontal planes are designed to be brought into play to combat seismic shudders.





THE EXTERIOR ROTATIONAL MOMENT Fa IS EQUALED BY A RESISTING COUPLE Rb OR Fa : Rb

Spiral steel reinforcing is used around columns instead of simple ties in order to slim the section and make them less bulky.

# GROPIUS APPRAISES TODAY'S ARCHITECT as a "master builder,"



Courtesy Harper's Bazaar; Hans Namuth

WHAT IS YOUR REACTION to this challenge by Walter Gropius, largely supported by Pietro Belluschi's remarks on the next page? We believe that not only architects, but also many builders, engineers and building owners will have interesting opinions pro and con this provocative appraisal of today's architect. We invite your comments for inclusion in a symposium in next month's FORUM. —The Editors. finds him unmoved by the impact of industrialization, unruffled by AIA rules which prevent him from building

# **RECOMMENDATIONS:**

closer contact with building production, closer work with engineer and builder\*

In the great periods of the past the architect was the "master of the crafts" or "master builder" who played a very prominent role within the whole production process of his time. But with the shift from crafts to industry he is no longer in this governing position.

Today the architect is not the "master of the building industry." Deserted by the best craftsmen (who have gone into industry, toolmaking, testing and researching), he has remained sitting all alone on his anachronistic brick pile, pathetically unaware of the colossal impact of industrialization. The architect is in a very real danger of losing his grip in competition with the engineer, the scientist and the builder unless he adjusts his attitude and aims to meet the new situation.

Complete separation of design and execution of buildings, as it is in force today, seems to be altogether artificial if we compare it to the process of building in the great periods of the past. We have withdrawn much too far from that original and natural approach, when conception and realization of a building were one indivisible process and when architect and builder were one and the same person. The architect of the future—if he wants to rise to the top again—will be forced by the trend of events to draw closer once more to the building *production*. If he will build up a closely co-operating *team* together with the engineer, the scientist and the builder, then design, construction and economy may again become an entity—a fusion of art, science and business.

\* Condensation of a statement by Dr. Walter Gropius, Chairman of Harvard's Department of Architecture, Graduate School of Design.

#### Target: AIA's rule No. 7

I will be more specific and reveal my target: the AIA at its 1949 convention in Houston added to the mandatory rules of the Institute a new Paragraph 7 which reads:

"An architect may not engage directly or indirectly in building contracting."

I have very great doubts about the wisdom of this rule which would perpetuate the separation of design and construction. Instead we should try to find an organic reunification which would return to us the mastery of the know-how in building. Of course, the intention of this mandatory paragraph has been a good one, namely to block unfair competition. But I am afraid that it casts away the baby with the wash, that it represents merely a negative veto and does not try to solve our dilemma constructively.

Let us not deceive ourselves as to the strength of our present position in the eyes of our clients. For instance, at the beginning of the last war high officers of the Army and Navy were not complimentary to us and showed a shocking ignorance of the character of our activities. The average private client seems to consider us members of a luxury profession whom he can call in if there is some extra money available for "beautification." He does not seem to consider us as essential for the building effort as the builder and the engineer.

### Facts of life—architecture

If you think I exaggerate, look at the facts:

More than 80% of all U. S. buildings are being built without an architect.

Average income of the architect is less than a bricklayer makes in the East. (That does not look very rosy in a country where money is so much the yardstick of values.)
People simply do not understand the complicated task of the architect as we define it, and we have not been able sufficiently to clarify the issue.

When a client is in the building mood, he wants to buy the complete package for a fixed price and at a definite time of delivery. He is not at all interested in the question of the division of labor between architect, engineer and contractor. Since he senses subconsciously that it is rather artificial to keep design and building so wide apart, he usually concludes that the architect may be the unknown "X" in his calculations, in terms of money as well as time.

And what else can we expect? Are we not in an almost impossible position, having to meet a preset price, though we have to start almost every commission with a kind of research and laboratory approach? Compare that with the long process in industry from paper design to test model to final product. In our field of design we have to absorb all the cost of research ourselves, for with us the model and the end-product are one and the same. Has this not become an almost unsolvable task, particularly because it is subject to changes caused either by the client or by public agencies?

We often question the soundness of the business angle of our activities when we realize that the greater the ingenuity and the harder the work we devote to reducing costs, the more we are penalized by lesser payment. The client on the other hand assumes that it must be in the material interest of the architect to increase the building cost deliberately, since this would also increase the architect's percentage fee. So he often tries to settle for a lump sum fee. Of course we have to oppose that tendency of the client, as it is quite unfair to us, but that does not solve the ticklish problem in either direction. Here indeed is our greatest ethical dilemma. It often causes distrust on the part of the client, because of its inherent injustice to both parties; it even keeps many clients from seeking our service altogether.

## Consider the industrial designer . . .

This does not happen to the designer of industrial products, who is usually paid for his initial service to develop the model, plus royalties from multiplication of the product. He benefits from the success of his work not only financially, but also in stature as a legitimate member of the team to which he belongs, along with the scientist, the engineer, and the businessman. This process, developing more and more in industry, is carrying the previously isolated artist-designer back into the fold of society.

I am convinced that a similarly co-ordinated teamwork will also become the trend within the building industry. This should give the future architect, who is by vocation co-ordinator of the many activities concerned with building, once more the opportunity to become the Master Builder —if we are only willing to make the necessary changes in attitude and training. We then must climb down from our brickpile and train the rising generation in conformity with the new means of industrial production instead of a training at the platonic drafting board, isolated from making and building.

# . . . and the industrialization of building

The machine certainly has not stopped at the threshold of building. The industrialization process of building seems only to take longer to complete than it took in other fields of production, since building is so much more complex. One component part of building after another is being taken out of the hands of the craftsman and given to the machine. We have only to look at manufacturers' catalogues to become convinced that already an infinite variety of industrialized component building parts exists at our disposal. In a gradual evolutionary procedure, the handbuilding process of old is being transformed into an assembly process of ready-made industrial parts sent from the factory to the site. Furthermore, the proportionate percentage of mechanical equipment in our buildings is *(continued on page 166)* 



Alda Jourdan

# **BELLUSCHI APPRAISES THE GROPIUS CHALLENGE,**

agrees with his conclusions but for different reasons,

finds modern building too complex to be mastered by any individual

# **RECOMMENDATIONS:**

fixed-fee contracts with architects co-ordinating the production teams\*

I agree with Mr. Gropius' concern about the architect's role in modern society, though I find some of his statements at odds with his otherwise logical conclusions.

#### A new architect for a new society

If the architect's functions have been taken over by the engineer, the scientist and the builder, it is because of the patent insufficiency of the architect's contributions to the very complex problems of a new society.

While too sharp a separation of design and execution is undesirable, some separation is essential. Nowadays we think that the head of a corporation is a bad executive if he attempts to concentrate on all the various tasks of managing, financing, purchasing, distribution, engineering, advertising, transportation and labor relations, which are a part of his particular business.

The machine, having enlarged the unit of activity, has made necessary the development of new managerial techniques and has required the use of teamwork as a tool of performance. Very few of our large modern developments would have been possible without this new tool. No single person, for instance, could have developed our atomic potential.

### Architect-builder collaboration without encroachment

Regrettably, the architect and the builder cannot be one and the same person, but even now it is practical for them to work as a team without encroaching on each other's field of action. A contract let on a fixed-fee basis permits architect and contractor to draw on each other's specialized knowledge, before and during the preparation of plans, to everyone's advantage.

It is impossible to go back to the simpler world of the craftsman; we must work in whatever direction promises results commensurate with today's machine potential.

## No defense for preventing architects from building

I will not defend the AIA ruling which forbids architects to engage in building contracting. All that may charitably be said of this rule is that it may be intended to eliminate possible abuses and the taint of commercialism which unscrupulous entrepreneurs may be tempted to inject into the profession. It is a mistake to make it a mandatory rule, because in many cases it is

\* A statement by Dean Pietro Belluschi of MIT's School of Architecture and Planning in Cambridge, Mass. a handicap to experimentation and creative freedom. However, I do not agree that separation of design and construction can be condemned merely on the basis suggested by Mr. Gropius.

#### Today's building is too complex for a single master

Anyone who has seen the construction techniques needed for a large building project will realize that an architect would have to devote a disproportionate amount of time, energy and study to master these techniques. Although the architect must understand and translate what the scientists and the engineers have contrived, he will dilute and hopelessly dissipate himself if he tries to take too active a part in developing new technique all down the line.

#### Through teamwork the architect may regain prestige

Mr. Gropius is right in saying that the architect's position in society has declined—but no more than the arts and the humanities. Perhaps the architect has lost his old place of eminence and prestige because of his insistence that he could give all the answers and that his ability to see esthetic relationships gave him also the right to solve the more complex problems for which he was not properly equipped. All we can do is to hope that this decline may be partly arrested 1) by a reorientation of our social aims, 2) by a new realization of the architect's role as a member of the team and 3) by the sympathy he will give to sociological, economic, technological and managerial problems of the world he lives in. His right to lead the team will come only through this ability to understand the many forces governing our society.

### Best man on the team: the architect

I heartily agree with Mr. Gropius' regretful conclusion that the architect's salvation will come from joining with the scientist and the industrialist. Teamwork among architects, as he sees it, is not enough; it must be extended to include others.

No matter by what name we call the man who co-ordinates and guides the team, he will be the man who not only has the ability to understand the problem which faces him but also shares with others the task of solving it. He usually is the man who has the intuitive powers of synthesis which from time immemorial have been conspicuously the attributes of the man we have called *the architect* and who may now well be called the co-ordinator or the engineer-architect, or simply *the best man* on the team.



INSTRUMENTATION of typical classroom in the laboratory school includes 1) globe thermometer suspended at geometric center of room, together with air-temperature comparison junctions, 2) 16-point electronic recorder, automatic potentiometer type, 3) finewire thermocouple cemented to window glass, and 4) blackened aluminum foil surface mounted on insulation board facing window, also with comparison junction. Other thermocouples not visible in picture register air temperatures at room thermostat, unit ventilator discharge, etc. Readings were recorded day and night at 4-min. intervals and in the case of the unit ventilator discharge temperature, at 2-min. intervals. Simultaneous records were obtained in identical classrooms facing north, south, east and west under a great variety of weather conditions.

Photos: Hedrich-Blessing

# LABORATORY SCHOOL points the way towards a more scientific

# evaluation of comfort conditions and building performance

During the past winter a new school in Moline, Ill. has been the subject of a searching investigation of classroom heating and ventilation which may become the prototype for a fruitful new type of industrially sponsored building research—detailed performance studies of completed, occupied structures.

In the course of this investigation, the researchers turned up at least one fact which may be regarded as a discovery: • they found that cold windows, during the daylight hours when school is in session, actually feel warmer than walls whose sensible temperature is 20° to 25° higher, owing to transmitted "skyshine" (facing page and p. 120). Other findings: • they verified a number of theories, such as the theory that the adverse thermal influence of concrete slabs on the ground can adequately be controlled by peripheral heating (p. 122). • They documented to the hilt the need for controlled cooling of school classrooms even in severe winter weather and the necessity for room-by-room control of both heating and cooling (p. 118-119). • They defined the problem of the large, single-glazed schoolroom window as a problem in convective cooling alone, and not, as was hitherto supposed, a combination of radiant and convective cooling (p. 120). • Finally, as though to prove the connection between all of this and over-all building design, they have come up with the suggestion that the ideal school building "cross section" must take into account not only daylighting and natural ventilation, but should be influenced as well by thermal considerations (p. 122).

LOCATION: Moline, Ill. MEL R. BECKSTROM, Architect R. A. MITCHELL & SON, General Contractors MECHANICAL CONSTRUCTORS, INC., Heating HERMAN NELSON DIVISION, American Air Filter Co., Inc., Heating Research

1.



These facts were uncovered by an elaborate array of test equipment. Thermocouples throughout the building linked to the latest in electronic recorders have printed well over 10,000 super-accurate temperature readings a day, without interference with normal classroom activities. Sensitive, highly responsive thermojunctions have registered the slightest divergence between air temperature and the settings of room thermostats. Others have made continuous records of the temperature of the air introduced into the rooms for heating and cooling, the temperature of the window glass, floor surfaces, air in contact with cold glass areas. Newly developed instruments have made day and night records of the so-called "black body resultant" temperature of flat surfaces facing the windows-i.e., have registered the "radiant cooling" effect of the windows on objects within the rooms. A specially constructed thermopile has scanned the sky to determine its true "radiative temperature" as viewed from inside the building. Globe thermometers have plotted the differences between mean air temperature and mean radiant temperature day and night.

Result of this elaborate testing program has been the accumulation of a mass of data of value not only to heating engineers, but to architects and school officials as well—since one of the most significant conclusions to be drawn from the study is that the design of the school building has almost as much to do with the satisfactory, economical operation of the heating and ventilating system as the equipment itself. Moreover, the significance of many of the findings is not limited to schools, but is equally applicable to other large-windowed, slab-on-grade buildings which means buildings of virtually every type.

# Growth of an idea

Moline's "laboratory school" was not built for research purposes. It is a representative new school building in a representative Midwest community, incorporating many of the advanced ideas current in the school field, but in no sense an experiment. With one exception (to be noted in a moment) the heating and ventilating equipment is as originally selected by the architect and school board, and has been operated on a normal basis under the control of the school custodian.

The fact that the George Washington Grade School—one of three recently constructed Moline schools—has become a laboratory of heating and ventilating performance is partly a matter of happenstance, partly the result of careful selection and partly due to the growth of an idea which started small and gathered mass and momentum, like a snowball rolling downhill. The school just happened to be under construction at a time when the Herman Nelson Division of the American Air Filter Co., Inc., unit ventilator manufacturer and specialist in school heating with headquarters in Moline, was busy with the development of a new system of classroom ventilation designed to control downdrafts from large windows. The school happened also to be designed with classrooms facing the four points of the compass—presenting, in a single building, four widely varying heating and ventilating problems in otherwise identical rooms. And the design happened further to incorporate the then-standard (and only available) method of window downdraft control: a continuous, single-tube convector beneath the windows. Thus, it provided a built-in basis of comparison for the system which Herman Nelson wanted to test.

Initially, the Herman Nelson organization had no more ambitious plan than to field-test its new equipment, which had been given a pretty thorough going over in the laboratory, anyway. As the plan matured, however, it became obvious that the George Washington School presented a number of other features of considerable interest from the heating and ventilating point of view. As a single-story, slab-on-grade building, it was representative of the predominant type of school being built in most parts of the country, with potential heat loss through the classroom floors and ceilings-a very different heating problem than that presented by older type schools in which the classrooms are stacked like blocks, over a basement, and only those at the corners of the building and on the uppermost floors lose heat in more than one direction. In addition, each of the rooms had a good deal of clerestory glass, in the form of a continuous roof monitor stretching the length of both wings of the building, as well as a continuous pipe trench running around the outside walls, intended among other things to isolate the floor slab from the outside air and surrounding ground. Comparatively little was known about the effects of such features on the heating and ventilating problem, or about the effects of the low classroom ceiling height (9'.5") on the air distribution pattern obtained with a standard unit ventilator.

As the significance of these facts was digested, what started out to be a simple series of tests of a new method of drawing return air back into the ventilating equipment was expanded to include a review of the whole relationship between an established and highly successful method of maintaining comfort conditions in school classrooms and the new problems and opportunities posed by a radical, nationwide shift in school design.\*

2.



# 3.



<sup>\*</sup> It is doubtful whether Herman Nelson would have undertaken this larger study without some prodding, and it could not have done so without the enthusiastic co-operation of the Moline School Board. The prodding was provided by Henry Wright, former managing editor of ARCHITECTURAL FORUM and known for his interest in the influence of technical factors on building design, whom the Nelson organization had retained as a technical and promotional consultant. School board co-operation was arranged by the architect of the school building, Mel R. Beckstrom of Moline, who gave the researchers *carte blanche* to find out anything and everything about the performance of the building, good or bad, and to make such use of information as they saw fit. The results, while they have disclosed significant and correctable shortcomings, have more than justified his faith in the essential soundness of the over-all design of the building, and the judgment exercised in the selection of its materials and equipment.



The straightforward L-shaped plan of the George Washington Grade School puts the kindergartens and lower grades in a wing running east and west, the upper grades in a wing running north and south. The school's definitive feature is the monitor "cross section" employed for both wings, which made possible deep, almost square classrooms in conjunction with double-loaded corridors and at the same time permitted lowering the classroom ceilings to give the rooms homier proportions more in keeping with their function than those of the typical boxlike schoolroom. In addition, this particular version of the monitor scheme has resulted in exceptionally pleasant and well lighted corridors, making these spaces—as they should be but seldom are—one of the most important and attractive parts of the school.

Besides freeing a large part of the square site for a playground which has been taken over by the city park department for yearround use, the L plan results in a convenient and easily grasped relationship of the various special purpose areas inside and outside the building. The offices face the main entrance, with the combination gymnasium-auditorium opening off the entrance lobby at one side. The cafeteria, flanking the gymnasium, adjoins the entrance most used by the pupils. The two kindergartens, on the south side of the east-west wing, have direct access to a playground of their own on this side of the building. A library, located alongside the main entrance, also has its own outside door for evening use and will be operated in conjunction with the municipal library.

An interesting detail of this double-barreled co-operation with other city agencies is that the corridors of the school have been equipped, at strategic points, with pull-down grilles barring access to the balance of the building while permitting use of toilet facilities by library patrons and those using the playground during week-end and vacation periods. Taking advantage of their location, the overhead enclosures for these grilles have been acoustically treated to act as sound baffles to exclude corridor noise from the entrance lobby and office area.

In designing the building, architect Mel R. Beckstrom began with a committee of teachers and with them determined the characteristics desired for the teaching space: the almost square classrooms, lower ceiling height, preponderance of tack board, as opposed to chalk board areas, and so on. By the same process it was decided that pupils' toilet and locker facilities should be located within the classrooms for the lower grades, but open off the corridors for the upper grades. Beckstrom then tried out several schemes for obtaining the bilateral lighting demanded by the preferred classroom shape, and having selected the monitor cross section as most practical for the Moline climate, "sold it" to the School Board with a large-scale model in which the resulting interior illumination could be examined visually. Once agreement on this point and on the desirability of the L-shaped plan had been nailed down, the rest of the design followed naturally.

Basically a one-story building, very much like a small factory in construction, the portion of the school housing the gymnasium and cafeteria has been provided with a basement for locker and shower rooms, a playroom, boiler room and storage space for playground and other equipment, with access to the storage space from ground level provided by a ramp. Partitions are special concrete block with ceramic tile wainscotings, floors linoleum tile in classrooms and terrazzo in the corridors and cafeteria. Classroom and corridor ceilings are acoustical tile, corridor side walls acoustical plaster. Artificial light is supplied by fluorescent lamps in recessed troffers. Window sash and frames are aluminum; monitors are glazed with corrugated diffusing glass. Cost of the school, which was built in 1949-51, was \$13.75 per sq. ft. (\$937 per pupil, \$28,125 per classroom), including plumbing, heating and electrical work.



**MONITOR CROSS SECTION** provides bilateral illumination for 29' deep classrooms with double-loaded corridor. Egg-crate ceiling separates clerestory from classrooms. Space below wind bracing at center is used to borrow light for the ...

> ... ATTRACTIVE, WELL LIGHTED CORRIDORS, which incorporate builtin lockers for upper grades, illuminated display windows for the work of each class.



# Temperature records show need for cold-

# weather cooling and room-by-room controls

The charts at the right are a representative sample of hundreds of temperature records made in the east, west, north and south classrooms of the laboratory school under normal occupancy conditions. The days shown—Mar. 6 and 7—are the ones on which the photographs illustrating this article were taken; the weather was cold (about freezing), but not extremely cold; clear, but not completely clear; wind velocities ranged from calm to 15 mph, direction from east to east-northeast. The ground was covered with a heavy (7") blanket of snow.

The charts cover a period from Wednesday midnight, Mar. 5, to 6 P.M., Friday, Mar. 7. Nighttime temperatures are shown against a black background, daytime temperatures against white. Each of the curves shown is plotted from readings made at 4 min. intervals, accurate to plus or minus  $\frac{1}{2}^{\circ}$ . Rectangles at the far right show the same curves in detail for the period from 8 A.M. to 4 P.M., Friday, Mar. 7.

To understand the charts, it is first necessary to have a general understanding of the heating and ventilating equipment of the rooms. Each of the classrooms at the laboratory school is equipped with a unit ventilator—i.e., a cabinet below the window fitted with a heating element whose fans are capable of drawing air through the element and discharging it at high velocity towards the ceiling. A system of dampers in the lower part of the cabinet, connected with a louvered opening in the outside wall, determines whether the air drawn through the cabinet will come partly from within the room and partly from outside the building, or wholly from the outside. These dampers are positioned by a device connected with the room thermostat which not only varies the proportion of outdoor and indoor air handled by the unit, but also throttles the heating medium (in this case, steam).

The unit ventilator is thus not only capable of supplying heated air when necessary to raise the temperature of the room air to the thermostat setting, but also of supplying cooler air to lower the room air temperature whenever heat gain from the occupants, the lighting system or the sun causes the room to get warmer than desirable. In addition, it supplies a certain minimum quantity of outdoor air at all times, sufficient to control classroom odors.

In the charts at the right, whenever the unit ventilator discharge temperature is above that of the room air, the unit ventilator is said to be "heating," and the area under the curve showing the discharge temperature is colored red. Whenever the unit is discharging air cooler than that within the room, it is said to be "cooling," and the area above the curve is colored blue. The same method is used to represent solar gain, as indicated by the temperature of a blackened metal foil surface mounted on fiber insulation board and set on the window sill facing the glass. Whenever the temperature of this surface rises above that of the room air, the area between the two curves is colored yellow, and labeled "solar gain." Red, dotted areas show nighttime heating, when the unit ventilator fans are off and heat delivery is much reduced.

Thus, each of the red areas on the chart, for each of the rooms, represents a period when the heat demand was positive and some means for heating the room essential. Each of the blue areas represents a period when, in the absence of the unit ventilator, it would have been necessary for the teacher to open the windows and admit untempered outdoor air to prevent overheating, and during which any form of heating which continued to add heat to the room air would have been unnecessary and wasteful. The general significance of the charts, taken as a group, is that despite freezing weather this latter condition occurred so frequently, and that the differences between the heating and cooling demands of the various rooms was so great.





-EAST-

Cooling (indicated by blue areas) was required in east classroom for most of school day on both Thursday and Friday, Mar. 6 and 7, despite an outdoor temperature ranging from 21° to 38°. On Friday, which dawned clear, solar gain began at 6:45 A.M., almost eliminated need for normal morning warmup. Detail (right) shows that room temperature was held between 71° and 73° except for momentary peak of 76° when class returned following lunch period.

- WEST -

Heating (red areas) was needed in west classroom until middle of lunch period on both days. On-off steam control, in operation Thursday night, Mar. 6-7, produced cycling of unit ventilator discharge temperature seen during night period in all charts, and intermittent steam supply to convectors beneath the windows a matching cycling of the glass temperature in all of the rooms. Note rapid rise in room air temperature when unit ventilators went on at 7:15.

# --- NORTH ----

This classroom, which received no direct solar gain, nevertheless required only moderate heating on both mornings, and some cooling on both afternoons. Indirect solar gain, perhaps the result of reflection from the snow-covered ground, was sufficient to register during most of Friday, Mar. 7, raising the temperature of the blackened metal foil surface facing the window as much as 7° above the air temperature. Glass temperature was steady at 50° to 55°.

### \_\_\_\_ SOUTH \_\_\_\_

The south classroom required very little heat for morning warm-up on either day, despite a 12° outdoor temperature at 6 A.M. on Friday. Demand for cooling was constant during the school day, except for a 20-min. period following a sudden drop in solar gain just before the class convened on Friday. By comparison with the east charts, it can be seen why southeast classrooms, like solar houses, require practically no heating on sunny days.



# Large windows have little direct effect on day-

### time comfort, but create hard-to-control drafts

Like most present-day classrooms, those at the laboratory school have continuous, wall-to-wall fenestration. And since more than three-fifths of the theoretical heat loss of the rooms is by way of the single-glazed windows and clerestory, a great deal of attention was paid to the effects of these areas on thermal comfort.

Temperature of the window glass, on the room side, was found to be normally about midway between that of the indoor and outdoor air, or below this mid-point. In very cold weather, it tended to hover about the freezing point in the more exposed rooms, but varied considerably with the direction of the wind. The lowest daytime glass temperature recorded—in the west classroom with an outside temperature of  $15^{\circ}$  and a northwest wind—was  $27^{\circ}$ . In the south classroom at the same time the glass temperature was  $48^{\circ}$ , in the north classroom  $39^{\circ}$  and in the east classroom  $43^{\circ}$ . The heating effect of the strip convectors beneath the windows, when these were operating, tended to raise the glass temperature a maximum of  $10^{\circ}$ .

Thus, considered from the standpoint of temperature alone, the 200 sq. ft. of window surface in each of the rooms constituted a "cooling panel" of no mean capacity. Normally, about one-half



**CONVECTIVE COOLING** by window glass, as measured under varying conditions in extremely cold weather. Drawings show cross section of window and "draft-stop" cabinet, with temperatures at various points indicated. First drawing shows condition with sun entering room and unit ventilator cooling; second drawing, condition with unit ventilator heating. Downdraft control succeeded in intercepting air chilled by window glass under conditions of both heating and cooling, an important consideration since schoolrooms often need cooling on cold, sunny days. Temperature of blackened metal foil surface, at position of child's shoulder, shows absence of significant daytime radiant-cooling effect. At night, plate in same position was 5° cooler than air.



of the cooling effect of such a panel would be exerted on the room air, by convection, and about one-half on the surfaces and objects (including persons) within the room, by "radiant cooling." This is what happened in the classrooms at night, when interior surfaces facing the windows became considerably cooler than the surrounding air, and the rooms "felt" a good deal colder than the air temperature indicated they should. During the school day, however, "skyshine" and reflected solar radiation (p. 115) almost invariably counterbalanced the radiant-cooling effect of the cold glass, and frequently raised the mean radiant temperature of the rooms above the air temperature (diagram above).

While "skyshine" eliminated daytime radiant-cooling, it had practically no effect on convection cooling by the glass. Such cooling was found to be potent enough to cool the air in contact with the glass surface as much as 10° below room temperature. The threat to comfort which this posed, together with the presence of a horizontal deflecting surface beneath the windows, was found to be greatest when the room as a whole required cooling, and the unit ventilator was discharging cool air. Thus it would have been necessary for the convectors under the windows (as installed in most of the rooms) to operate in opposition to the unit ventilator to combat the worst effects of the downdraft. As a matter of fact these convectors never actually operated during school hours, and went on only at night in the coldest weather. In one of the rooms in which the controls were modified to reverse the order in which the steam supply to the unit ventilator and the convectors was shut off by the thermostat, the convectors did a good job of controlling the downdraft on extremely cold days when solar gain was at a minimum, but failed to provide needed protection under other conditions. Performance of the "draft-stop" system of downdraft control is shown in the picture at the right.

GLOBE THERMOMETER READINGS, contrasted with air temperature at center of classroom for 24-hr. period in very cold weather, show how globe temperature falls below air temperature at night (lighter tone) and rises above it in daytime (darker tone) owing to nighttime radiant loss to window and daytime radiant gain from "skyshine," reflected and direct sunshine. Record is from east classroom on Mar. 4. Globe thermometer readings (heavy line) are a better index of comfort conditions than that provided by air temperature.

**SMOKE GUN**, trained on cold glass surface (below), reveals downward moving curtain of air intercepted by "draft-stop" grille at window sill . . .





... Similar test under egg-crate ceiling (above) shows absence of downdraft from clerestory glazing, due to turbulence induced by unit ventilator.

Classrooms are generously wide, evenly lighted, fully equipped. Low (9'-5") ceilings are scaled to "pupil dimensions"



Photos: Hedrich-Blessing

In the early stages of the school's design the committee of teachers agreed they wanted wider classrooms to permit greater freedom in arranging learning activities. They also wanted lower classroom ceilings. This combination of width and height posed a difficult problem in natural lighting, especially since freedom in arranging activities demanded better lighting than that afforded by conventional classroom windows.

The monitor roof and egg-crate ceiling developed to meet these specifications have produced rooms of deceptive simplicity in terms of what is accomplished. Not only is every part of the 29' depth evenly and adequately illuminated; this is true despite almost complete absence of the sky-glare so common in high-windowed classrooms, with or without bilateral lighting, and also without the high surface brightness of the upper side walls and ceilings associated with many other daylighting schemes. Still another virtue of the arrangement is that it works almost equally well regardless of the orientation of the rooms.

The freestanding storage cabinet and work surface shown in the photograph at the right was used in the lower grades, together with student lockers along the room side of the corridor wall. In the upper grades, work table and cabinets are attached to the wall, and lockers face out into the corridors. In both cases, daylighting of these activity areas (as shown by the photograph) is exceptionally good.

> **CORRIDOR SIDE** of south-facing classroom shows illumination at 9 A.M. on clear day. Obstruction of egg-crate ceiling by strip lighting fixture seems needless since lights might well have been placed above louvers.







# Peripheral heating proves effective for controlling slab-on-grade floor temperatures

Before there was any thought of using the George Washington School for heating research, the architect decided upon a simple method of controlling the "edge loss" of the concrete floor slabs and preventing cold floors. This was by the provision of a pipe trench around the outside of the building (in the natural location to serve the unit ventilators), and utilization of the normal heating main loss to warm the edges of the floors. Cabinets along the window walls of the classrooms were designed to cover the trench but make it accessible for repairs to the piping.

Floor temperature measurements taken near the outside walls of the north, south, east and west rooms, throughout the winter, show this method to have been effective. Floor temperatures ranged, on the average, from  $68^{\circ}$  to  $72^{\circ}$ , with the lowest temperature recorded during the period of occupancy with the heating system operating on a normal basis  $66^{\circ}$ .

On one occasion, the system was shut down entirely for a  $10\frac{1}{2}$  hr. stretch, and there was no steam in the mains from 3 in the afternoon until 7:30 the next morning. With an outdoor temperature of 23°, the room air in the west classroom fell to 47° by 7:30 A.M. and the floor cooled to 52°. When the heat was turned on again, the unit ventilator brought the room air back to 70° in about 40 mins., but the floor temperature did not reach 68° until shortly after noon, or about 4 hrs. later.

This experiment serves to demonstrate the profound effect of the

"heat capacity" of a slab-on-grade on the problem of restoring comfort conditions after classrooms have been allowed to cool considerably. Since the practice of allowing school buildings to cool overnight, and over week-end and holiday periods, is an excellent way to save furl when heating equipment permits, some means of doing so that will not result in cold floors during the warm-up period is indicated. The peripheral pipe trench offers such a means provided controls are arranged to keep steam in the main overnight while admitting it to the heating equipment only a needed to maintain a predetermined minimum temperature.



continuous pipe treinch around outside walls utilizes heat from steam mains to counteract heat losses at edge of floor slab. Removable cabinets provide access for repairs.

# "One-sided" solar gain complicates heating problems and results in mild-weather overheating

One of the few criticisms which can be made on the basis of the searching evaluation of thermal conditions within the school is that the design does not provide adequate control over solar heat gain. On warm spring days and in the very early fall the east classrooms tend to become overheated in the morning, and the west classrooms in the afternoon. To a lesser extent, the south classrooms overheat throughout the school day. The design of the monitor windows and egg-crate ceiling is such that direct sunshine can penetrate the egg-crate (in diffuse form, owing to the diffusing glass used in the monitor) whenever the solar altitude is greater than about  $50^{\circ}$ . Moreover, the cross section of the wings is such that indirect heat-gain from the monitors occurs throughout the winter at the same time of day and in the same rooms as heat gain from the windows.

A considerable improvement in the warm-weather condition could probably be affected by tilting the lateral vanes of the eggcrate ceiling about 30° to the vertical, and providing gravity ventilators in the upper roof to exhaust air from above the egg-crate to the out-of-doors. (This air often reaches 100° F. in quite cold weather, and in warm weather its tendency to rise might be a means of creating air circulation across the rooms from the windows.) Adjusting the solar imbalance in cold weather could be accomplished only by radically altering the cross section of the wings as indicated at the right, so that at low sun angles the rooms on both sides of the corridors would receive about the same amount of solar heat simultaneously.

Such a radical change in the cross section of the building of course raises a number of questions, many of which were taken into account by the architect in selecting the monitor scheme. The most obvious is that the space between the clerestory windows, in the second arrangement, would be a snow pocket. Assuming that the drainage problem so created could be licked, there is also the fact that on clear days illumination of the classrooms would tend to be brighter on the side of the rooms where the sun was coming in than on the side where it was not. (With the section actually used, illumination is remarkably uniform from side to side under all conditions, and particularly so on clear days.) In allowing these considerations to govern his design, architect Beckstrom was following the present practices of most advanced designers. The alternative cross section, however, is interesting as an example of what the effect on school design might be if the understanding of and consideration given to thermal factors were as great as that presently given to factors controlling daylight illumination.



**PRESENT CROSS SECTION** results in one-sided solar heat gain, warming east classrooms in morning, west classrooms in afternoon, south classrooms all day long, north classrooms not at all.



ALTERNATE CROSS SECTION divides low-angle sun heat between classrooms on opposite sides of corridor, equalizing effect. Tilted vanes in egg-crate ceiling block direct high-angle sun, ventilators exhaust trapped heat.

# Good daylighting is marred by poor sun control; an experiment shows how this can be corrected

Architect Beckstrom provided roof overhangs to exclude high-angle sun from the classroom windows on the east, west and south sides of the school, and protect them from sun heat. Control of lowangle sun was left to some form of blind, shade or curtain. Because of their high first cost and maintenance problems, Venetian blinds were avoided and the south and west classrooms equipped with roller shades.

This has not proved adequate. When the translucent shades are drawn, their surface brightness is greater than should be tolerated for good seeing, and warm weather ventilation is obstructed. The shades also transmit a great deal of solar heat. Moreover, the east classrooms have been left without protection, and the teachers in these rooms have had to resort to stopgap measures such as cardboard barriers and painting the glass.

To test an alternative solution, a stock vertical blind consisting of 7" wide opaque vanes has recently been installed in one of the east rooms. The vanes can be rotated or drawn aside when not needed, and transmit light in the same way as a Venetian blind: by reflection. While it is too early to pronounce this experiment a success, the vertical blind seems to compliment the roof overhang almost perfectly. It controls low-angle sunshine without blocking the view of the outside, and keeps direct sun heat out of the occupied area by reflecting a large part of it back through the classroom windows.



**EXPERIMENTAL INSTALLATION** of vertical blinds in east classroom employs twotone plastic-coated vanes to control low-angle sunshine. Lighter side of vanes faces out to reflect sun heat.

# **CONCLUSIONS:**

Laboratory school research produces a six-point summary of school heating and ventilating "do's and don't's"

Hedrich-Blessing



Henry Wright (right), technical consultant who directed the research program at the laboratory school, and engineer William G. Potter (left), who carried it out, examine continuous temperature record produced by 16-point automatic electronic recorder in one of the rooms. **1.** The modern, single-story school with its increased emphasis on natural light increases the need for classroom cooling during cold weather and the need for room-byroom control of classroom temperature.

2. In schools with large glass areas, it is desirable to increase the air-handling capacity of the ventilation equipment considerably beyond the usual 30 cfm per pupil, unless special precautions are made to control solar gain.

**3.** The comfort problem created by continuous classroom windows is almost entirely a matter of convective cooling by the glass surface. The best solution of the problem is to draw off the chilled air at the window sill.

4. Air flow patterns resulting from the irregular cross section, lower ceilings, etc. in the laboratory school did not adversely affect air distribution from the unit ventilators. Agitation of the air was sufficient to obviate the need for heating equipment beneath clerestory glass areas.

5. Thermal problems created by slab-on-grade construction can be solved by the use of a marginal pipe trench or other simple form of peripheral heating.

6. An effort should be made in school design to control and equalize solar heat gain throughout the building for the best and most economical performance of the heating equipment. The best classroom orientation, for northern climates, is southeast.



rovides bombproof shelter, brings space and light to crowded urban areas

SANDERS, MALSIN & REIMAN, Architects

How can a store be a smooth-running machine for selling, a bombproof shelter and a spacious city park—all at the same time?

To prevent visions of Googie architecture from flooding more visionary minds at such a question, here is a novel solution with plenty of ideas—sound, non-Googie ones at that.

This provocative design by Sanders, Malsin & Reiman combines store, shelter and park in a single package. It offers lower building costs in many areas, lower maintenance costs everywhere, as well as a better chance of beating on-again-off-again government restrictions on commercial building.

Key to this store-shelter-park idea is the building's underground location. Placed below grade it becomes not only a block-size multilevel store but it also fulfills the prime requirements of a bomb shelter. And since the roof is at street level, the idea of a spacious city park falls naturally into place.

Logically, the next questions are: How well does the design function as a store? and as a bomb shelter? The architects believe it not only answers basic requirements of both, but also introduces several new store ideas.

#### Flexible, visible space

Store levels consist of three ramps: two for selling and one for stock. The first and most evident of these is what the architects term the sales ramp spiraling from the main entrance on the street down to the lowest selling level.

From the main entrance customers get a view of nearly all selling areas since there are no obstructing interior walls. As a result the interior becomes one gigantic display case with the customers viewing it as though they were suspended from the ceiling.

Impulse departments line the sales ramp (known as the fast ramp due to its steeper pitch) as it spirals downward. These departments can be expanded or contracted easily by simply varying the space between them along the ramp. The second, or slow ramp, has considerably less pitch than the fast ramp. Wherever these differently pitched ramps touch, a walk-on connection is made.

The third ramp is the stock gallery which follows the slow ramp around the store perimeter. It is fed from one corner of



Intermediate sales level

25 50 75 100 ft.



Lowest or service level



the store by a turntable-elevator on which trucks are lowered from the street to the receiving and shipping department on the lowest level. From this point, stock is carried around the gallery on electric hand trucks to individual departments. In addition to being a passageway, the stock gallery is wide enough to serve as a reserve stock area.

An outstanding advantage of this store concept is the virtual elimination of vertical circulation problems. In other words, this store is as flexible vertically as most stores are horizontally.

Lounges, offices and employee areas are contained in the hollow centers of huge reinforced concrete columns which provide most of the structural strength to the building. Sidewalk display—an obvious problem for an underground store—is solved with individual sidewalk display units whose floors are small elevators which go down for display changes to a gallery directly beneath the sidewalk units.

#### **Bomb shelter qualities**

The entire structure is made of reinforced concrete and designed to withstand all but direct hits from A-bombs. In an emergency, the building could be used as a first aid station, a hospital, civil defense headquarters, gathering place for evacuees or it could serve any combination of these needs.

The main entryway is sheltered by a series of baffles to reduce blast effects while the fast ramp permits large numbers of people to enter the building in the event of an emergency and get quickly to the lower levels.

The truck turntable-elevator becomes an ambulance lift and with all store fixtures pushed quickly to the perimeter, the entire building becomes available for war work.

Emergency exits are placed as far from the main entrance as possible so that debris from surrounding buildings would be less likely to block all exits.

Storage space is provided for civil defense supplies and auxiliary power service could be provided.

#### Economy—today and tomorrow

In areas like Los Angeles where soft ground condition makes excavating easy, an underground store would prove economical since smaller heating and air conditioning loads would substantially reduce initial equipment costs. And in all areas, operating costs would be lowered. With little or no wall above ground, window washing and other exterior maintenance costs are virtually eliminated.

Added to these immediate economies is the preservation of urban real estate values that are often wrecked by overcrowding. Here, the park could give space and light to the area, modernizing the town in the best sense of the word. At the same time the store operating underneath the park would maintain the productivity necessary to such high land cost areas.



ABRAHAM & STRAUS LOCATION: Hempstead, L. I. MARCEL BREUER, DANIEL SCHWARTZMAN, PETER COPELAND & ASSOCIATES, Architects AUSTIN CO., Engineers and Builders

# SUBURBAN Department Store



Alexandre Georges

# STORE uses underground delivery, corner entrances and windowless walls to give big city service

The new A & S store in Hempstead faces the toughest competition in the world: Manhattan stores—only 1 hr. away. This fact, above all others, influenced the plan and design of the three-level, 236,000 sq. ft. store: It produced the windowless building with corner entrances to free peripheral space for large stock areas which assure wide selection and deep reserve stock while cutting warehouse handling to a minimum.

▶ It produced a smooth-flowing truck delivery system—a ramp down from the rear street to basement level unloading platforms. Thus the many trucks needed to maintain a large stock don't clutter streets or parking lots.

• It produced duplication of all departments found in the main Brooklyn store to give customers the best of city service in the suburbs.

Yet with all these department store amenities, the new A & S looks and feels like the most modern of suburban shops. Marcel Breuer designed its simple, inviting facade. He used stone walls around show windows, planting in the open corner entrances. Inside, the other architects used light, color, textural wall surfaces and glass-and-metal display cases to complete the specialty shop atmosphere.

# Cars by the thousands

Where most branch stores head for a shopping-center location, the new A & S store decided to "go it alone," made no attempt to develop a retail community around the store. But since the store is located in one of the most densely populated US suburban areas boasting the highest concentration of cars in the country (.92 automobiles per family) such merchandising precautions were not considered necessary.

Deliberately removed from the main Hempstead business district—though in the direction of its probable growth—the store solicits its own trade and provides parking space for 1,200 cars. This space, already inadequate, will be increased soon to accommodate 1,500 cars for customers who are expected to bring in an annual volume of \$12 to \$15 million (between \$63 and \$85 per sq. ft. of selling space).

To clear the decks for motorist customers, all truck deliveries are made below ground. A concrete ramp—heated in winter to prevent icing—leads from a back street to a basement loading platform. Here, in a two-bay expansion of the lower level beneath the parking lot, are located receiving-shipping facilities, air conditioning and other mechanical equipment, and most services. This subterranean expansion has the added advantage of leaving all of the basement level directly beneath the store clear for selling.

While providing for motorists, A & S did not neglect the pedestrian shopper. The store front was placed right on the sidewalk line with the most imposing entrance located where it would be first encountered by pedestrians coming from the Hempstead business district. Actually all four entrances are given prominence since no traffic study could reveal which would draw best.

Photos: (below) Luis Azarraga; (above) Alexandre Georges





Situated on a main traffic artery leading out of the main business district of Hempstead, the new A & S Nassau store has dimpled brick and stone wall exterior designed by Marcel Breuer, on a frontage of 300'.

SUBURBAN DEPARTMENT STORE



To keep truck traffic off street and parking lots a ramp from a rear street leads to an unloading platform on the basement level of the building. There, in a 50' (two bay) extension of the basement, are located shipping and receiving departments, mechanical equipment, wrapping department and other services. This extension leaves other basement space beneath the store free for selling. Unloading platform location induced store to place appliance and furniture departments on this level, thus keeping heavy merchandise handling at a minimum.

Independently located several blocks from other commercial sections (map, left) store boasts 9-acre parking lot for 1,200 cars, plans an increase to handle 1,500.



Minsten & Steam

#### Effect of corner entrances

To handle customers coming into the store through the four corner entrances, the interior was treated like an X—with the escalator at the crosspoint. Chief advantage of this circulation plan was that it freed all four exterior walls for generous peripheral stock space. Chief disadvantage, of course, was that it required setting up four impulse or convenience selling areas to cover all entries.

One change from usual department store operation was the location of furniture and appliances in the basement rather than on the top floor. (Ease in handling the heavy merchandise delivered from this floor as well as from warehouses—was more important than high productivity on the lowest level.) But since, at present, top and bottom of the store are equidistant from street level, no great departure from traditional demand department location is actually made. When two floors are added later, however, these departments may have to be shifted.



Special lighting fixture takes eight 2' fluorescent lamps plus one 200 or 300 w. incandescent, gives near daylight conditions on sales floors (25 foot-candles).



#### **Specialty shop atmosphere**

Special glass-and-metal fixtures used predominantly on the street floor give the store a sophisticated specialty shop air. And although they are standardized to some extent for economy's sake, they successfully avoid a ready-made look. Counter cases have nearly continuous fluorescent lighting which is particularly effective in supplementing the over-all lighting.

Ceiling lights combine fluorescent and incandescent lamps in a special fixture to simulate daylight, and they keep the deepest space well lighted at around 25 foot-candles. Unfortunately, the grid arrangement of ceiling lights (for easy maintenance) produces a monotonous pattern in the comparatively low hung ceiling.

Appropriate colors define the different departments and the division is emphasized in several places by the use of special wood wall finishes. The men's department, for example, sports a rib-paneled oak wall while the gift shop is paneled in redwood.

X-shaped traffic pattern with escalator at crosspoint is produced by location of entrances at the store's four corners.





Photos (above & opp.): Richard Averill Smith

Alexandre Georges

Open treatment of entrances gives store a light, specialtyshop atmosphere. Note mirrors used between interior edge of entrance canopy and ceiling which contribute to light treatment of this entrance. Though one of the most prominent entryways, it has so far been least used—a fact that could not be accurately determined prior to the store's opening.



# THE STORE THAT CARS BUILT provides central parking lot

as solution to the small store owners' problem of where to put the customers' cars

It took 50 years plus the pressure of 50 million automobiles to find the best place for a small store parking lot. Since 1900—when the nation first took to its wheels—store owners have struggled to find the right location. Many schemes have been tried but none quite like Victor Gruen's which eliminates most bad points of the usual solutions.

Curb parking, rear, side and front parking lots all have their disadvantages. Space limits curbside parking; side and rear-of-store lots have a back yard atmosphere and usually are reached by alley-type driveways while a frontof-store parking lot obscures valuable displays from both pedestrians and passing motorists.

Gruen's ingenious solution splits the store in two, separating selling from outside display. He places display windows along the sidewalk, pushes the store building itself to the rear of the lot and turns the space between into a de luxe parking lot.

Advantages of this arrangement are instantly obvious: displays are not obscured from passing motorists by cars parked at the curb; windowshopping pedestrians may look at sidewalk displays without blocking the store entrance; and customers feel they're halfway in the store by the time they've parked their cars.



Main display windows of Victor Gruen's Tyler, Tex. store line the sidewalk (left, above, and right) where they can be seen by pedestrian and motorist alike. The store itself is located on the rear edge of the lot where the main entrance is free from jostling sidewalk window-shoppers. In between is a shielded parking lot for shoppers' cars. This arrangement gives the luxury women's specialty store an intimate character. MAYER & SCHMIDT, Owners LOCATION: Tyler, Tex. VICTOR GRUEN, Architect RUSSELL P. RANDALL, Electrical Engineer K. BARDIZBANIAN, Structural Engineer CHARLES KAHAN, Mechanical Engineer H. E. WHITE, General Contractor



Supplementary display window flanks main entrance

Photos: Photo Associates-Ulric Meisel

To make the parking lot plan work, sloping site was filled and retaining wall built to bring main store level to that of the driveway entrance. Rear of the store faces on a secondary parallel street where it is revealed as a two-level store. Walk along one edge of the site invites pedestrians.

Sidewalk display units (left), totally independent of main store, are accessible from the rear for display changing.

#### To see the whole, look at the parts

Gruen's new concept of small store design shows how dealing with each element of a problem separately can often produce startling results. (This principle was excellently demonstrated when the two functions of windows—light and ventilation—were first treated separately some years ago.) Here, by separating the three elements of any small store—display, selling, parking—he found an almost ideal solution to the parking headache. He also credits his extensive experience in large shopping center design with training him to look at parking as an integral part of any modern store. Thus he had parking constantly in his mind when he tackled this small store problem.

To make the site compatible with the idea, a 12' slope from its front on the main street to the parallel street at the rear of the site had to be overcome. Retaining walls were erected along the sides of the site and the grade brought to the main street level with compacted earth fill.

In designing the store building itself, the grade difference was used to produce a two-story building. The top or main selling floor is the only one showing from the front and is on a level with the parking lot. The lower level contains beauty shop and teenage shop plus all services. Trucks use the street along the rear of the store to reach the loading area. Interior stairs connect the floors while exterior steps along one side of the building lead from the lower rear level to the upper level of the parking lot.

Primarily an autoists' store, Mayer-Schmidt's still caters to pedestrian traffic. A sidewalk runs along one side of the site leading to display windows in the store facade which supplement those along the main street sidewalk. And when the business district expands—as it is expected to do—the sidewalk display cases as well as the supplementary store window displays will serve pedestrians and motorists equally. But for the present the display emphasis is on appeal to motorists.

#### Branch store swallows main store

Mayer-Schmidt's new branch shop enjoys the unique distinction of being closer to its parent establishment than any other branch store in the country. Only three blocks separate it from the main store. But where the main store sells all types of soft goods, the branch sells only better women's goods. And since Tyler, a town of about 50,000, has only one vehicular promenade for shoppers—a long and often crowded shopping area—the proximity of the two stores is no handicap. As a matter of fact it will be turned to advantage. The main store is now in an obsolescent building with no parking facilities around it. The plan is eventually to move the main store to the branch store site. In anticipating this, the branch store was designed to take three additional floors in the future.

Interior design of the new shop follows the best modern practice using an informal departmental arrangement with simple circulation patterns, full air conditioning with ductwork concealed by a hung ceiling, and brilliant accent display lighting.

#### What the new idea cost

Development of the difficult site to fit this new store concept was an added expense but the owners were willing to pay it to give what Gruen describes as "the ultimate in customer convenience." A poor subsoil condition also added to the bill by requiring pile-supported foundations and, since the design called for a reinforced concrete structure which could support three additional floors, the over-all cost was higher than it would be for a similar small store on a flat site. Gruen has provided for service to the additional floors by reserving space for two elevators and placing the air conditioning equipment on the lower level instead of on the roof.

Total cost of all three elements of the store—display, parking and selling areas—came to \$255,000 with the basic building cost held to a reasonable \$13 per sq. ft.



Hung ceiling throughout the store conceals air conditioning ducts. High level general lighting is supplemented by brilliant accent light.



Luxurious salon selling section (above) characterizes quality level of the store. Informal layout (right) gives spaciousness to relatively small selling area.

Back cases in main sales island (left) are kept low (4'-6'') to give unobstructed vista of all sales areas, permitting customers to locate any department at a glance.









Large window lights sportswear section while wooden grille extends into store to reduce glare. Lower level (right) houses receiving-shipping, all services plus beauty salon and teen-age shop.

Street and subles



1850 textile mill, like this one on a New England riverbank, was a vertical structure six stories high....



... with machinery arranged by type on the various floors.

1950 textile mill, like this new one for Clemson, S. C., is typical . . .





Bettmann Archive

New textile mill for Utica-Mohawk Division of J. P. Stevens Co. by Lockwood Green Engineers, Inc.



... of today's sprawling industrial plant with acres of machinery spread out on a single floor





# VERTICAL TEXTILE MILL updated with ingenious structure

challenges today's one-floor factory.

# Buckminster Fuller harnesses gravity to move materials through open \*russ floors

Nothing is more typical of 20th Century industry than the spread-out factory on a single floor. These vast building pancakes have covered fantastic areas-the Dodge plant fans out over 86 acres, a full-sized farm.

Only a genius or a screwball would challenge this universal concept. Buckminster Fuller has now raised a fascinating challenge to the pancake factory-the "fountain factory" shown on these pages. And Fuller's record over the past 25 years (when he concentrated chiefly on housing structures) has been that in the beginning he was called a screwball but in the end hardheaded men such



. 19XX textile mill proposed by inventor Fuller and arranged vertically like early New England mills



as U. S. Steel's Foster Gunnison have declared him the unquestioned genius of the entire field of prefabricated construction.

Fuller's "fountain factory" was worked out specifically for the textile industry-it's a "90% automatic" textile mill-and his collaborators were 20 enthusiastic and indefatigable graduate students of the North Carolina State College School of Design at Raleigh. His expert advisers were technicians of the North Carolina textile school-at first they were either grudging or amused, but in the end many became Fuller's enthusiastic supporters.

Fuller's "fountain factory" at first glance violates every tenet of modern manufacturing. Actually, every "violation" is justified by some new invention:

1. Industry has been opposed to "fighting gravity" by lifting materials into the air. But Fuller, dealing with cotton as a "fluid" raw material, has found it easier to blow it (after preliminary treatment) to the top and then work down. And there are many other raw materials that could be treated similarly as semifluids. With manufacturing turning more and more to plastics as a basic raw material, Fuller's "vertical flow" plant may tomorrow look much less startling than it does today.

2. Industry has turned away from the multifloor factory not only because of the cost of vertical transportation but because of the bottlenecks caused by having to run isolated elevator shafts through solid floors. But Fuller's floors are mere sievesmaterials and services can, so to speak, be drifted down anywhere through the floor, an open truss.

3. Industry has been opposed to upper floors because of the heavy construction needed to support heavy machinery and materials above the ground and still maintain the needed wide spans for unobstructed lateral movement. But Fuller's new structural system reaches a high in efficient strength-weight ratio by spreading weight across a more efficient three-way grid instead of the two-way grid of the conventional post and beam, slab or truss support. Fuller's system makes it economic to build wide spans to support machinery at upper levels.

More comprehensively, Fuller's technique is an advance in the separation of functions. Thus the conventional floor is designed for two things simultaneously: 1) to support machinery; 2) to permit lateral movement of materials and men over the entire area. Fuller's spidery scheme uses construction primarily to position machinery in the third dimension, up in the air. But the movement of men and materials, in an accurately designed 90% automatic process, is channeled or tracked only where it has to go; so no solid floor is required for it. Fuller draws the analogy of the airplane wing. It holds the motor in correct position above the ground, but does not support personnel (out at the ends) for either operation or maintenance.



Exploded view of Fuller's vertical textile mill (above) shows the seven open sieve-like floors whose shapes are varied to suit the nature of the operation and machinery assigned to each floor and whose openness gives the building a three-dimensional flexibility of layout.

# Vertical textile mill: for flexibility, a third dimension

Fuller's "fountain factory" is based on his analysis of the dozen or so processes required to turn raw cotton into finished muslin. He noted that in the modern "pancake factory" the production flow is not actually the famed "straight-line" pattern it is supposed to be, but more like the endlessly widening and narrowing path of a tortuously curved river. In spinning, for example, the process might spread out over a 100' wide slice of floor space, but the next process step might require the thread to be passed through a single machine occupying only a narrow strip on the assembly floor. Fuller noticed that this intermittent widening required an enormous amount of rolling material on the vast horizontal factory floor. And even in the most modern textile plants, a sizable part of this movement was not conveyorized, but moved by lift-truck or even lugged by hand at some points.

#### Up by air; down by gravity

The "fountain factory" takes its radical first step by blowing its raw material—cotton received, cleaned and blended on the ground floor level—up to the very top of the structure through ducts in the central shaft (*see section*). Once at the top, the cotton sieves down through a floor that is more like a screen than the heavy barriers we are accustomed to think of as floors. By stacking his processes up on seven layers of sieve-like floor space, Fuller gets a three-dimensional flexibility of layout, as compared to the two-dimensional limits within which the layout designer must work in the horizontal factory.

This vertical scheme also rests on the assumption that automatic operations, already carried very far in today's air conditioned textile plants, can be carried farther still—or to about "90% of total process" as Fuller precisely says. For what manual labor is still needed to rectify any slip-ups in the impressive performance of such machines as automatic bobbin-threaders, Fuller proposes to install light catwalks across his sieve-like floors. An alternative for moving labor around to tend machines and to repair them, he says, might be little cars hung from monorails. These cars would give workers access to the huge machines at an operating level, and keep them off the floor entirely.

# Despite cheap land and electricity

Textile mill operators, now as wedded to the sprawling "pancake factory" as they once were to the multistoried stone mills perched along the waterfalls of New England, can, of course, find many objections to Fuller's brilliant theoretical realignment of process. Not the least of these is that the electrical power available for long-distance horizontal movement within the plant is now so cheap, especially within the great power-grids of the south, as to make any consideration of the advantages of gravity flow negligible. Moreover, with the vast amount of rural land available for "pancake factories" much cheaper than the limited amount of steel available for vertical ones, Fuller's rationalization of process flow is not likely to have many takers at the moment.

Engineer Fuller can undoubtedly counter these "practical" and immediate objections with his solid confidence that whatever is rational will, in the long run, prove to be cheap, too. Actually, his "fountain factory" must rest its claim to attention, like much of Fuller's work, on a spectacular structural innovation, which might very well make a multistory structure cost less than today's horizontal factory. For how he does it, turn the page.



Section through dome-like building illustrates the "fountain" quality of its structure. Central core accommodates utility ducts and elevator and its integrally built concrete rings position the floors which are further supported by cables around their periphery. Note diagrammatic flow of cotton from bale receiving department on ground floor (lower left) up through pneumatic tubes around the core and then down through various processes to the second floor looms which produce finished muslin. Open trusswork of floors permits the material to flow down through the floors from process to process.

**Enclosed within a geodesic sphere** of short steel components, the seven production floors assume a mushroom shape which would be enclosed with a stretched plastic skin.



# Vertical textile mill: for interfloor flow, a new floor structure



Typical floor plan (the seventh) consists simply of open trusses and the machinery they support (carding machines in this case). For such minor pedestrian traffic as would be necessary in this automatic factory, inventor Fuller would provide narrow catwalks. Floor framework (right) is a series of trusses comprised of short, light steel parts arranged in a three-way triangulated system. Light in weight, such a framework is strong and easily extended. The "fountain factory" is designed around three main elements: the central mast, the three-way trusses which replace floors, and the enclosing shell.

Mast. Fuller hangs his truss-floors from a mast. This central support is made of six concrete spiral reinforced columns 18" in diameter placed 10' apart in a hexagonal pattern and designed to carry a total load of 3,200,000 lbs. These columns are braced by reinforced concrete rings at "floor" levels, which occur at 14' intervals. Columns are also laced together between floor levels. Through this mast travels all ductwork: for blowing the cotton up, for waste products and for the heating and humidification system. It also carries the sprinkler system, utility lines, conduits for automatic oiling of the machinery, and an elevator for personnel and machinery. On top of the mast is a 50,000 gal. water tank and a robot weather control unit to aid in maintaining accurate temperature and humidity conditions inside the dome.

**Truss-floors.** Fuller's basic structural innovation is the steel trusswork used, like a scaffolding, to support the machinery in proper position in the vertical process flow. These truss-floors

Passe and the second

**Central "mast"** springing from ground floor receiving-shippingadministrative area consists of six reinforced concrete columns tied together with concrete rings at the floor levels 14' apart. are designed on a three-way triangulated system, which has the big advantage of distributing stresses in concentric circles around the point of support. As is usual in Fuller's chronic structural revolution, this steelwork is calculated to be spectacularly light in weight for its strength. Fuller also points out that his cantilevered truss-floor system will make it easy to add more floor space concentrically about the mast at any future time. Cables are used to tie the cantilevered trusses together at their circumference to insure an integral structure.

Open network of the truss-floors acts like a sieve permitting natural filtering of the product, as well as installations of ducts and conduits at any point and at any time. The trusses are designed to carry a maximum of 115,000 lbs. and the machinery is arranged around the mast in a turbine-like pattern so as to minimize any chance of sympathetic vibrations in the structure from

Revealed above without its protective envelope of insulation and plastic, the "fountain factory's" structure combines the appearance and light weight of a spider web with the appearance and strength of a dome.

the machinery. (Textile men criticize Fuller's radial pattern of machine placement as wasteful of floor space around the perimeter of his circular floors.) A monorail system permitting automatic transfer of the product from one process to another is installed underneath each truss-floor. Vapor barriers control the humidity at each level.

**Shell.** A geodesic sphere (for a full account of this complex, easily demountable structural system, see Aug. issue '51) encloses the mill. This sphere's plastic envelope is planned as a double layer to allow for return air flow and insulation. A minimum of concentrated foundation is required to support this geodesic envelope because of its lightness and even distribution of weight. Because the geodesic is constructed of small, industrially produced steel units, it can easily be dismantled and reerected. Fuller foresees lightning-like expansion possibilities for his fountain factory—with a bigger geodesic dome erected over the existing one, the older sphere quickly dismantled, truss levels extended and more machinery installed with no stop in work. Inventor R. Buckminster Fuller and his youthful collaborators at North Carolina State College School of Design (below) received enthusiastic advice from technicians at the College's textile school.



# **BRITAIN:**

# **RUBBER FACTORY**

BRYNMAWR RUBBER LTD. LOCATION: Brynmawr, South Wales ARCHITECTS' CO-OPERATIVE PARTNERSHIP, Architects OVE N. ARUP & PARTNERS, Consulting Engineers

# demonstrates the esthetic and practical benefits of close architect-builder collaboration

Heartening proof of continued ingenious co-operation between architect and engineer comes from Britain's best postwar building: the Brynmawr rubber products factory in South Wales. As in the new British steel mill shown on page 146, architects and engineers have achieved here the almost perfect balance between the art and the science of building.

Reflecting the long-time European steel scarcity, the building is made of reinforced concrete, and the result is a structure in which engineering and architectural skills are so closely joined that neither engineers nor architects know—or care—where their respective contributions begin and end.

The striking 146,000 sq. ft. building evolved from the function of the plant which may roughly be divided into four parts:

1. Receiving-shipping and initial process areas for raw materials. These two similarly functioning areas are linked achitecturally by roof structures of thin reinforced concrete barrel vaults.

2. Special process and supplementary areas. Placed outside the main production areas, they are connected to the main plant structure by passageways.

3. Main production area, the heart of the plant. It is kept free of columns by employing nine rectangular  $(85' \times 62')$  skylighted roof domes of 3" thick reinforced concrete. Since this area performs a variety of functions flexible free space was called for.

4. Employees' facilities. The entrance hall and the three windowless locker rooms whose exterior walls are cantlivered structural overhangs give the facade (above) its distinct architectural note.



Mill room (approximately 334' by 64') is 36' high to the apex of the reinforced concrete barrel vaults, ten of which form its roof. Vaults are 234'' thick, span 68'-6''.






South side of rubber factory is employees' wing with entry hall at extreme right and with three concrete locker rooms punctuating the glass-walled corridor.



Plan for material processing and worker movement (left) governed arrangement of factory departments. Exterior of mill room (above) shows barrel vaults cantilevered 4'-6" with clerestory windows enclosing vault ends. Below: Windowless locker rooms, also cantilevered beyond building line, are faced with precast concrete panels.

Photos: Courtesy Architectural Review; de Burgh Galwey



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#### **Entrance hall**

1.



#### Entrance hall is used by all personnel. From it they go down the south corridor (1) where all employee services are located and from which all parts of the factory can be reached.

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The hall itself is covered by one shell vault of reinforced concrete spanning 57' between supporting walls. Sides of the vault are flanged upward for roof drainage as well as shade for clerestory windows (2) along each wall, Double-glazed windows below clerestories have planting boxes between exterior and interior glass. Vault ceiling is painted with asbestos spray, has a decorative mural.

Ramp (3) leading to entrance hall level is single precast concrete trough 200' x 12' supported at intervals by concrete columns. Finish of ramp, like that of other exposed concrete, is pattern of battens used in forms for this decorative purpose.

Main production area: Main production area (4) of 77,000 sq. ft. designed to be as free of obstruction as possible is covered by nine rectangular reinforced concrete domes each spanning  $85' \ge 62'$ . The 3'' thick domes are pierced by skylights and ventilation registers.

In valleys between domes 12' walkways permit a clerestory window treatment (5) throughout the production area. Expansion joints where four dome corners meet leave each dome structurally independent.

3.

Harmonious whole: Well related work areas form 146,000 sq. ft. of efficient production space. Most of the building is painted white, pale gray or mixed fawn. Strong colors (yellow, dark red and scarlet) are used on various interior walls.







Exterior is finished in corrugated steel painted a light tan. Lighting is through vertical windows curved inwards at the top, supplemented by roof clerestories. Main mill above; furnace and casting bays below.





Clerestories are set into ends of structural bays. Note complex downspout system designed to bypass curved windows. This is mold preparation bay.

#### BRITAIN:

## STEEL MILL is a big, bright workshop for a grimy industry

This is more than the newest and biggest of European steel mills. Like the British rubber factory shown on the preceding pages, it is also a new and big rebuke to those who claim that U. S. industrial buildings are more beautiful than their European counterparts.

It is the new Abbey Works at Margam, Port Talbot, South Wales, designed by architects Sir Percy Thomas & Son, in association with British engineers. Four of the largest British steel companies amalgamated to construct the giant plant. Total cost: \$240 million. Total length: more than 4,000'. Annual capacity: 1.6 million tons of steel ingots, 1 million tons of pig iron, 780,-000 tons of coke. Some 8,300 men will operate the mill, turn out steel for guns, tanks, aircraft, ships and cars to strengthen Western Europe's defenses.

Second only in importance to its contribution to the defense of the free world is the Abbey Works's contribution to better industrial architecture. For here is a steel mill that is clean, sunny and bright—a shining workshop in grimy South Wales, a new and proud chapter in Britain's continuing industrial revolution.



Generator room has "high-low" roof typical of rest of mill, demonstrates evenness of natural lighting achieved.



Interior of 4,000' long mill enjoys good natural lighting. Trusses span 90', are set 40' on centers.

End view of furnace bay is shown below. Port Talbot mill covers nearly 600 acres. Twenty-seven million dollars of its cost was contributed in Marshall Plan aid.





Photos: (above) Helene Adant; (opp.) France-Illustration



**CHAPEL.** Not even Michelangelo ever had the opportunity to design an entire church as a completely personal expression—from altar to doorknobs, from stained glass windows to the chasubles worn by the priests. Nor did Leonardo, nor Bramante, nor Brunelleschi, nor any of the masters of religious art or architecture of the past. But old Henri Matisse has. And with his little Dominican chapel at Vence in the South of France, he has done all architects a service by giving an electric shock to a concept which is in need of stimulation: the religious building.

At Vence he has driven pomp from the temple and replaced it with a passionate, pure vitality. The bright discerning sun of the Mediterranean strikes the brilliant white walls of his chapel with a continuous visual shock; inside, the strength of the impact is not slackened, but only made softer and more spiritual. The interior is a white-walled pool which receives lambent refractions of the light through the stained glass windows. This light is predominantly blue or green, depending on the hour of the day; red is absent from everything except some of the vestments. And baked into the glazed tiles of one long interior wall (the wall opposite is whitewashed) are large black-on-white Matisse drawings with all this modern master's precise vigor, his "concentration of sensations," About the chapel interior, Matisse has said mildly, "My chief aim was to balance a surface of light and color against a solid white wall covered with black drawings." But he has said before, "What I am after, above all, is expression."







Only seats in chapel are in nuns' transept



Orientation of apse and altar at west end is unorthodox today but has ancient precedent. Below, the chapel viewed from the south.

No churchgoer himself, the 82 year old Matisse came to design the chapel when a Dominican nun who had nursed him through a serious illness early in the war asked him in 1947 to help her with some designs she was making for stained glass windows. He became enthusiastic and gave the next four years of his life (and, reportedly, much money) to the chapel.

Matisse has tried several forms of expression in art, but never before architecture. The emotionally functional approach he made to architecture, however, might well have been anticipated from the *Notes of a Painter* which he wrote in 1908: "The whole arrangement of my picture is expression. The place occupied by figures or objects, the empty spaces around them, the proportions, everything plays a part. Composition is the art of arranging in a decorative manner the various elements at the painter's disposal for the expression of his feelings. In a picture every part will be visible and will play the role conferred on it, be it principal or secondary. All that is not useful in the picture is detrimental. A work of art must be harmonious in its entirety; for superfluous details would, in the mind of the beholder, encroach upon the essential elements . . . a drawing must have power of expansion which can bring to life the space which surrounds it."

Now working with space itself, this artist has succeeded in evoking a religious atmosphere in a very personal way. Architects recently have begun to realize that they have virtually eliminated the artist from modern architecture, although too many architects still blame the artist for his failure to contribute. Here is an artist who reversed the process. He took charge of this building, and created a Matisse in three dimensions.

> Northeast corner of the chapel interior (right) shows the carved door to the confessional. On adjacent wall are the Stations of the Cross.

> > Photos: Helene Adant







Looking from behind altar toward east end of church

Photos: (color) Courtesy Museum of Modern Art; (bottom) Helene Adant; opp. LIVE, Dimitri Kessel



Says Henri Matisse, "This chapel is for me the ultimate goal of a whole life of work and the culmination of an enormous effort, sincere and difficult. This is not a work that I chose but rather a work for which I have been chosen by fate towards the end of the course that I am still pursuing by my researches. The chapel has afforded me the possibility to realize them by uniting them. I foresee that this work will not be in vain and that it might remain the expression of a period in art, perhaps already surpassed, though I do not believe so ..."



View past travertine altar toward apse, left. Above, west end of church, showing same windows

When photograph on facing page was made, Matisse was working in his lofty studio on the drawing of the Virgin and Child which is over windows in photo above.



# **BUILDING ENGINEERING**

- 1. Galvanized sheathing for prestressed concrete
- 2. Timber roofs for wide spans
- 3. Plastics for ceilings and windows
- 4. High tensile plates for steel framing
- 5. Elliptical pipe for utility tunnels
- 6. Caisson foundations for difficult soil

#### 1. BETTER PRESTRESSING New tension method helps span 65'

with concrete girders only 4' deep

These six concrete girders in the Manhattanville College in Harrison, N. Y. show how the European technique of prestressing is being adapted to American construction. Originally detailed for six 3'.8" deep steel girders weighing 12 tons each, the design was modified when steel became unobtainable. The substitute prestressed members are only 4" deeper, used a total of only 8.08 tons of steel, thus saved about 64 tons or nearly 90%. They are 65' long.

Several new building techniques are used in these 28-ton concrete girders:

Designed for a dead load of 100 psf plus a live load of 122 psf, they represent one of the first U. S. uses of prestressed concrete to support a floor system.

▶ Tension cables are sheathed in .035" thick, 11/4" diameter galvanized steel tubing. This reduced friction in the curved cables so much that they could be tensioned from one end only, which considerably simplified this critical operation. Bituminous sheathing used in previous prestressing jobs developed so much friction that two jacks had to tension each cable simultaneously from each end to distribute the required elongation uniformly throughout the long cable.

▶ Girders were poured and prestressed in place. Formwork was simplified by precasting the 3'.10" wide and 8" thick keystone-shaped brackets spaced on 7'.7" centers along each girder. Used to support the floor slabs, these brackets are positioned with the formwork and contain slots through which the cables are threaded.

A new anchorage technique combines the advantages of both the Freyssinet and the Magnel systems. The 12 0.196" wires in each cable are threaded through 12 tapered holes arranged in a circular pattern in a 4" square, 1" thick steel anchoring plate and, after the cable is tensioned, each wire is wedged into place.

The prestressed girders were designed by Preload Corp. Architects Eggers & Higgins; engineers Weiskopf & Pickworth.



#### 2. RIBBED TIMBER ROOF

Light timber arches with pipe braces

span 75' at \$1.25 per sq. ft.

This bowling alley in Newton, Kan., 150' long and 75' wide, has an interlocking ribbed roof that boasts all the advantages of rapid, simple erection, economy, and uses only readily obtainable materials. It is also strong construction; the Pittsburgh Testing Laboratories have loaded a 120' span roof of this design to 43 psf with no signs of failure.

Basically, the roof consists of 2" x 12" Douglas fir (or equivalent timber) arches spaced 2' on center. Lateral support is given by 2" piping spaced 5'-11" on center across the arches and secured at 12' intervals to double arches by pipe couplings. The arches are made up of 11'-10" lengths of timber with 2" diameter hemispheres cut into the ends so that they frame into the 2" stabilizing pipes. Butting ends of the arch segments are nailed securely to a 5%" thick 12" x 12" plywood cover plate, through the center of which the pipe is fitted before erection. The arches are roofed with 3/4" sheathing laid at right angles to the arches and covered with 20-year bonded built-up roofing. Thrust is taken by 1" diameter tie cables attached to the side walls and tightened by turnbuckles.

While the walls, columns and collar beams are built, half-span roof sections are assembled on the ground in 12' widths. The butt ends of each 12' section are fastened by U-bolts to 2" x 10" plank which is in turn hinged to the collar beam plate. A derrick and winch raise the first half section to a point just above roof peak where it is supported by 4" x 4" wooden legs set on screw jacks. The opposite half is similarly raised and the two sections are then lowered into position by the jacks and bolted together. Temporarily nailed shiplap assures correct spacing of members during erection. On this bowling alley the interlocking ribs were assembled, erected and roofed by an experienced crew in only six days at a cost of \$1.25 per sq. ft.

In case of fire, the interlocking rib system has a high degree of safety. Even if some section of the roof should fall, adjacent sections, acting independently, will remain structurally stable. This has been recognized by local fire underwriters, whose insurance rates for this building are 55% lower than those for neighboring structures built of conventional steel and concrete blocks.

Builder and designer of the interlocking ribbed roof, H. R. Hoekendorf; architect, Earl J. Bartel.





Lightweight arches are built in sections 12' long and half-span wide. Each half is then hoisted simultaneously and locked in position. Thrust is taken by 1" tie-cable between supports. Alternatively, thrust could be taken by heavy buttresses.



-2"x12" plate

reinforced

2"x 12" rit

tension cable



Ends of arches rest on precast concrete beams mounted on side walls. Plan above shows how adjacent arches are staggered for greater rigidity.

#### **3. PLASTICS IN LIGHTING**

#### Luminous ceiling, translucent windows produce 120 foot-candles, no glare

Use of a luminous ceiling of translucent acrylic plastic in this new design engineering office proves that a high level illumination of 120 foot-candles can be achieved with brightness ratios well within the accepted 3-to-1 standard.<sup>\*</sup> It also proves that external glare can be kept within the same standard through the use of translucent plastic windows with vision strips.

Main axis of this design office for Rohm & Haas Co. runs  $25^{\circ}$  west of north. Its poor orientation, unavoidable due to plans for future expansion of adjacent manufacturing facilities, presented the designers with difficult glare problems. In layout, 26' deep drafting offices and laboratories line the east side and  $15\frac{1}{2}'$  deep executive offices the west side of a central corridor. The building is not air conditioned, but heat load is reduced by spraying the roof in summer.



**Ceiling plenum** (above) shows how brightness contrast is kept down by plastic diffusing panels 20" beneath lamps. Section through laboratory (right) shows lighting curves measured in foot candles.





Lighting. All office ceilings are designed as a single visible light source. Using diffusing panels 1'.8" below fluorescent tubes, brightness contrast from wall to wall is kept down to 4%, total light transmission is pushed up to 93% and specular reflection is reduced to a minimum. This is achieved by keeping the depth between fluorescent tubes and plastic diffusing panels at more than two-thirds of the spacing between tubes, and painting all ceiling plenum surfaces white to reflect nontransmitted light back through the panels. Sprinkler pipes and hanger rods

\*This preferred 3-to-1 ratio stipulates that the brightest surface—the light source—should not be more than three times as bright as the working area, and the working area should not be more than three times as bright as the darkest surface in the room.



REFLECTED CEILING PLAN

**Drafting office** on the east side has fixed plastic windows above clear glass vision strip. Note window details (left, below).





supporting the panels alternate on 4' centers in each direction.

In the 108' x 26' drafting room, the luminous ceiling is composed of 48" wide corrugated acrylic plastic panels running from wall to wall at a height of 9'-3". An average of 120 foot-candles is provided at drawing board level by 63 rows of three fluorescent lamps each, placed 1'- $81/_2$ " on center and 1'-8" above the diffusing panels. Power consumption is 4.5 w. per sq. ft.

Similar totally luminous ceilings are employed in the executive offices on the west side of the building. In the small offices corrugated plastic diffusing panels are used with lamps on 1'-6" centers, 1'-8" above the diffusion ceiling and taking 3.8 w. per sq. ft. In the large offices, the luminous ceiling consists of 32" x 39" flanged plastic pans with the bottoms slightly domed up to assure rigidity, with lamps on 1'-7" centers 15" above the pans.

Cost of the luminous ceiling was \$4.90 per sq. ft., including plenum fixtures and sprinkler system.

Fenestration. Upper 3'-4" of the window wall is glazed with a gray translucent corrugated plastic that has a 30% white light transmission factor. Below is a 15" vision strip of clear glass set in movable sash and mounted on a 4'-6" high sill. This design equalizes the brightness of the surrounding buildings and trees with that of the horizons and effectively reduces the brightness of the window areas to less than three times the brightness of the paper on the drawing boards. Direct morning sun presents a glare problem for about two hours each day and is frankly overcome by slatted wood blinds.



Details of the suspended luminous ceiling and sprinkler system

As a result of their experience with this pilot plant, the designers are afraid that they might have been too succesful in reducing glare. They fear that brightness ratios are so close that they have a soporific effect and it may be desirable to enliven the scene with large areas of intense color.

On the west side, close-fitting wall-towall windows extend from 2'-6" high sills up to the diffusion panels. Having no air conditioning, the offices face considerable glare and solar heat from the afternoon sun. The original design called for extension of the translucent plastic through the wall to form an awning jutting out about 3' from the side of the building. Thus sunlight would strike the top of the translucent plastic, be reflected up onto the white painted ceiling and then down into the back of the room giving additional light in that region. Unfortunately, for reasons of economy these awnings were vetoed in favor of interior Venetian blinds, which control glare but do not keep out solar heat.

Acrylic plastic is extremely durable and has good weathering properties. It combines light weight (a 4' square 0.125" thick weighs only 12 lbs.) with high strength and resilience. It depolymerizes and burns like wood at 800° F, but is just as safe as wood for building construction, and no toxic gases are given off during combustion. It is easily maintained by washing and applying antistatic wax every three to six months at a total cost of \$40 per 1,000 sq. ft. Experience to date with these ceilings shows that little dust has collected above the diffusing panels so that maintenance costs turned out to be very low.

Edward M. Linforth of Rohm & Haas Co. was responsible for the general design and lighting; Wigton-Abbott Corp. were the architects.

**Cove lighting** in corridor balances natural clerestory lighting from west offices. Ceiling is furred down to accommodate pipes. **Executive offices** on west side of corridor has ceiling-high glass windows which require Venetian blinds for glare control.





#### 4. NEW FRAMING SYSTEM

#### High tensile plates equalize moments,

#### reduce girder steel 37%

By an ingenious exploitation of hightensile steel anchor plates, structural engineer Gilbert D. Fish has cut the simple span bending moments in structural girders by one-half, compared with only one-third reduction by rigid design.

In this seven-story library in Athens, Ga. all girders are twin 10" 15.3# channels supported by 20" square box columns (which also act as air conditioning ducts). They are welded to columns in pairs back to back, cantilevered out 1'.7" either side, the ends of the cantilevers being joined by 13'-6" long channels of the same weight. A 21" long tapered anchor plate extends from each box column to the splice where the channels are bolted back to back. Made of low alloy steel having a high yield point of 50,000 psi, these plates are welded to columns and channels. Their effect is to reduce the deflection of the center portion of the girder. The alloy steel costs one-third more per pound than ordinary mild steel but proves economical when used in a sufficient number of members. In all, 302 such girders are employed in this 124,000 sq. ft. library building, columns being spaced on 18' centers both ways.

Analysis of this framing technique is not difficult. For any symmetrical case the



Structural frame of University of Georgia library doubles as air conditioning ductwork Guest Photographers

solution is obtained from one-slope-anddeflection equation plus the conditions of equilibrium. The common theory of flexure can be applied to the tapered arm with only minor inaccuracy when the angle of taper is not great. In this case the effect on stresses is only 1% on the safe side in the arm. Throughout the structure, live loads are 100 psf reduced to 85 psf for the columns.

Weight of framing steel employed in the girders and their connections was 96 tons; simple span connections would have required 152 tons, conventional rigid frame connections 127 tons. Total steel used in the structure was 730 tons.

#### **Double duty steel**

In this library, the 20" sq. hollow box columns in conjunction with each pair of channel beams serve as supply and return ducts for air conditioning. Fresh air passes up through the box columns, through large square holes into the girders and through smaller 5" diameter holes in the channel beams into the ceiling plenums. This technique was developed by Angus Snead MacDonald and has already been successfully applied in two smaller libraries (AF, Jan. '52, p. 130).

Recognizing that fire danger was greatest in certain rooms—boiler room, carpenter shop, photograph laboratory, etc. these were grouped together, built of reinforced concrete and separated from the rest of the building by a fire wall and selfclosing fire doors. The rest of the structure was not fireproofed, but at box column and girder openings in the air conditioning system self-closing dampers actuated by fusible plugs are fitted to contain momentary flash fires.

Now being completed for the University of Georgia, this library was designed by Alfred Morton Githens, architect; structural engineer was Gilbert D. Fish.

#### **5. OVAL PIPE SECTIONS**

#### Passing through each other, they ease

#### expansion of urban utility tunnels

As communities grow they face the problem of increasing the capacity of their water supply and sewage systems. This may now be done quickly and economically with precast concrete pipe sections of new and ingenious design; their elliptical shape permits them to pass through already completed sections. Thus excavation is reduced to a minimum and there is no waiting for cast-in-place concrete to set.

Using this technique, a 5-mi. sewer line is under construction in Bay City, Mich. The spirally reinforced sections are  $31\frac{1}{2}$ "



x 49" and 15" deep, cost \$26 per linear ft. in place. This size of tunnel is equal to a 39" round pipe sewer.

Each additional pipe section is carried through the completed pipe by a long hydraulically controlled steel arm in front of a weighted chassis powered by electricity or compressed air and traveling on a narrow gauge railway track. In transit, the section is supported at its narrowest point and, when extended beyond the completed sections of pipe, is lined up and pulled back into position. Then the space around the pipe section is backfilled with dry cement and sand. With crews working two shifts a day, up to 40' of pipe can be constructed— "just as fast as the tunnels can be mined."

The technique was invented and used by engineer Edward P. Washabaugh of Lamar Pipe & Tile Co.; V. Francis Engineering Co. are consulting engineers on the project.



High-tensile steel plates equalize bending moments in channel girders. Hollow columns and girders form air conditioning ducts.



Bending moment diagrams show effect of restraint on uniformly loaded beams. Deflection curves are shown by broken lines. Starting at top, simply supported beam with no end restraint; next, fixed ends reduce maximum moment by one-third; and bottom, high-tensile plate reduces moment by one-half, acting at splice in girder channels. End restraint is obtained by welding a 21" long tapered plate of high-tensile steel between 20" square hollow box columns and splices in channel beams.



Precast concrete pipe sections can easily be lowered into utility tunnels.



Elliptical shape of pipe section permits it to pass through completed pipe.



Sections are positioned by special power trolley running on light railway tracks.

#### **6. CAISSON FOUNDATION**

Completed basement of office building is sunk 40' to overcome faults of soft clay subsoil







Sinking was accomplished by removing clay beneath structure. Note diagonal reinforcing.

Though bridge engineers are familiar with caisson techniques for obtaining firm foundations in plastic soil conditions, building engineers faced with such conditions usually turn to piling. Here is a notable exception.

In building one of Japan's largest office buildings—the 340' long Nikkatsu International in downtown Tokyo—the threestory 25,000-ton concrete basement was sunk 40' as one huge caisson while the nine-story steel frame was erected atop it.

This technique has many advantages: • it saved 700 tons of steel sheet piling and

1,700 tons of steel reinforcing beams;

• it saved time by building foundations and main frame simultaneously;

it eliminated the vibration and noise of pile driving;

▶ it avoided the danger of collapse and damage to surrounding structures that has been so often experienced with sheet piling in Tokyo's difficult soil conditions.

Tokyo is built on a soft clay having an ultimate bearing capacity of only 30 psi and an allowable bearing capacity of only 13 psi, under which is a more compact gravel. As a result of soil tests engineers decided the foundations would have to go down 40' to obtain sufficiently firm support for the structure from the underlying gravel and the surrounding walls. Consequently they decided to use a three-story concrete basement-which also serves as a parking garage. To prevent the side walls from caving in, they built the basement atop a heavy timber mat on the soft topsoil and sank the building as a single block down to the required position. The structure was built of reinforced concrete with the addition of temporary diagonal steel bracing, thus making the three basement

floors in effect one huge bridge girder. To facilitate sinking, an 18' deep reinforced concrete knife edge was built around the perimeter of the trapezoidal-shaped structure, the cutting edge being tipped with  $\frac{1}{2}$ " thick hardened steel plate.

The supporting timber mat covered an area of 13,200 sq. ft. around all sides of the building. Once the basement was built a crew of 180 men working in shifts began digging out the supporting clay starting at the center, and the building settled gradually as the supporting soil was removed.



concrete foundations were built to take structural columns (below).



Huge nine-story building in Tokyo was sunk 40' as one huge caisson to overcome bad soil conditions. Note detail of knife edge (left, above).



Excavation was by pick and shovel and the soil removed in skip buckets.

As sinking proceeded, wall friction and soil bearing power increased so the supporting mat was reduced. This increased the weight of the building per unit area and maintained the rate of sinking at a steady 2" per day. When the building had been sunk down to the stronger gravel stratum, the supporting slab was no longer required, the weight being taken mainly by the knife edge. Sinking now continued by digging channels alongside the knife edge. Final settlement went according to plan by digging out the central area beneath the structure down to the gravel stratum, building reinforced concrete foundations just before final settlement and gradually settling the structural column supports of the "caisson" upon these foundations, Finally the basement was protected by a water resistant concrete floor slab.

The process was engineered and contracted by Takenaka Komuten Co., Ltd. who have previously built two department stores and an office building by this process.

Graph-photo





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## RESEARCH

#### throws new light on daylighting

Professor R. L. Biesele, Jr., of the School of Engineering at Southern Methodist University, has completed a study of daylighting in schools that meet the standards of *Recommended Practice for Daylighting*\*. Below is his report on his findings in the Lake Waco School at Waco, Texas. This school has Daylight Walls of L·O·F glass, providing both the quantity and quality of natural light which authorities on daylighting have found desirable for eye comfort.

Reprints of Professor Biesele's articles in *Illuminating Engi*neering are available upon request. Write to Libbey Owens -Ford Glass Company, 4252 Nicholas Bldg., Toledo 3, Ohio.



This is a floor plan made by Professor Biesele in which each rectangle represents a desk top. The figures are footcandles of light. The readings were taken in the Lake Waco School with only 500 footcandles on the window, representative of a dull day. A Daylight Wall of clear, flat glass furnished the only light. Nevertheless, the quantity of light (footcandles) on the desk tops exceeds the minimum requirements set forth in *Recommended Practice for Daylighting*.

Recommended	Practice	for	minimum	lia	htina	levels
-------------	----------	-----	---------	-----	-------	--------

Min.	ftcand
Classrooms—on desks and chalkboards	30
Study halls, lecture rooms, art rooms, offices, libraries, shops, laboratories	30
Classrooms for pupils with partial sight and those requiring lip- reading—on desks and chalkboards	50
Drafting rooms, typing rooms and sewing rooms	50
Reception rooms, gymnasiums and swimming pools	20
Auditoriums (not used for study), cafeterias, locker rooms, washrooms, corridors containing lockers, stairways	10
Open corridors and storerooms	5



This is the actual classroom in the Lake Waco School represented by the floor plan. The figures superimposed on the photograph are footlamberts. These reflectance values show that the *quality* of light throughout the room falls well within the recommended limits. By comparing the footcandles and footlamberts with *Recommended Practice*, you will see that Daylight Walls of clear glass can provide both the quantity and quality of light you want in your schools, even on dull days.

to eliminate glare
between the paper and the desk top 1 to 1/3
between paper on desk and surrounding dark areas, such as floor
between paper on desk and surrounding light areas, such as ceiling
between windows and the areas around them within the field of vision

\*Recommended Practice for Daylighting, prepared by the Committee on Daylighting, of the Illuminating Engineering Society. May, 1950. Price 50 cents.

#### DAYLIGHT WALLS

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They are clear glass from wall to wall and sill to ceiling, with a minimum of muntins and mullions, and with no other building material to reduce light transmission.

This construction comes closer to meeting the *Recommended Practice* than any other type of window construction using any other form of glass. All other forms of glass have lower light transmission than clear, flat glass.

During most days of the school year, in most of the United States, there is no direct sunlight. Hence, that is the condition to keep foremost in mind when designing schools. The primary problem is to admit maximum light. On those relatively few days when sunlight is too bright, flexible shading can be used. Flexible shading is the only device that can be adjusted to provide proper lighting on brightest and dullest days.



Lake Waco School at Waco, Texas. Note the clear, flat glass from sill to ceiling, wall to wall, with a minimum of nontransparent material within the window area.

Architects—Wilson and Patterson, Ft. Worth, Texas.





Left—Daylight Walls in the Edgebrook School, McHenry, Ill., contribute to the sense of spacious cheerfulness characteristic of this school. Daylight Walls have the added advantage of providing ventilation near the ceiling, as well as at sill height.

Architect-Raymond A. Orput, Rockford, III.

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#### **GROPIUS ON ARCHITECTS**

steadily increasing. Prefabrication has penetrated much further into the building of skyscrapers than into residential building. Some 80% to 90% of the new Lever House in New York City and the new apartment buildings by Mies van der Rohe in Chicago consists of industry-made parts assembled, not made, at the site. Many other buildings show the same trend.

But, to be honest with ourselves, we must admit that only relatively few of us architects have directly taken part in influencing and performing this great change, or in designing those component parts which we all use in building. It is the engineer and the scientist who have been instrumental in this development. That is why we have to speed up to regain lost ground by training our young generation of architects for their twofold task: 1) to join the building industry and to take active part in developing and forming all those component parts for building, and 2) to learn how to compose beautiful buildings from these industrialized parts. This presupposes, in my opinion, much more direct participation and experience in the workshop and the field in contact with industry and builders than our usual training provides.

#### Who designs our public buildings?

Before concentrating further on this idea, let us check up on our present status in relation to the public client. Everywhere in Washington I find a rather discouraging attitude towards the private architect in government and military building. The deputy chief of engineers has gone very far in standardizing buildings. If work is farmed out to architects in the different states, a set of standard drawings for an armory or a veterans' hospital is sent out; the architect is permitted only to adapt the plans to the individual job and to do some surface treatment as an individual touch. Are we really being pushed out of public building? For instance, who designs the schools in our big cities?

One of the important historical missions of the public client is to set high cultural standards. But today economic factors have suppressed cultural obligations, and so our public client has come to turn his back on creative contributions by the artist, who is apt to deviate from the customary and thus disturb the slow working bureaucratic machinery of the public office. Art and bureaucracy are indeed a clear antithesis. I do not accuse; I only try to outline the apparent trend towards an *(Continued on page 170)* 

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#### **GROPIUS ON ARCHITECTS**

increasingly deteriorating relationship between our profession and the public client. Does it not seem important, then, for us architects to arm ourselves against the sterilizing effect of this bureaucratic domination which threatens quickly to degrade our art into a routine application of cliches?

But do we have the power to stop it?

In trying to answer this, let me compare first our habitual evaluation of the basic professions here in the U.S. with the professional standing in some other countries: In pre-Communist China, the country of the oldest culture, the scholar and the artist were enjoying the greatest respect, then came the farmer, then the businessman and the soldier at the low end. In pre-Hitler Germany both the scholar and the soldier were in equally high esteem socially, whereas the businessman was looked down on. No doubt in the U.S. the businessman, the industrialist and the scientist rank highest, while the scholar, the teacher and the artist are way down. These classifications-deeply rooted in the character of the nation and conditioned by the state of its cultural refinement-are changing only very slowly. We shall not be able, therefore, to bring about a quick change of public esteem in favor of the artist and the architect in our country. Therefore, if we seek to regain leadership of the art of building, we should collaborate with the scientist and the industrialist; then we may finally come to share their power.

#### Action now-or an exodus from AIA

The coming generation of architects must bridge that fatal gap between design and building, to make whole again what is now unhappily separate through our own misconception. I know this is a long shot and I certainly do not claim to have all the answers for the effective implementation of the suggested change of approach.

First of all, let's stop squabbling about styles; every architect owes it to himself to defend the integrity of his design effort. What matters to the profession as a whole is to close ranks, to do some hard thinking together, and then to come to constructive decisions as to how we may reopen the gate leading into the field of building production for the benefit of the younger generation of architects. They are beginning to lose confidence in the trusteeship character of our professional setup and in its logical result: the self-appointed prima donna architect. If we should fail to do so in due (Continued on page 174)

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#### **GROPIUS ON ARCHITECTS**

time, I predict that AIA will lose many architects who will refuse to be restrained any longer from a natural urge to take actual part in a team effort with the industry to produce buildings and their parts. The emphasis, I believe, will be more and more on the *team*.

For years I have been personally concerned, through my activities as an educator, with the plight of young architects as they leave school and enter into practice. I have seen them make valiant attempts to establish themselves independently, and I have seen them more often resign themselves to work indefinitely as draftsmen in large offices which offer little or no chance of exercising individual initiative. It is sad to see so much youthful energy and talent dry up by the slow attrition of our more and more centralized working system. Democratic concepts cannot easily survive the assaults of our increasing mechanization and super-organization, unless an antidote is used which may protect the individual in his struggle against the leveling effect of the mass mind.

#### A book of rules from the cathedral

In my own setup for practicing, The Architects Collaborative, as well as in training students, I have had many years of experience with working in teams. It is a most rewarding experience to learn how to co-operate with others and to blend in without losing one's identity, instead of trying to beat the other fellow.

In our particular field there is no book of rules for such an undertaking, unless we go back as far as the Middle Ages to study the working teams of the great cathedral builders. Most striking within the organization of those building guilds was the fact that until late in the 18th Century every craftsman on the job was not only an executing hand but was permitted to put his own design ideas into his part of the work as long as he abided by the master's guiding key of design, which was the secret, geometrical auxiliary of the building guilds, similar to the keys in musical composition. Preconceived paper design hardly existed at all; the group lived together, discussed the task and built their ideas.

Compare this with our present conditions. We are expected to put all our design ideas unto the last screw into drawings and specifications. Then an army of workmen has to execute our design. We are hardly permitted to make any changes though there is no genius who could have (Continued on page 178)



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#### **GROPIUS ON ARCHITECTS**

sufficient foresight or imagination properly to judge the effect of every detail of his preconceived design; even less so the more he stays aloof from the practical process of building and making. Nor has the workman of today any chance to contribute to the design of a building. Since the time of the building guilds, collaboration among men, which would release the creative instincts of the individual instead of smothering them, has not been practiced much, and we find very little knowledge about the basic requirements which make such teamwork possible.

#### **Teamwork** abroad

There are many potentialities of different combinations of teamwork, but little has been tried, particularly in our country. In South America the architect and the builder are still either identical or do design and execution together in one firm. They seem to be financially stronger and more influential in their countries' economy compared to us in the U.S.

The best recent example of an effective attempt at teamwork in building is in England. A farsighted public client in Hertfordshire near London, represented by its school superintendent and his congenial county architect, took the initiative to develop a new type of prefabricated school building which is most successful in both design and economy. This public client had the courage to pick out a group of young architects and to charge them with the task of developing together with the steel industry not a school building, but a system of building schools. They built about 40 new school buildings which one by one have steadily improved the construction, the use value, the price and the beauty of these buildings, in a collaborative effort of a team composed of architects, engineers and builders. Mind you, this is a very different approach to the problem from the way cliches are ordered from Washington these days, for it allows for individual variety in design within the agreed-on system.

#### Architects and AIA at the crossroads

I have merely tried to pat the light on the crossroad to which our profession has come. One of the two roads appears rough but wide and full of venture and hope. The other narrow one may lead into a dead end.

I have made my personal choice where to go, but being along in years, all I can do is to urge my students, who will (Continued on page 182)
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### **GROPIUS ON ARCHITECTS**

represent the next generation, to search for a constructive solution how to correlate again design and execution in their future practice by direct participation in industrial and building production. But, of course, I have to tell them that, as things stand now, they then could not join the AIA. I confidently hope that the AIA will reconsider and remove that fatal paragraph No. 7, which bars the road to a most promising creative development. If not, I want to be kicked out of membership as a rebel against this unfortunate and timid rule. For I cannot convince myself that if a young architect and a young builder should decide to join hands and to build up a complete modern service-both design and building execution-this would show a lack of integrity on their side. Instead the AIA should actively encourage such a natural combination.

I have been asked whether this would not leave the client high and dry when he is deprived of the trustee control of his architect. My reply is that we do not need trustees for buying our everyday goods: we select them on account of the good reputation of the make or of the manufacturer. I do not see any difference as to buildings and their component parts. Of course, I know that the task of reconciling design and execution-which should be inseparable-will still meet a great many difficulties which can only be slowly solved in practice. But it is always a change of attitude first which precedes any implementation of a new course of direction.

This country in its new if unwanted position of world leadership has been called upon to create the magic which would equip it beyond its might and wealth with the creative means for peaceful world guidance. We are all aware that consolidation of the American genius on the cultural level, in addition to our material strength, would bring salvation to us and to others. It is not enough then that we defend our democracy only; we must wage and win the battle of ideas to make democracy a positive force, and we architects must find the dynamic means to make these ideas visible in our environment.

Our disintegrating society needs participation in the arts as an essential counterpart to science in order to stop its atomistic effect on us. Made into an educational discipline, it would give our environment the unity that is the very basis of culture, embracing everything from a simple chair to the house of worship.

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XD Pushmatic Electri Center. A panel to pro tect and control ever electrical circuit in th modern home. BullDog XI Electri-Centers feature Mai Disconnect as well as individua control over lighting circuits plus individual control and pro tection over 110-120 or 220-240' appliance circuits. Design per mits one XD panel to handl both types of circuit. Send fo bulletin for full information

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- TIE HANDLE—two 50-amp. Push matics tied together act as Main Disconnect for all branc lighting circuits in lower sec
- LIGHTING CIRCUITS—Space for to 10 circuits. All can be *pushe* off or on by Main Disconnec directly above.
- **UNUSED CIRCUITS**—Can b plugged with filler plates unt needed. 4

BULLDOG ELECTRIC PRODUCTS COMPA DETROIT 32, MICHIGAN - FIELD OFFICES IN ALL PRINCIPAL ( In Canada: BullDog Electric Products of Canada, Ltd., To PIONEERS IN FLEXIBLE ELECTRICAL DISTRIBUTION SYSTE





To help you pack a lot of bathing convenience into a limited space





### LITTLE IN SIZE BIG IN CONVENIENCE

The 12" high Restal fits a finished compartment approximately 36" x 37", yet affords complete bathing facilities. It has all the advantages of sturdy construction, being made of rigid cast iron smoothly coated with acid-resisting or regular enamel in white or five popular colors. It comes with left or right hand outlet. Streamlined fittings are of nontarnishing Chromard.

# ...here's the new RESTAL Receptor Bath

 $T_{ence}^{HE}$  new Restal receptor bath provides complete bathing convenience in a shower stall space. And its cost is comparable with that of a properly-installed conventional shower stall.

Doubling as both a shower receptor and a bath, the Restal permits you to add an extra *complete* bathroom in small space in the homes you plan. And when it comes to modernizing, you can turn an unused closet, alcove, or sewing room into a really complete bathroom with the help of this space-saver. The Restal is ideal for use in small bathrooms of apartments, hotels, and motels, too.

Designed for utmost convenience and safety, the Restal is so low that even elderly people can enter and leave it with safety. Its corner seat facilitates foot and sponge bathing. And the Restal is particularly useful when bathing children.

Consider the Restal receptor bath in your planning. It will help you give more client convenience in minimum space. For complete details, contact the American-Standard sales office serving you or write for literature—Form No. 227.

American Radiator & Standard Sanitary Corporation, Dept. AF-52, P. O. Box 1226, Pittsburgh 30, Pa.

~ Serving home and industry

AMERICAN-STANDARD + AMERICAN BLOWER + ACME CABINETS + CHURCH SEATS + DETROIT LUBRICATOR + KEWANEE BOILERS + ROSS HEATER + TONAWANDA IRON

### **BOOK REVIEWS**

Plastics in Building (right) Slum Area Market Behavior (p. 190) Architects' Year Book (p. 198) Color in Industry (p. 198)



the BALANCED DOOR

PLASTICS IN BUILDING. By Joseph B. Singer. The Architectural Press, London, England. 192 pp. 6 x 8". Illus. 18/

For want of a billiard ball, the U.S. plastic industry was launched. In 1845 an ivory shortage prompted the Hyatt brothers to market a hard composition of nitro-cellulose and camphor as a substitute. It was one of the few ventures into *ersatz* materials since the ancient Egyptians found that bitumen could be made into attractive amulets. Plastics lolled around on dresser sets for almost a century until warborn demands on shortening supplies of natural materials fired the Bunsen burners. At the same time, *Plastics in Building* notes, the concept of building was flirting with an aboutface from an eon-old stand:

"In the past, building materials were expected to last for centuries and the amortization period of buildings was quite considerable. Today the conception of permanency has changed, and the importance of time-durability has diminished. This transition has a significant bearing, particularly on those materials whose resistance to air and exposure can be only empirically established." Evolving construction techniques also have a big hand in setting the pace:

"Today a complete change has taken place, and a tendency to decentralize building operations has increased. Raw materials are procured independently of the actual task of building and their choice is determined by the type of structure. The possibility of prefabricating whole units has brought about a new development in building techniques, but transport economy, however, remained a factor which has not altered substantially. The bulk and the weight of the material still play important roles in accessing the over-all cost of building."

Mr. Singer's study purports only to be a textbook on applications of plastics in the building industry. It will nevertheless be absorbing fireside reading for imaginative architectural designers. Format of the bulk of the book is conventional. Divided into sections on history and general outlines of the plastics industry, plastics for exteriors and plastics for interiors, the publication discusses applications of divers synthetics. Although several of the British trade names may find the U.S. reader flipping to the glossary, most of the compounds mentioned have identical counterparts in this country.

"Future Possibilities," the last section, is a forecast of plastics' structural potential with a solid grounding on physical characteristics. (Some of the phantasia—piping, translucent walls, etc.—is already fact.) Most stimulating are discussions of plastic as large building components and as load-bearing framing. The Gordon beam, which is made of *Aerolite*, a water soluble urea formaldehyde glue, is compared in size and weight with conventional (Continued on page 190)



### GOOD REMEDY for business ailments



Many of the big pharmaceutical houses use Worthington air conditioning and refrigeration machinery

to control chemical reactions, inhibit bacteria, prevent deterioration.

And many a corner drug store keeps up "hot weather" business by using Worthington air conditioning to bring in customers.

No other manufacturer makes so complete a line. A Worthington system is all Worthington-made – not just Worthington-assembled – assuring you of perfectly balanced operation and unit responsibility.

Worthington Corporation, formerly Worthington Pump & Machinery Corporation, Air Conditioning and Refrigeration Div., Harrison, N. J.



The Most Complete Line... Always the Correct Recommendation

# Honeywell Customized Temperature Control Helps Make Employees More Efficient



Insurance companies' home office personnel do superior work in ideal "climate" provided by specially designed system



Located in Omaha, Nebraska, the big, modern building pictured here houses the home offices of three of the country's largest insurance firms – known as the "Companion Companies." They are United Benefit Life, Mutual of Omaha and United Benefit Fire Insurance Company.

Besides being one of the finest buildings in America, it's one of the most efficient offices in the insurance business.

Sound work methods and an advanced personnel policy play important roles in maintaining this efficiency.

And so does the superior kind of *comfort* the building's modern heating and air conditioning plant provides—with help from Honeywell Customized Temperature Control.

Executives of the Companion Companies have found that employees are happier and more efficient because of this ideal, uniform "climate."





**Important factor** in making sure the Customized Temperature System always operates at top efficiency is this panel, specially designed by Honeywell technicians. Simply by glancing at the dials, engineers can check important readings throughout the building. This helps them to regulate efficiently the heating and air conditioning plants for maximum comfort on a minimum of fuel.

Accurate temperature control is especially important in large office areas like the one shown at left. Should the room become uncomfortably warm – or too cold – employee efficiency would drop. But with Honeywell Customized Temperature Control there's little danger of this. Result: supervisors' efficiency problems are greatly eased by constantly ideal "climate,"



An important part of the Companion Companies' business planning is built around periodic meetings of top executives with the field

force. These get-togethers are held under ideally comfortable conditions in this auditorium that can seat 1,300 people.



**True comfort** can result only if the right number of thermostats are located in the *right places*.

Starred positions on the floor plan above demonstrate how Honeywell Customized Temperature Control makes sure the comfort level will remain constant in large office areas. The four thermostats located centrally—along with the perimeter-located thermostats—are assurance that a large area will be provided with an even, constant temperature.

Building was designed by architects Tinsley, Higgins and Lighter, Des Moines, Iowa. Mechanical engineer for heating and air conditioning was Charles S. Leopold, Philadelphia. Honeywell Customized Temperature Control was installed by J. J. Hanighen Co., Omaha.

### For Comfortable, Even Temperature in New or Existing Buildings – of Any Size, Specify Honeywell Customized Temperature Control

Whether it's an office, store, factory, school, garage-or any size building-new or existing -there's a Honeywell Customized Temperature Control System to meet your clients' heating and ventilating problems.

Once equipped with a Honeywell Customized Temperature Control System, they'll have the right kind of controls to keep their employees, customers and tenants comfortable and they'll save fuel besides.

For complete facts on Honeywell Customized

Temperature Control, call your local Honeywell office. There are 91 across the nation. Or mail the coupon today.

"We've proved a comfortable office is an efficient office," says Mrs. Mabel Criss, vice-president and director of personnel and planning, United Benefit Life Insurance Co.

"And I give our Honeywell Customized Temperature Control System a lot of credit for keeping us comfortable."



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MINNEAPOLIS-HONEYWELL REGULATOR CO. Dept. MB-5-124, Minneapolis 8, Minnesota Gentlemen:

I'm interested in learning more about Honeywell Customized Temperature Control.

Name	
Firm Name	
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City	Zone State



SAFETY... SANITATION... IN THE

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### POSITIVELY LEAKPROOF

FOR BETTER SHOWER BATHS

> Formed in one piece of heavy gauge enameling iron . . . finished inside and outside in vitreous porcelain enamel . . . Weisway Vitreceptor is a better, more practical stall shower receptor. Easy to install—no metal underpans, no wall flashing, no waterproofing required. In public and semi-public showers safety and sanitation are vitally important. Vitreceptor unit is positively leakproof, sanitary, non-absorbent, with no dirtcatching cracks or joints, reducing possibility of fungus infections to a minimum. Textured Foot-Grip, No-Slip floor is safe, comfortable, quiet as the tread of a bare foot.

DETAIL FOR TILE OR GLASS



Sketch at lower left shows detail for use with tile or glass walls. Specify Weisway Vitreceptors for safety and dependable, leakproof service which assure satisfied elients, protect your reputation. Write now for catalog and detailed information.

### **BOOK REVIEWS**

members. While sheetings for partitions and skylights are rapidly gaining popularity here, little attention has been given to complete plastic wall sections and hardly a thought to structural members. It is somewhat embarrassing to realize that although our plastics production is tons ahead of Britain's, their application thinking may be out in front.

**PLASTICS AND BUILDING.** By E. F. Mactaggart and H. H. Chambers. Pitman Publishing Corp., 2 W. 45 St., New York 19, N. Y. 181 pp. 7 x 10". Illus. 16 color plates. \$12,00

Today's architect finds an engineering grounding indispensable; tomorrow's may haunt the chemical laboratory. Although the authors of *Plastics and Building* do not ballyhoo a forthcoming "Plastic Age" they do feel that plastics soon will play an important part in construction. The book is a lucid technical roundup on the chemistry, production and uses of plastics. Color charts, charmingly illustrated, provide the designer with a quick key to the properties of various plastic materials.

HOUSING MARKET BEHAVIOR IN A DE-CLINING AREA. By Leo Grebler. Columbia University Press, New York, N. Y. 265 pp. 6 x 9". Illus. \$4.50

To explore the fact and fancy of slum area market behavior, Dr. Grebler and his associates at Columbia University's Institute of Urban Land Use and Housing Studies finecombed almost 50 years of real estate history of Manhattan's lower east side. The result is a provocative and significant study devoid of bold generalizations and pat answers.

The researchers found that a half-century of neighborhood decline had slashed the area's population in half. Main reasons: improved living standards, declining immigration, inadequate transportation and recreation facilities. But despite the mass exodus, many of the dreary tenements remain standing. Houses built in 1902 will not be torn down until 2017

(Continued on page 194)



**DEMOLITION VS. CONSTRUCTION:** Between 1903 and 1948 the number of dwelling units built was equal to 57% of those demolished and half of the new units were provided before 1910.

HENRY WEIS MANUFACTURING CO., 502 Weisway Bldg., Elkhart, Indiana

high-wide and handsome

# MIAMI AWNING WINDOW

Specific design requirements are deftly met with building materials that are adaptable.

...Adaptable in width and height. ...Adaptable in general style and construction.

Adaptable in materials that bring to life your carefully conceived plans... the all-aluminum Miami Awning Window. Specify Miami Awning Windows, made to any dimension up to 6'2" wide, and to any height. Hopper vents, gothic and circular heads may also be specified. Windows which are 4'5<sup>1</sup>/<sub>8</sub>" in width or wider may be made of special hollow extrusion for added strength. This specially engineered extrusion prevents sash sag due to the increased span. Constructed from extra heavy aluminum alloy extrusions (63-ST5).



ARCADE SUNSHINE LAUNDRY, Washington, D. C. Ring Engineering Co. of Washington, D. C. — Architect and Contractor.

Air infiltration test taken by Pittsburgh Test Laboratories



For further information, see Sweet's Architectural File  $\frac{17A}{ML}$  or – write, wire or phone Miami Window Corporation, Dept. BF-5



### MIAMI WINDOW CORPORATION 5200 N.W. 37th Avenue, Miami 42, Florida



Don't let old-fashioned radiators stymie modernization plans



IDEAL FOR STORES, SHOWROOMS, SCHOOLS, BANKS, HOTELS, HOSPITALS, THEATERS, CHURCHES, OFFICES, VESTIBULES AND OTHER COMMERCIAL AND PUBLIC BUILDING AREAS

Type C with optional plenum base for floor mounting

# Modine Cabinet Units simplify remodeling... save space...permit addition of cooling

WHAT YOU when you re fashioned rad Modine Cab	<b>U GAIN</b> place old- liators with onet Units met Units occupy only a ion of space taken by radi-
SPACE port ator	abinet Units can be built-in r installed outside of rooms erved.
COOLING	You can have both heating and cooling in a single unit. Attachment of optional ple- um-damper base permits fresh
VENTILATION	Quiet blowet fans provide positive air distribution.
APPEARANCE	E Attractively ordern decor.

THERE'S no need to accommodate unsightly, existing radiators in modernization work. One attractive Modine Cabinet Unit can replace up to three or more radiators...frequently with no change in piping.

Mounted on the floor, wall or ceiling, Cabinet Units take little space. When installed with ducts they can be completely concealed above a false ceiling or behind a partition.

Where desired, chilled cooling and hot water heating can be provided with a single unit for year 'round comfort. Other models for steam or hot water heating only. Fresh air introduction is possible through use of an optional plenum base.

Not as elaborate or expensive as unit ventilators or air conditioners, Modine Cabinet Units are economical to use. What's more, the scrap value of the radiators they replace defrays part of their cost. (For example, a 280 lb. Modine Cabinet Unit replaces 3200 lbs. of cast iron radiation.) Available in five sizes from 120 to 640 Edr.

For complete information write for free illustrated Bulletin 550. Modine Manufacturing Company, 1507 De Koven Ave., Racine, Wis. c-1149

CABINET UNITS



### FIAT PRECAST TERRAZZO RECEPTORS

I find Fiat precast receptors make a definite saving in building tile showers.

Save money . . . Save time . . . Make a better tile shower floor . . . . .

One piece slab construction gives a lifetime leakproof floor.



### Available for prompt delivery See your plumbing contractor

### STANDARD SIZES:

Square type 32" x 32" - 36" x 36" - 40" x 40" Corner type 36" x 36" - 40" x 40"

The Fiat one piece precast receptor slab will not be affected by settlement of the building as would the old-fashioned "multilayer" construction of fill, lead pan, grout and tile. The rustproof metal receptor flange encases the tile walls making a leakproof connection.

### FIAT METAL MANUFACTURING COMPANY

Three Complete Plants 9301 Belmont Avenue, Franklin Park, Illinois Long Island City 1, N. Y. Los Angeles 33, Los Angeles 33, Calif. In Canada—Fiat showers are made by Porcelain and Metal Products, Ltd., Orillia, Ontario

### **BOOK REVIEWS**

(or 115 years later) if the area's past rate of demolition continues, Grebler found. Abandonment of housing, contrary to some planners' belief, does not always mean physical removal.

Underlying reason for this lag is the absence of profitable alternatives that would make private redevelopment feasible. So far, large scale public and private housing projects have gobbled up the lion's share of cleared slums. Public housing alone covered 9% of the lots cleared from 1903 to 1948. But high-density housing cannot continue to absorb much of the remaining area. And Grebler's great concern is that hasty and unplanned clearance and rebuilding will take place without adequate attention to "the kinds of land use which in any system of private or public accounting would be compatible with the typically high land prices caused by false expectations and fortified by tax assessments."

Contributing further to the anemia of the area is the scattered pattern of vacant lots which constitute 6% of the area's total acreage. Large scale redevelopment is hamstrung by this wide physical separation and by the bewildering number of different landowners. Landownership throughout the area, incidentally, shifted during the 50-year period from private hands to corporations. And not only is there no concentration of ownership cur-(Continued on page 198)





30% OR MORE OF PARCELS VACANT

VACANT LAND: Scattered location of vacant parcels is a major impediment to large scale redevelopment. Of 192 lower east side blocks, only 10% have ten or more vacant parcels.

# 15 months in service without a service call



And now you can have LEVOLOR-built Venetians that are matched in quality and color in all 3 vital parts: smart, enclosed Head, durable, springy aluminum Slats, slender enclosed Bottom Bar... all of which are chip-, mar- and stain-resistant. Dust and dirt is easily wiped off the plastic, mirror-smooth surfaces. And when tilt cords are uneven, they are evened up again by simply pulling the short one.

> See our catalog in Sweet's File, Architectural, 19E $\overline{LO}$



### ... That's the Believe-It-Or-Not record of Venetians equipped with LEVOLOR metal heads in the General Petroleum Building, Los Angeles

If it's maintenance-free service you want in venetian blinds—specify LEVOLOR-built. The LEVOLOR enclosed head houses the finest precision hardware . . . the smoothest operating parts obtainable. And this feature, plus LEVOLOR's *patented* self-adjusting tilter, provides quiet, easy, mechanically-perfect performance.

And if it's *smart appearance* you want-LEVOLOR-built Venetians give you the last word in styling, too. Head is smartly tailored ... aluminum Slats are mirror-smooth ... the sleek LEVOLOR metal Bottom Bar blends perfectly-tapes just disappear.

Yes, for every reason you can think of, specify LEVOLOR-built Venetians...made by makers of high quality blinds everywhere.



Time-proven Products for Venetians

### pardon us ...

The March Levolor advertisement in the Architectural Forum, which featured the Sterling-Winthrop Research Institute, Rensselaer, New York, inadvertently listed incorrectly the building's architects and general contractor. Architects were W. Stuart Thompson and Phelps Barnum; General Contractor was Grove, Shepherd, Wilson & Kruge, Inc.

Copyright 1952, Levolor Lorentzen, Inc., 391 West Broadway, New York 22, N.Y.



# \$6,500 DESIGN COMPETITION

### **Magazine Display Rack Contest**

sponsored by

the National Association of Magazine Publishers

and the Magazine of Building, Architectural Forum Edition

### problems

To design a complete magazin display rack installation in th following four classes of mage zine retailers:

- **CI** Drug Stores
- b Hotels, Office Building Lobbies and Air, Rail and Bus Terminals
- **C** Super Markets
- d Department Stores, Cigar and Stationery Stores



Ø

0

To improve the design of magazine display facilities. To stimulate the interest of architects, industrial and store fixture designers in installations that will not only fit their surroundings, but will also develop the maximum sales potential for the space allocated to magazines.

To encourage cooperation and consultation between architects, industrial and store fixture designers and magazine distributors. At the present time too many of these display fixtures are designed by persons who have not made an adequate study of the problems involved.

### basis of awards

1) the functional layout and esthetic appearance of the display in relation to its surroundings.

 the effectiveness of the display fixture in allowing for the greatest number of full cover displays within a given area
 the utility of the display rack in a large number of similar outlets, for example, a drug store magazine rack should be useable in a large number of drug stores
 relative economy of installation

5) ease of handling for the magazine stand manager.



### awards

### First Grand Prize . . . . . . . \$1,000

(the entry which in the opinion of the judges is the best in the contest. It may lie in any of the four groups, A, B, C or D)

Four Prizes to Distributors of . . . \$250 (for those who cooperated with the winners of the \$1,000 and \$500 prizes)

Four Second Prizes of . . . . . \$250 (one for each group)

Four Prizes to Distributors of . . . . \$125 (for those who cooperated with the winners of the second prizes)

Fifteen additional Prizes of . . . \$100 (to be distributed among groups A, B, C or D unless the judges decide on a different distribution)

examples of excellent installations

### form of submission

Judgment will be based on photographs and black and white drawings of completed stands. Each exhibit shall comprise at least one photograph of the rack loaded with magazines and another of the empty rack, both taken from the same point—<sup>3</sup>/<sub>4</sub> front view. There shall be another photograph showing the facility and its surroundings.

Drawings as follows: front view, end view and a vertical section through each display space—all at a scale of one half inch equals one foot.

Any exhibit submitted becomes the property of the Contest Commission.

The jury of judges will be made up of people from the field of publishing chosen by the National Association of Magazine Publishers and Architects to be nominated by the Magazine of Building, Architectural Forum Edition.

### dates

check one:

Contestants may submit any installation completed during 1951 through August, 1952. Contest closes September 1, 1952.

supermarket

Enter now.

### eligibility

The competition is limited to architects, industrial or store fixture designers and draftsmen or their employees.

Contestants must register (coupon, right) to receive the program which will include further details of the competition. This is an announcement only; conditions governing the competition and the awards are set forth in the program. John Callender, AIA, Professional Adviser c/o The Magazine of Building, Architectural Forum Edition

9 Rockefeller Plaza, New York 20, N. Y.

I intend to enter the NAMP-FORUM Rack Design Competition. Please send me the program, including the conditions governing the competition and the awards.

office building



Pittsburgh 19, Pennsylv	rania
Please send me complet	e information on Rolla-Duct. I ar
interested in using it for	
NAME	TITLE
NAME	

### **BOOK REVIEWS**

rently, but "there may be a greater predominance of small holdings today than in the earlier decades of this century."

Couched in the technical language of the statistician-economist-sociologist, the study sometimes reads like this: "It would be possible theoretically to trace differentials of movements of these three groups out of and into the lower east side, as the first step toward associating the differentials with ethnic as well as other variations such as socioeconomic mobility (exemplified among other things, by relative changes in income status and occupational distribution)." The fascinating subject matter of this and similar tracts published by our social scientists surely deserves simpler, more readable treatment. But this minor flaw does not detract one whit from the value and importance of this book to all planners preoccupied with the reconstruction of our blighted cities.

ARCHITECTS' YEAR BOOK 4. Jane B. Drew, Trevor Dannatt, Editors. Paul Elek, London, Publisher. 296 pp. 7!/4 x 10". Illus. 42/

This handsome book, generously illustrated with excellent photographs and detail drawings, presents most of England's outstanding contemporary buildings—with particular attention to its apartment buildings, factories, schools and the Royal Festival Hall—plus several "foreign" ones. The chapter on U. S. architecture (by Edgar Kaufmann Jr.) is devoted exclusively to three West Coast buildings: Charles Eames's residence (Sept. issue, '50), Frank Lloyd Wright's gift shop for V. C. Morris in San Francisco (Feb. issue, '50) and John Yeon's information center for the Chamber of Commerce in Portland, Ore. (Aug. issue, '49).

The pictorial character of the book is relieved at mid-point by two technical chapters: one on welding, the other on insulation and thermal conductivity.

COLOR IN BUSINESS, SCIENCE AND IN-DUSTRY. By Deane B. Judd. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 401 pp. 6 x 9!/4". Illus. \$6.50

The background and scope of this technical book on color are well summarized in the author's preface:

"It has been my privilege in my 20 years at the National Bureau of Standards to come into contact with hundreds of colorimetric sore spots in our industrial life. I have seen victories that paid off in dollars and cents won by applying the sciences of mathematics, physics and psychology to these problems. This is the science of visual psychophysics. The key to color problems of the future is to be found in visual psychophysics mixed with a liberal sprinkling of common sense. This book is an attempt to present visual psychophysics in terms that are practically useful."



Increase the operational efficiency of multi-story buildings by the inclusion of this Sedgwick Dumb Waiter in your plans. It has proved its value all over the country in hospitals, hotels, restaurants, clubs, libraries, schools, stores and other commercial, institutional and industrial structures.

### ADVANCED ENGINEERING

Embodies the most advanced electrical and mechanical features and is built to give long, dependable service.

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Car operates only when all doors are closed — Sedgwick Type "SL" Combination Door Locks and Switches prevent opening of all doors except the one where the car stops.



The car can be called and dispatched by momentary pressure push buttons at each landing opening. "Open Door" and "In Use" signal lights show at each station. Special control and signal equipment can be furnished for unusual needs.

### OTHER REFINEMENTS

The control system includes reverse phase, overload, and noninterference relays.

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Sound engineering and careful workmanship in this and other Sedgwick Products reflect many years of specialization in the vertical transportation field.

Write for booklet MB-3 on complete line of Sedgwick Dumb Waiters, Dumb Waiter Doors and Elevators

### Sedgwick MACHINE WORKS 140 WEST 15th ST., NEW YORK 11, N. Y. Specialists in Vertical Transportation Since 1893





### NO WONDER THEY ARE SO GOOD! THOMASON **FLUSH DOORS** (ALL WOOD)

Are Top Quality Throughout

In addition to the fact that all face veneers used in the construction of a THOMASON Flush Door meet or exceed U. S. Commercial Standard CS-35-47, the high production standards of the THOMASON PLYWOOD CORPORATION are absolute assurance of top quality throughout. Among other things, this means that the face veneer on every THOMASON Flush Door has been carefully matched for color of wood, figure of grain, and for similarity of color and figure on both

### **AVAILABLE WITH** THESE FACE VENEERS

sides of the door.

In addition to the Gumwood faced door, the THOMASON Flush Door comes faced with veneers of Mahogany, Walnut, Oak, Birch, Knotty Pine, Cativo, or in any face veneer desired.

### ALSO MADE FOR **EXTERIOR USE**

Available either plain or with any one of five standard patterns of light opening. Or you may have the THOMASON Flush Door with a solid allwood core, faced with any type of veneer desired.

**Sold Only Through Distributors** 







No. 945 Recessed Towel Cabinet & Removable waste receptacle. Towel Waste Receptacle...fabricated of stain-less steel . . . designed for efficiency. 400 "C" type folded towels.

MEMBER

MFMA

NOFMA

# For modern washrooms-

the Scott No. 945 Recessed Towel Cabinet and Waste Receptacle

Here's the fixture designed specifically to meet today's growing trend to recess fixtures.

For a detailed dimension and installation drawing of the No. 945 fixture or for the help of a trained Scott consultant, write Washroom Advisory Service, Dept. MB5, Scott Paper Company, Chester, Penna.

> SCOTT Symbol of Modern Washrooms

### FASTER **Better Service** from WISCONSIN'S Hardwood Forests to your

**Customers' Floors** 

Whether you need Northern Hard Maple, Oak or Birch flooring, Yawkey-Bissel offers you these advantages:

· Centralized plant location up here in Northern Wisconsin, right where the hardwood timber grows.

• Mill facilities that provide ample capacity for large volume production of all types and sizes of hardwood flooring

• Well balanced inventories of finished flooring available to take care of most orders promptly.

• Mill work second to none, producing strip and block flooring to meet every requirement.

Star :

HARDWOOD FLOORING COMPANY

WHITE LAKE . WISCONSIN

Specify Yawkey-Bissell Northern Hardwood Flooring for longlasting beauty and service.

# NEW ... all-purpose incandescent downlight — the SILVER-SPOT



Versatile Silver-spot and Silver-dot downlight units are designed for use with the new 100-watt A-21 silvered-bowl lamp. They produce more candle power than equipment using 150-watt projector or reflector lamps . . . use less energy . . . generate less heat — without glare or wasted spill light.

Easy to maintain and install, these new units can be relamped from the floor without handling of fixture parts. A new lamp automatically restores initial efficiency.

In addition to providing warm color quality and soft, even light distribution at high illumination levels, these new Silvray units offer the following features:

### The Silver-spot

### The Silver-dot

- Complete shielding of light source — 45° shielding of reflector.
- Recessed units fit opening 5½" deep by 9¼" in diameter.
- Simple accessory permits surfacemounting—unit projects only 3½".
- Easily convertible to either floodlight or spotlight distribution.
- light circle at a vertical distance of 6'.Requires a recess opening only

• 4" ceiling aperture controls a 6'

- Requires a recess opening only 7¼" deep by 6½" in diameter.
- Complete shielding of light source

   no bright areas on interior of housing.
- Minimum initial cost.



City\_

Zone\_\_\_\_State\_\_\_\_





UNITED STATES AIR CONDITIONING CORP. MINNEAPOLIS 14, MINNESOTA Export: 13 E. 40th St. N.Y. 16, N.Y.



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### ... with these Door-Frame-Hardware Units!

Each beautiful Fenestra\* Hollow Metal Door comes complete with pre-fitted frame and handsome hardware . . . all in one package . . . ready to go in the wall. No cutting, no fitting, no mortising, no prime-painting, no expensive time and labor wasted.

And what doors! Clean, modern lines, velvety finish. They are even insulated for quiet performance. They can't shrink or warp, or swell or splinter. And they can't burn.

These low cost Fenestra Door-Frame-Hardware Units are the result of long years of metal fabricating experience ... the help of master craftsmen ... tremendous plant facilities and unique manufacturing methods.

You can get Fenestra Door-Frame-Hardware Units in a wide variety of sizes . . . in three types ingeniously designed for versatile use. Each door may be hinged right or left, swing-in or swing-out.

Get full details and prices. Call your Fenestra Representative—or write to Detroit Steel Products Company, Dept. MB-5, 3401 East Grand Blvd., Detroit 11, Michigan.



One of the Fenestra Door-Frame-Hardware Units in Robert N. Mandeville High School, Flint, Mich. Architect: Bennett & Straight, Dearborn, Mich. Contractor: Karl B. Foster, Flint, Mich.

Fenestra HOLLOW METAL DOOR • FRAME • HARDWARE UNITS save building time, labor, materials and money



# ...uses the ageless and fadeless material Vitreous Porcelain \* on steel for toilet compartments

Canymetal "Porcena" (Vitreous Porcelain on Steel) is a material, not merely a finish. It is in every aspect unlike paint enamel or lacquer finished steel because it is fused to steel at a temperature of 1350° - 1550° F. This impregnates the steel with vitreous porcelain enamel to the extent that it cannot be hammered out. Sanymetal "Porcena" (Vitreous Porcelain on Steel) is incomparable with any other material commonly used for toilet compartments. It is a lifetime material that stays new.

> Vitreous porcelain en a mel being fused to steel at a temperature of 1350° - 1550° F. Baked-on paint en amel finishes would be totally destroyed by this temperature. Vitroous porcelain on steel is unlike paint enamel or lacquer finished steel in every respect.

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Sanymetal Century Type Ceiling Hung Toilet Compartment of Vitreens Porcelain on Steel, There is nothing better – nothing so enduringly modern. material

# stays new

always

Vitreous Porcelain on Steel stays new two ways: (1) in appearance; (2) in structure! This newness does not depreciate. Vitreous porcelain on steel retains its original newness because this newness is the result of a correct combination of the desirable qualities of the hardness of glass and the natural structural strength of steel. Vitreous porcelain on steel is a product of the white heat of the enameling furnace—a material that is as new as tomorrow and as old as time! In the judgment of Sanymetal Engineers, no other material is so ideally suited for toilet compartments because it provides the utmost in sanitation and a degree of protection against obsolescence that is otherwise unobtainable. The use of vitreous porcelain on steel for toilet and shower compartments was originated by Sanymetal Engineers.

Vitreous porcelain on steel is in every aspect unlike paint enamel or lacquer finished steel. It is incomparable with any other finish or metal base material commonly used for toilet compartments. Vitreous porcelain on steel provides these features that cannot be duplicated by any other material suitable for toilet compartments:

It is a non-porous material that greatly exceeds the structural strength and durability of other materials now available for toilet compartments. It is often acclaimed as a lifetime material because it consists of no elements that are vulnerable to gradual depreciation.

It is impervious to moisture, odors, uric and other ordinary acids, oils and grease, and is scratch resistant.

Its Aint-hard, glass smooth surface can be kept as immaculately clean as a china plate. There are no pores to collect dirt, harbor germs or absorb odors or moisture.

It reduces the cost of maintenance to an all-time low.

The glass-hard, lustrous finish of vitreous porcelain on steel does not fade, tarnish, peel or discolor. This surface is obstinately resistant to scratching, scrubbing, scribbling or defacement.

The orginal luster and freshness of colors is never lost. Its gleaming, colorful beauty does not fade or depreciate. It is truly an ageless and fadeless material.

Sanymetal "Porcena" (Vitreous Porcelain on Steel) Toilet Compartments are available in several different styles and a wide range of fadeless colors (refer to Sanymetal Catalog 89 for complete range of exact colors). Only Sanymetal offers "Porcena" (Vitreous Porcelain on Steel) Toilet Compartments. Ask the Sanymetal Representative in your vicinity to demonstrate the unusual and exclusive features of Sanymetal Vitreous Porcelain on Steel Toilet Compartments.

A FEW BUILDINGS, SELECTED FROM HUNDREDS, IN WHICH SANYMETAL "PORCENA" TOILET COMPARTMENTS HAVE BEEN INSTALLED:

------

Denver Chamber of Commerce, Denver, Colorado - J. A. Zurn Mfg. Co., Erie, Pa. - Kingsley Mills, Thompson, Ga. - State Capitol Annex, Frankfort, Ky. - Oklahoma A & M College, Stillwater, Okla. Erie Railroad, Jersey City, N. J. - North High School, Charlotte, N. C. - Katy School, Katy, Texas Meadville City Hospital, Meadville, Pa. - A Achisan, Topaka & Santa Fe R.R. (Several Locations) Pennsylvania State College, State College, Pa. - Tennessee Eastman Corporation, Kingsport, Tenn. Dayton Power & Light Co., Dayton, Ohio - Masonic Temple, Washington, D. C. - General Electric Company, Cleveland, Ohio - Southwestern Bell Telephone Co., Oklahoma City, Okla. - The Borden Co., New Orleans, La. - Container Corporation of America, Philadelphia, Pa. - St. Louis Stat Times, St. Louis, Missouri - Rich Department Store, Atlanta, Georgia - Boulder Dam, Boulder Dam, Nevada

> THE SANYMETAL PRODUCTS CO., INC. 1687 Urbana Road, Cleveland 12, Ohio





It has exceptionally high resistance to water, weather, water vapor, acids and alkalies, since it is impermeable throughout its entire thickness.

It is unaffected by the laitance of Portland cement or concrete—Retains its excellent, initial waterproofing qualities when in direct contact with these materials.

It is extremely versatile—In addition to waterproofing, it reduces vibration, increases resistance to corrosion, and affords good protection for outdoor insulated ducts, pipe lines, and industrial equipment.



It is easy to handle—Remains flexible and pliable in winter and summer.

It is economical—Reduces labor costs a superior, yet inexpensive material.

Eliminates need for multi-layers— Under normal conditions one ply of Seal-Pruf gives ample protection — is completely waterproof, stormproof, dampproof and mildew resistant.

Nervastral Seal-Pruf is an impermeable plasticlike sheeting which does not need to be embedded in mastic and is easily installed. It is available in two types: Type #30 is excellent for general construction in the residential housing field—28 mills thickness—rolls 72 feet long—in widths 36", 30", 24", 20", 18", 15", 12", 8". Special widths provided on request. Also available in Type #60 for heavier constructions.

Nervastral is sold all over the country. Use coupon for complete technical information and sample.



MEMBRANE



Nervastral	Please send sample of Nervastral SEAL-PRUF and more information.
Seal=Pruf	Name Company
REG. U.S. PAT. OFF.	CityState

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Lemon Packing Plant, Goleta, California W. W. Ache, Architect Wm. Wheeler, Structural Engineer C. M. & K. C. Urtan, General Contractors

> SUMMERBELL'S wide acceptance by Architects and Engineers for all types of buildings didn't just "happen." It is the result of 30 years of experience in producing the best wood roof structures for all types of buildings...plus progressive management, ample resources and complete facilities. Write for descriptive brochure.

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For quality, economy and satisfaction, specify SUMMERBELL
Summerbell roof structures

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IN CHICAGO —The Algonquin Apartments used a set of GPX forms in each of six fourteenstory buildings. After fourteen pourings of beams, floors and roof slabs, 43,000 square feet of GPX was still serviceable.



IN TEXAS—The Lipton Tea Building in Galveston is an outstanding example of modern monolithic construction. Walls, floors and ceilings are all smooth, lustrous concrete . . . poured in GPX forms.

### MONOLITHIC MADE EASY-BY GPX

Take a new look at monolithic construction. GPX has revolutionized concrete building methods with tremendous savings in time and labor that add up to thousands of dollars on many jobs. Designed especially for concrete form work, this plastic-faced plywood provides a satin-smooth surface that reduces costly finishing to a minimum. GPX forms strip easily and clean quickly by brushing. No oiling is required and they can be re-used as many as fifty times on each side. GPX forms are light enough to be handled by one man.

GPX is high-grade exterior Douglas Fir Plywood with a superior plastic overlay applied under heat and pressure, producing an armor-hard plastic surface that is a part of the plywood itself. GPX is 20 times more resistant to water absorption, 10 times more abrasion-resistant than ordinary plywood. It's virtually impervious to acids, molds, termites and fungi.

Get in touch with your nearest G-P office for complete information and costs. Or write for GPX descriptive folder. Georgia-Pacific Plywood Company, 610-5A North Capitol Way, Olympia, Washington.



OFFICES OR WAREHOUSES IN: Augusta, Birmingham, Boston, Chicago, Columbia, Detroit, Lancaster, Louisville, Memphis, Nashville, Newark, New Hyde Park, Olympia, Orlando, Philadelphia, Pittsburgh, Providence, Raleigh, Richmond, Savannah, Vineland.



**IN NEW YORK**—This Flushing housing project builder found GPX eliminated plastering or refinishing. Interior walls and ceilings were ready for painting shortly after stripping the GPX forms.



FOR ALL CONCRETE FORMING\_GPX is not limited to monolithic construction. United States Steel used GPX forms for foundations for spread footings, blast furnaces, coke bins and gas holders at the new Fairless Works near Trenton, N. J.





and let 'er snow!

### Service stations with steel pipe snow melting get the business

It takes a constant flow of cars at the gas pumps to keep a modern service station operating profitably, for traffic and sales go handin-hand. Anything that interferes with the station's capacity to fill 'em up and keep 'em moving, naturally reduces the profit.

Sudden and heavy snow falls that slow down normal operations, sometimes for days at a time, not only result in disgruntled customers but, perhaps, in permanent loss of business as well. It need *not* be so! Foresighted operators of service stations with steel pipe snow melting systems do "business as usual" . . . while competitors shovel! The known economy of steel pipe makes investment in a snow melting system practical for service stations, just as it does for super-markets, decentralized shopping areas and any business dependent upon automobile patronage. And in service, steel pipe has a performance record proved in more than 60 years of conventional hot water and steam heating applications. Add to this the advantages of formability and weldability for coil fabrication and you know why steel pipe is first choice for snow melting systems, too, and why it is the most widely used pipe in the world.



COMMITTEE ON STEEL PIPE RESEARCH

350 Fifth Avenue, New York 1, N.Y.



# A good point to remember about the Russwin *Stilemaker*

The knob release mechanism of Russwin "Stilemaker" heavy-duty locks has been placed behind the rose for two reasons . . . (1) to eliminate chances of scratching the rose or knob in the process of installing or removing the lock . . . (2) to speed installation. These are points that help assure client satisfaction . . . save time and money. + + + From every angle . . . design, construction, functions, styling and finishes ... every effort has been made to merit your complete confidence in specifying Russwin "Stilemaker" heavy duty locks. Send for detailed information. **Russell & Erwin Division**, The American Hardware Corporation, New Britain, Connecticut.

> Engineered to Architects' Specifications All Popular Functions Knob styles . . . in wrought or cast bronze or brass



BY THE MAKERS OF THE ORIGINAL KEY-IN-THE-KNOB LOCK

### **PRODUCT NEWS**



Desks, chairs and storage cabinets have a domestic look which belies their adaptability to the changing needs of today's office.

### **NEW FURNITURE** adaptable to various office needs

Because the term "office furniture" is used as a roundup for many sturdy eyesores ranging from elephantine Chippendale to punched steel kneeholes, it is unfair to put this new group under the same label. The Knolls's (Florence and Hans) own name for their comprehensive line, *Office Planned Furniture*, if a bit modest in these times of loud desert noises, is for once right and fitting. This comely furniture is thoroughly researched and it means business.

Sized for five jobs, the desk, storage and seating pieces take in the executive, his junior exec, the exec's sec, the steno and that no man's land—the conference room. (Not categorized is one item—a solid teak topped desk with butterfly joints and chromed legs which could be only for the Executive executive.)

Adaptable to almost any office plan, the collection is made up of divers individual units which lend themselves to limitless fresh and practical combinations. In all the groups, strong metal frames serve as the skeletons for both the desks and tables. The basic executive's desk consists of a table on a



metal frame from which two or three storage drawers can be hung on either or both sides. Junior's is similar but a little smaller and has only two drawers. The secretarial desks are efficient Ls; the long arm is regular desk height, and the short arm (on right or left hand side) is the proper height for a typewriter. In this group, too, various drawer and cabinet arrangements are possible to meet particular needs. For multiple

Drawer units may be hung from the desk's metal supporting frame Robert Damora





The conference table with tapered ends combines the neighborliness of a round parlor table with across-the-board efficiency.



is now impressively sophisticated

settings, acoustical wall panels can be bolted directly to the desk frames; no extra leg supports are needed.

Stain and burn resistant hard plastic laminates with walnut or birch veneer are used for the furniture tops. On the secretarial units, a gray linen pattern plastic is also available. The metal frames and legs have an oxidized black finish. Flexible storage pieces (scaled for each group), a gently bellied conference table and several comfortable chairs by Eero Saarinen complete the series. The upholstered pieces are covered with durable, distinctively Knoll weaves.

Manufacturer: Knoll Associates, 575 Madison Ave., New York 22, N. Y.

### (Continued on page 210)

Long-lived fabrics woven of rayon and jute fibers cover the chairs, and hard scratch-resistant plastic laminates top tables, desks, and cabinets.



# The New "Look" Fort Wayne ...



gets the new lock



**Russell & Erwin Division** The American Hardware Corporation New Britain, Conn. in builders'

### PRODUCT NEWS

### **MAGNETIC TEMPLETS simplify plant layout**

For 3¢ a sq. ft. of floor area, Magne-Plastic Corp. will supply a complete layout kit for engineering efficient industrial interiors with a minimum of drafting and processing. The economy of the service hinges on tiny magnets and "disappearing" ink. The magnets are imbedded in scale dimensioned plastic templets of factory machinery and equipment, and the ink, made of removable plas-



tic, is used to draw structural details-columns, walls, service outlets-on a transparent mat placed over a metal sheet. The magnetic templets are then shuffled around to a satisfactory scheme and photosensitive

Architect—J. N. Pease & Co., Charlotte, N. C.

General Contractor—Inge-Hayman Constr. Co., Inc., Dallas, Texas

COOLITE

Samples on request.

Glazing Contractor—Pittsburgh Plate Glass Co., Charlotte, N. C.



### Kroehler, Famous Name in Furniture, **Chooses COOLITE GLASS by Mississippi**

Kroehler Manufacturing Co. safeguards the high quality of its famous furniture by flooding workrooms with filtered daylight. Three exposures in this modern factory are glazed with 5800 square feet of Coolite, Heat Absorbing and Glare Reducing Glass. The precise workmanship of the woodworking shop and careful skill of the sewing department would be difficult to maintain under the eye-fatiguing glare of raw sunlight. But Glare Reducing Coolite strains out the unwanted properties in natural light . . . floods rooms with softened illumination that aids seeing tasks . . . keeps interiors more comfortable by helping to absorb solar heat rays.

Coolite has a refreshing, cool, blue-green color, modern in appearance. It reduces maintenance . . . no painted windows, makeshift shields or bothersome blinds. In your plans for new construction or the modernization of existing facilities, investigate Coolite. See how it can provide increased efficiency and economy for your clients. Get in touch with your nearby Mississippi Glass distributor today.

Mississippi offers a wide variety of patterns in translucent, figured and wired glass. All are scientifically designed to distribute daylight to best advantage. "Visioneer" your buildings with glass by Mississippi.



WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

paper is slipped under the mat. After the plan is left exposed to ordinary shop light for about 10 mins., a finished print of the plan is slipped out from under the transpar-



ent overlay. Other prints of alternate arrangements can be made just as easily for comparing one plan with another.

Manufacturer: Magne-Plastic Corp., 70 N. Gratiot Ave., Mount Clemens, Mich.

### **COPYING MACHINE** reproduces large drawings quickly

Designed for engineers and architects with moderate print requirements and low budgets for equipment, the Model-30 Copyflex whiteprinter provides high speed production of drawings and tracings. Accounting departments also will find it useful for duplicating large sized records, balance sheets and charts. The Model-30 has a 46" printing width which enables it to handle standard 42" roll stock, or multiple cut sheets of paper. Its 4' long 2,000-w. mercury arc lamp is said to assure uniform exposure and to permit rapid printing up to 12 lin. ft. per min.

The unit is installed merely by plugging it into a 230-v. 60-cycle power line. It needs no inks, negatives, dark room, plumbing or exhaust to carry off fumes. Copies of drawings may be made on sensitized or acetate coated paper, film, or cloth. One control switch turns the machine on and another regulates



speed. The operator feeds in the paper with a translucent original and copies are processed and stacked automatically ready for use. The price of the printer is approximately \$1,600. Manufacturer: Charles Bruning Co., Inc., Teterboro, N. J.

(Continued on page 214)

# How to increase the walle area of a room ...

### **Build the walls with Facing Tile**

You can install more equipment and machinery—both vertically and horizontally —in a room with walls of Facing Tile.

Why? Because you don't have to provide space near the walls for scaffolds or ladders for refinishing.

This is especially important to productive areas employing heavy, permanent machinery that can't be moved or shut down except at great cost and loss of efficiency.

Walls of Structural Clay Facing Tile never have to be refinished or redecorated. The burned-in finish is there for the life of the building. It will not fade or disintegrate.

Consider this functional advantage of Facing Tile when you next plan an interior which demands the greatest possible uninterrupted use of a given area.

### FACING TILE INSTITUTE

### FOR ALL THE FACTS ABOUT FACING TILE

glazed or unglazed, send for free booklets, "Catalog 52-C," "The Scientific Approach to Color Specification" and "Facing Tile Construction Details." Just address your request to any Institute Member or Dept. MB-5 of our Washington or New York offices.

### LOOK FOR THIS SEAL



It is your assurance of highest quality Facing Tile. This seal is used only by members of the Facing Tile Institute...these "Good Names to Know."

> BELDEN BRICK CO. Canton, Ohio

CHARLESTON CLAY PRODUCTS CO. Charleston 22, West Virginia THE CLAYCRAFT CO.

Columbus 16, Ohio

HANLEY CO. New York 17, New York

HOCKING VALLEY BRICK CO. Columbus 15, Ohio

HYDRAULIC PRESS BRICK CO. Indianapolis, Indiana

MAPLETON CLAY PRODUCTS CO. Canton, Ohio

METROPOLITAN BRICK, INC. Canton 2, Ohio

McNEES-KITTANNING CO. Kittanning, Pennsylvania

NATIONAL FIREPROOFING CORP. Pittsburgh 22, Pennsylvania

ROBINSON BRICK & TILE CO. Denver 9, Colorado

STARK CERAMICS, INC. Canton 1, Ohio

WEST VIRGINIA BRICK CO. Charleston 24, West Virginia

1520 18th Street, N. W., Washington 6, D. C. 1949 Grand Central Terminal, New York 17, N.Y.



C B S TELEVISION CENTER LOS ANGELES, CALIFORNIA.

> Architects: Pereira and Luckman Contractor: William Simpson Construction Co.

Photos by EZRA STOLLER for CBS-TV





LAMINATED FIBRE TUBING

> Permits Round Column Beauty at LOWER COST

A proven, practical method for low cost, one-time use in forming all types of round concrete columns, piers, piles, underpinning. Available in sizes from 3" to 24" I.D., up to 25' long. Can be sawed to any length on job.



Write for complete information and prices

SONOCO PRODUCTS COMPANY

Cancer strikes one in five

# Give to conquer Cancer

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	GENTLEMEN:
	DELASE SEND ME FREE
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Strike

back

### **American Cancer Society**
# UTILITY and BEAUTY

AND SUPPLY

IN THE FUT

NAME ADDRESS OF TAXABLE

<u>inside</u> and <u>out</u> when you build with

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HANLEY BRICK AND TILE

Prime aim in modern hospital construction is to combine beauty, efficiency, and low maintenance costs. Architects Skidmore, Owings & Merrill have accomplished this by using Hanley Duramic Brick and Facing Tile in the new 200-bed Greenwich, Connecticut, Hospital. Here are utility and beauty inside and out!

The exterior of Hanley No. 501 Pearl Grey Duramic Brick not only reinforces the building's clean lines, but assures positive fire protection and eliminates maintenance. Stainproof and impervious to weather, it will retain its "just-built" look through the years.

In the hospital's kitchen and utility areas Hanley Glazed Structural Facing Tile permits maximum cleanliness with minimum labor, shrugs off the wear and tear of hard usage, provides maintenance-free, cheerful surroundings for the staff.

The Greenwich Hospital, like all structures built with Hanley Duramic Brick and Facing Tile, will remain a symbol of the ultimate in utility combined with beauty and low maintenance.

Hanley Duramic Brick and Facing Tile are available in a wide variety of controlled shades and textures. We welcome your inquiry for full information. 

 HANLEY
 COMPANY

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 PARK AVE., NEW YORK 17, N. Y.
 Itsts Schaefer Highway, Detroit, Mich.

 MURRAY HILL 9-4134
 Vermont 7-3200



### **PRODUCT NEWS**

### FIRE EXTINGUISHING SYSTEM comes in a carton ready for installation

A "package" of automatic fire extinguishing equipment is now on the market. Designed to provide protection against normal industrial types of flammable liquids—gasoline, kerosene, etc.—the *Standard Pak* carbon dioxide system also may be adapted to guard against some special hazards. In many small plant applications, this pre-engineered system



should afford substantial savings over custom jobs. It will not substitute, however, for specially planned setups where hydrogen, butane, propane or other highly volatile chemicals are stored.

Approved by Underwriters Laboratories, Standard Pak systems come in six capacities ranging from a single 50-lb. cylinder unit which will protect 800 cu. ft. of space up to a set of four 75-lb. cylinders for areas of 4,051 to 6,000 cu. ft. Prices run from approximately \$266 for the smallest size (complete with galvanized pipe and fittings) to \$1,111 for the largest. Each package contains temperature rate-of-rise fire detectors, connector tubing, automatic control heads, nozzles, and a cylinder supporting frame. Only the cylinders are shipped separately. Optional accessories such as remote control pull boxes and pressure operated trips that will close doors and windows automatically (and thereby help the CO<sub>2</sub> smother the fire) are also available.

Once the system has discharged it may be put back into operation by recharging the cylinders and resetting the heads with a screw driver.

Manufacturer: Walter Kidde, 40 E. 34th St., New York 16, N. Y.

### WHITE PLASTIC STRIP for terrazzo flooring glows in dark

Into darkened aisles a little light may fall. Rudel's new floor strip gives off a bluelavender luminescence for several hours after being exposed to light, and will glow continuously under "black" (ultraviolet) light. Set in terrazzo the same way as standard all-



metal dividers, the safety strip consists of a length of white plastic stapled to sheet metal. It is 3/16'' wide and  $1^{1}\!/4''$  deep, and the metal base is stamped with projections and holes to assure a good bond with the flooring ma-



terial. Price, per lin. ft., is 16¢. For decorative effects in lobbies and corridors, other nonluminous plastic topped terrazzo strips are available at  $13\frac{1}{2}$ ¢ per lin. ft. in bright colors such as yellow, red and green.

Manufacturer: Rudel Floor Strip Co., Inc., 3709 Third Ave., New York, N. Y. (Continued on page 218)

# New \$5 Million Warehouse gets asting protection - A KOPPERS ROOF!

New Warehouse at Pittsburgh, Pa., Protected by a Koppers Built-Up Roof, Bonded for 20 Years.

• Shown here is a giant warehouse, that was recently constructed at Pittsburgh, Pa. It is well over a quarter-mile long. It is functional, yet is modern and attractive in appearance. Not only is the building itself fire-proof, but it also employs the latest devices in order to protect

KOPPERS

merchandise against fire, damage and theft.

With a Koppers Roof "on guard," warehouse contents get the best possible protection against the elements, too. This protection will last for many, many years; no exaggeration, this, for Koppers has guaranteed the performance of its roofing materials for 20 years.

Koppers Roofs are built-up with Koppers Coal Tar Pitch and Approved Tarred Felt. These roofs give long, care-free service. They "heal" themselves if cracks are caused by weathering. They resist water proved by the fact there are many Koppers Water-Cooled Roofs in use.

Architects and Engineers: Hunting, Larsen & Dunnells, Pittsburgh, Pa.

General Contractor: Trimble Company, Pittsburgh, Pa. Roofing Contractor: Warren-Ehret, Pittsburgh, Pa.

> Koppers Roofing Materials are available from coast-to-coast. Specify these materials and your projects will have the best in built-up roofing. Get in touch with us for full information, including specifications.

KOPPERS COMPANY, INC., Pittsburgh 19, Pa. DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALABAMA

SPECIFY KOPPERS FOR LONG-LIFE ROOFING

### It's your problem...and marcel breuer's

see his solution in the May house + home the light construction edition of THE MAGAZINE OF BUILDING

If you design houses, your clients are probably asking for "modern"... but not too "cold" or "severe." It's today's common request.

And you'll want to see across 14 pages of the May house + home how Breuer softens the stern geometry of his newest houses . . .

... by using stairs and fireplaces as sculpture

... by "focusing" the house like a camera towards a view

... by designing open but intimate floor plans

... and other deft design techniques.

you'll see also ... how an architectural "amphibian," Roger Lee, designs for both custom and volume construction

> ... how Van Evera Bailey invented a beam-less roof for a house he "projected" 1,100 feet above a city

... why William Beckett's window walls don't disturb the dignity of a French Regency house

... plus many more stimulating design features

### And the JUNE issue will bring you ... what's coming in home air conditioning

house + home has completed the first field investigation ever made of air conditioning in America's homes, to show you ...

What kind of house design aids air conditioning most ... what choice of cooling systems you have to specify ... what air conditioning costs . . . what's next in heating . . . everything about the built-in climate, sure to show up in tomorrow's home

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THE MAGAZINE OF BUILDING



540 North Michigan Avenue, Chicago 11, Ill.

A Booklet Architects Will Welcome ....The Only One Of Its Kind

> It's the Final Cost That Counts

### **NEW...** BOOKLET SHOWS HOW TILE IN INDUSTRY CAN BOOST Morale .... CUT Maintenance

For some time we have felt that there was need for some literature to which architects could refer when planning tile installations for industrial buildings. Now, for the first time, it's available. American-Olean's new Booklet 300 gives you all the facts, in concise, complete form.

This new booklet shows you how and why plant rest areas can work for management, boosting morale and reducing maintenance costs.

You will find page after page of full color photographs of actual installations in plants such as Esso Standard Oil and Standard Pressed Steel Co. A group of

### **American-Olean Tile Company**

color combinations of floor and wall tile especially selected for industrial and institutional use is shown, complete with specifications.

No Other Surface Can Equal Tile

A copy of this booklet is being mailed direct to most architects. If you have not received yours, or if you would like additional copies, we will be glad to send them to you.

AMERICAN-OLEAN TILE O	COMPANY
910 Kenilworth Avenue, La	insdale, Pa.
Gentlemen:	
Please send me, without new booklet on Modern	obligation, my copy of your Industrial Washrooms.
Name	
Name Title	
Name Title Firm Name	
Name Title Firm Name Address	

### **PRODUCT NEWS**





The fixture's square reflector has an opening in its dome shaped top section for a 300 w. lamp. The lens is concave to shield the viwer from glare.



#### RECESSED LIGHTING FIXTURE with concave lens provides glareless light

Basically, this trim lighting unit consists of a metal box and two pieces of faceted glass: a square domed reflector and a concave lens. The fluted glass reflector works with the lens to produce high lighting efficiency from a 300-w. bulb. However, the prismatic surfaces of the glass are engineered to distribute the high intensity evenly, and the observer, standing or sitting at any normal viewing angle, is shielded from surface light on the fixture by the concavity of the lens face. Designated the F-1570, the fixture has a 14" square narrow gray enameled frame held in place by two concealed drop hinges. It is about 10" deep, and is finished in white enamel on the inside. Its price in quantity orders is \$22.50.

Manufacturer: Holophane Co., Inc., 342 Madison Ave., New York 17, N. Y.

### VERSATILE LIGHT FIXTURE installed as easily as electric bulb

Screwed into any socket like an ordinary bulb, the Silver Spot Adapter is a handy portable light fixture for display and accent illumination. The latest in a line of Silvray fixtures which have silvered bowl lamps, the Adapter may be utilized as a ceiling or side wall unit, and can be fitted very simply with a swivel device. It has a steel housing, a porcelain receptacle adapter, and an aluminum reflector and concentric louvers (which shield the viewer from the light source). Compact, the Adapter measures  $5\frac{3}{8}$ " high and 8" across its diameter. Serving either as a flood lamp (with a frosted silvered bowl bulb) or as a spot (with a clear-topped



bulb), the fixture directs light back to the reflector which distributes it to the area below. It can be relamped without removing the louver. A pack of 12 *Adapter* units sells for \$84.50; the fixture also may be purchased separately.

Manufacturer: Silvray Lighting, Inc., Bound Brook, N. Y.

### WAX LUBRICANT helps produce clean cuts on metal work

Out of Frank Lloyd Wright's tower in Racine (Jan. issue '51) comes a new little product for big building—*Stik Wax.* A blend of solid waxes in a Bunyanesque crayon, the lubricant facilities many metal operations. It (Continued on page 222)



### THE ALL-PURPOSE FLOOR TILE

Features: Lasting Beauty, Color and Durability at Low Initial Cost.



in a floor covering . . . It has lifetime wearing toughness as well as beauty . . . it's practical, easy to keep clean, and is not damaged by detergents and cleaners—a choice of 13 glamourous colors and, it's so very easy to cut and trim.

Ideal floor covering for every room in the home and restaurants, kitchens, showrooms, hotels, apartments, offices, schools, hospitals, laundries, institutions and service stations.

VINYLFLEX Plastic Floor Tile has everything expected

- High resistance to greases, fats, oils, mild acids, alkalis, gasoline, naphtha, paint.
- Extremely resilient . . . reduces fatigue . . . resistant to indentation . . . warm underfoot.
- Install above, on or below grade on almost any base floor.
- Non-shrinking, non-curling.
- Safety-slip resistance.
- Conforms to floor irregularities without cracking.



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### Here's why most control center buyers specify Westinghouse

Why this mass preference? It all boils down to matching product to need. Close co-operation with industry, exhaustive tests and constant improvement have produced this control center which matches industry's every need. Here are the product features that make Westinghouse Control Centers the MOST PREFERRED control centers:

### FLEXIBILITY

Westinghouse Control Centers have complete flexibility to match the periodic movement, substitution and addition of machines—flexibility of electrical components—flexibility of structural units. All cubicle units are built to a standard 14" module—are completely interchangeable. Vertical structures are standardized and free-standing—can be moved or added at any time.

### EASIER SERVICING

There is no maze of mechanical obstacles on a Westinghouse Control Center. A few twists of a screw driver and your serviceman is ready to go to work. Guide rails simplify removal and insertion of cubicles. All starter units are front wired. Side baffles are removable for easier wiring. Sectional and master terminal boards speed hook-up work.

### **POSITIVE SAFETY**

Westinghouse Control Centers protect *both* personnel and equipment. The Westinghouse "Magnagrip<sup>®</sup>" stab connectors and tilt-out disconnect position assure a "dead" unit for servicing. Unit door remains on structure to cover hot buses when starter unit is removed. Tested baffling prevents explosive chain reactions if faults occur. Each starter has an interrupting capacity of not less than 15,000 rms amps.

Complete details on these and other important features are contained in the Control Center Booklet B-4213. Ask for your free copy. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-27021





Applied manually as needed, the new lubricant helps achieve precise sawed surfaces. The extrusion (near left) was waxed; the other was not.

### **PRODUCT NEWS**





### Specify LACLEDE STEEL JOISTS

FASTER CONSTRUCTION—Light, easily-handled, prefabricated to speed the job.

ADAPTABLE—Laclede Steel Joists combine efficient structural function with architectural versatility.

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**ECONOMICAL**—Laclede Steel Joists assure more room at less cost. High strength *plus* light weight gives substantial savings in foundation and framework. Utility conduits, pipes and lines are easily threaded through the open webs.

> Specify these Laclede Products for your construction needs... Multi-Rib Reinforcing Bars—Steel Pipe— Welded Wire Fabric—Form and Tie Wire—Spirals— Conduit—Corrugated Steel Centering—Electrical Weld and Gas Tubing.

CLEDE STEEL COMPANY

is reported to provide a durable, clean lubrication for metal sanding and sawing, pipe cutting and threading, drilling, tapping, grinding, and flush riveting; and to produce a burrless finish on cut or drilled pieces and a smoother surface on sanded items. An efficient emollient, it extends the life of saws, drills, and sanding and grinding discs. *Stik* Wax is packaged in a transparent wrap and encased in a 2" wide cardboard tube. It is applied manually as needed. Each piece weighs 1 lb. and sells for \$1 in cartons of 24. *Manufacturer:* S. C. Johnson & Son, Inc., Industrial Products Dept., Racine, Wis.

### MASONRY SAW does many cutting jobs

In a few minutes the Clipper HD masonry saw can be converted from dry sawing to wet, dustless operation. With the cutting head mounted on a four-wheel cart, the unit may be used on concrete. For working bulky materials, both head and cart are run on a track guide. Available with six different kinds of cutting and abrasive blades, the HD handles materials such as glazed tile, concrete block, sewer pipe, corrugated siding, pressed hardwood, and precast stone. It also will cut concrete floor trenches and asphalt floor patches. The cutting head equipped with a 11/2 hp motor and work table sells for \$395. The cart costs \$165, and an 8' long elevated track is \$35.

Manufacturer: The Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo.

#### LABOR SAVING PAINTING TOOL squeegees coatings over concrete floors

No stoop, squat or dip is necessary when painting concrete floors with a *Jiffy* tool. A  $20'' \ge 4\frac{1}{2}''$  rubber wedge mounted on the end of a 54'' handle, the tool is worked with a push-broom motion, and is said to permit a thorough painting job in 1/10 the time re-



quired with a 4" brush. Paint is poured directly on the floor and the tool is used to spread it into a thin even layer, filling in cracks and indentations. The *Jiffy* will spread paint to the wall edges without smearing the sides. It sells for \$4.95; in quantities of six or more, for \$3.95.

Manufacturer: Mico Products Co., 170 Gorham Ave., Hamden 14, Conn.

(Technical Publications, page 226)

## MATICO'S New MULTI-PURPOSE FLOORING

simplifies planning...cuts building and remodeling costs

### LOW-COST, STANDARD-GAUGE

# ARISTOFICE FLOORING



Now the problem of selecting the right flooring is simplified. New MATICO ARISTOFLEX does the jobs of many floorings . . . its modern, vinyl-asbestos qualities meet the requirements of practically all installations.

And the low price of standard-gauge ARISTOFLEX—comparable to that of grease-proof asphalt tile—meets thrifty budgets. Installation is easy and economical. No special cements are required, ordinary asphalt tile adhesive does the job. ARISTOFLEX lays in tightly, immediately, due to square corners and clean edges... cuts clean without use of a torch.

- Resistance to acid, grease, and alkali make it ideal for such installations as laboratories, cafeterias, hospitals.
- Durability is outstanding. It's vinyl-asbestos through and through—no felt backing.
- Sparkling colors and easy-to-clean surface make it perfect for all installations.
- Recommended for installation ON, ABOVE, or BELOW GRADE.
- May be laid direct on concrete, terrazzo or ceramic.
- Can be installed on wood over 15-lb. saturated felt . . . over gypsum, plank or unfinished concrete slab with suitable underlayment . . . and over magnesite, above grade.
- LOW COST is comparable to grease-proof asphalt tile.

ARISTOFLEX is vinyl-asbestos from top to bottom—no felt backing. It resists household acids, alkalis, petroleum solvents, oils, greases, turpentine, and fire... is tough and flexible... and has excellent indentation recovery. Vivid colors and marbleization go clear through each tile. As a result, ARISTOFLEX is one of the most durable of floorings. It wears for years and years... and steadfastly maintains its sparkling beauty. The smooth surface sheds dirt... wipes clean with a damp mop. Maintenance costs are low. Available in 9" x 9" standard gauge and 1/8" tiles.

For vinyl-asbestos flooring quality with economy, look to ARISTOFLEX.

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### **TECHNICAL PUBLICATIONS**



AIR DISTRIBUTION. Anemostat Selection Manual No. 40, 1952. Anemostat Corp. of America, 10 E. 39 St., New York, N. Y. 64 pp. 81/2 x 11".

This recently revised edition of the manual contains comprehensive technical data on the manufacturer's air diffusers. Excellent photos, performance tables, and case examples help explain how proper locations and number of units are determined. Among the sections which have been updated are *How to Select* 



ISSUE DIALEGIAN

Anemostat Air Diffusers, How to Install, Accessories, and Prices and Weights. A new chapter added to the book covers high pressure units for high velocity air distribution systems.

AIR CONDITIONING. Superior Heat Exchangers. Superior Combustion Industries, Inc., Times Tower, New York 18, N. Y. 8 pp. 8½ x 11".

Following a brief run-down of uses for heat exchangers in heating, cooling, condensing, and evaporating systems, the bulletin outlines graphically the basic parts of *Superior* heat exchangers. Clearly illustrated with two-color diagrams, the presentation should simplify the task of selecting the manufacturer's equipment for heat transfer applications.

GLASS BLOCK. Daylight for Industry. American Structural Products Co., Sales Promotion Dept., Ohio Bldg., Toledo, Ohio. 24 pp. 6 x 9".

Behind this light reading explanation of the functions and advantages of glass block-controlled daylight are years of heavy research and practical experience in industrial buildings and schools. In simple diagrams, the reader is shown how the block transmits daylight through tiny prisms and directs it up toward the ceiling from where it is reflected to the working area below. The structural glass material is described as having the insulation value of an 8" brick wall. Resistant to humidity and corrosion, it is said to require very little maintenance.

**ROOFS.** Paramount Aluma-Seal. Paramount Industrial Products Co., University Center Station, Cleveland 6, Ohio. 2 pp. 8½ x 11".

Printed in two colors, the catalogue sheet tells how the firm's asbestos-aluminum coating adds to the life span of a built-up roof and helps reduce inside temperatures.

MOVING STAIRWAYS. Fire Resistance of Shutters for Moving Stairway Openings. By Nolan D. Mitchell. Edward W. Bender, and James V. Ryan. Building Materials and Structures Report 129. 9 pp. 81/2 x 11". 10¢

Because moving stairways in commercial buildings necessitate through-floor openings which might permit the passage of fire, shutters for closing such openings must be adequately fire resistant to meet code standards. The information contained in this report of tests made by the National Bureau of Standards should receive the attention of designers and contractors who specify equipment and officials who set up building regulations. In the Bureau's experiment, flexible rolling shutters of galvanized steel slats were subjected to three fire endurance tests; time-temperature curves are charted for each test, and "after" photos illustrate the fires' effects on the specimens.

(Continued on page 228)

THE MAGAZINE OF BUILDING



### **TECHNICAL PUBLICATIONS**



**GENERATORS.** Preferred Unit Steam Generator, Bulletin No. 2000. Preferred Utilities Manufacturing Corp., New York 23, N. Y. 28 pp. 81/2 x 11".

Prepared for engineers, consultants, and architects, the bulletin explains the operational features of a self-contained steam generator. Illustrations of the unit and cutaway views of its components are visual supplements to the descriptions. Fired by light or



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We regret that space permits only a partial listing of quality firms who have specified Fairhurst installations.

John T. Fairhurst Co., Inc. 45 West 45th Street — New York 19, N.Y. heavy oil, or natural or manufactured gas, *Preferred* generators are said to provide economical service for an average period of 25 years.

**ROOFS.** Roof Decks and Roof Insulation. Zonolite Co., 135 S. LaSalle St., Chicago 3, III. 12 pp. 81/2 x 11".

Originally a mica-like mineral, expanded vermiculite is reported in this booklet to provide 12 to 16 times the insulation of sand aggregate when used in a concrete mix. Physical properties of vermiculite concrete in various roof constructions are described, and installation specifications for several types are listed.

**STAINLESS STEEL.** How and Where to Specify Stainless Steel in Architecture. Committee of Stainless Steel Producers of American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y. 20 pp. 81/2 x 11".

A companion publication to last year's Architectural Uses of the Stainless Steels, this current booklet lists, alphabetically, 300 different construction applications of stainless ranging from "air conditioning ducts" through "doors, swinging" to "windows, show." It provides data on 20 groups of fabricated stainless items, and lists specifications and good practice recommendations for metal contractors who handle stainless.

**STEEL.** Allegheny Ludium Serves the West. Allegheny Ludium Steel Corp., Pittsburgh 22, Pa. 8 pp. 81/2 x 11".

The company's expanded facilities are detailed in this booklet which gives information on equipment and materials produced on the Pacific Coast, and lists sales and engineering representatives.

**PLASTICS.** Reinflastics by Repco. Russell Reinforced Plastics Corp., Lindenhurst, L. I., N. Y. 18 pp. 81/2 x 11".

A low pressure plastic laminate reinforced with glass fiber, nylon and other materials is detailed in this new brochure. Described as being "lighter than aluminum but as strong as steel," the product has a vast potential in the construction industry—especially the sandwich of flat sheet and foamed plastic insulation now being processed for boat hulls, military housing units, and refrigerators.

FLOORS. Traffic Concrete, A Study in Specialization. Flash-Stone Co., Inc., 3723 Pulaski Ave., Philadelphia 40, Pa. 20 pp. 81/2 x 11".

Strength, wear resistance and other advantages are noted for high density *Dynapakt* concrete floers in this handsome booklet. The materials used for the durable topping and methods of installation are described.



### How Fires Start . . .

### Carelessness

Top-of-the-list cause of fires, according to study after study, turns out to be just plain human carelessness.

Under the heading "Careless smoking habits" you'll find such oddities as the

waitress who cleaned *hot* ash trays with napkins destined for the laundry chute, and the mechanic who tossed a match into a puddle of gasoline. But far, far more frequently it's simply the ordinary guy who unthinkingly tosses away a lighted match.

### How Fires Are Stopped . . . 🦓

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Education does a world of good to prevent fires from *starting*. But until human behavior is perfect, your best protection lies in *automatic control*.

The surest control is with Grinnell Automatic Sprinkler Systems, which check fire at its source, wherever and whenever it may strike, with auto-

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### **TECHNICAL PUBLICATIONS**



VERTICAL TRANSPORTATION. Vertical Transportation by Otis. Otis Elevator Co., 260 Eleventh Ave., New York 1, N. Y. 24 pp. 81/2 x 11".

Instead of listing chapters consecutively, the table of contents in this booklet keys Otis equipment and services according to elevator, escalator and dumb-waiter requirements. These are typical headings in the breakdown: Heavy Passenger Traffic, Massed and Circulating



Clow (threaded) Cast Iron Pipe was used in the construction of this modern apartment building—as it has been used in similar installations throughout the country. The preference is for Clow Cast Iron Pipe because of its corrosionresistant properties and the fact that it offers a useful service life of more than a century.

The trend among leading architects and plumbers is to Clow (threaded) Cast Iron Pipe—for all 3 to 10 inch downspout, waste and vent piping. Everyone agrees its 18-foot lengths are economical to install.

JAMES B. CLOW & SONS 201-299 North Talman Avenue Chicago 80, Illinois Clow (threaded) Cast Iran Pipe has same O. D. as steel pipe, is available with plain or threaded ends, in 3, 4, 5, 6, 8, and 10° sizes in 18' random lengths. Also available with integral calking hab on one end (other end plain) in 18' random lengths in 4, 6, and 8' size. CLOW CAST IRON PIPE CAN BE

on the job, with ordinary tools of the piping trade.

WHOLESALERS OF PLUMBING AND HEATING SUPPLIES Publishers of the Clow Bulletin Passenger Traffic, General Freight Traffic and Dumb-waiter Traffic. Also described are control systems for passenger elevators. Photographs, line drawings and 17 engineering data tables add to the publication's usefulness as a reference.

MAINTENANCE. The Why, When and How of Modern Lighting Maintenance. Sylvania Electric Products Inc., 60 Boston St., Salem, Mass. 12 pp. 81/2 x 11".

Outlining an eight-step program for taking care of fluorescent lighting, the colorful bulletin emphasizes the point that planned maintenance of light sources and reflecting surfaces saves time and useful light.

MAINTENANCE. Power Sweepers. Wilshire Power Sweeper Co., 526 W. Chevy Chase Drive, Glendale 4, Calif. 4 pp. 81/2 x 11".

As a guide to maintenance personnel who select mechanical sweepers, the bulletin gives comparative operative data on the manufacturer's various models for industrial and commercial use.

ROOF TRUSSES. Macomber Steel Trusses. Macomber, Inc., Canton, Ohio. 20 pp. 81/2 x 11".

Design information on steel bowstring roof trusses is presented in this booklet. The section covering basic plans for industrial buildings contains structural details drawn to scale. A safe load table is also included.

**CORROSION.** Atmospheric Exposure Tests of Nailed Sheet Metal Building Materials. By Theodore H. Oren. Building Materials and Structures Report No. 128. For sale by U. S. Government Printing Office, Washington 25, D. C. 24 pp. 8½ x 11". 20¢

To find out how various sheet metals resist the weather and what kind of nailing practices catalyze serious corrosion, the National Bureau of Standards is conducting exposure tests of typical construction materials. Included in the experiments are building sheets of aluminum, aluminum alloy, aluminum coated steel, galvanized steel and zinc alloy. Although the metals have been exposed (in the Washington D. C. vicinity) for only two years, enough has happened to some of the materials to make this report an important reference.

Test conditions are described in the booklet and important conclusions and recommendations for installing sheet metals are given. Several of the sheets under study which are nailed with dissimilar-metals or contact certain nonmetallic materials are deteriorating prematurely because of electrolytic action. Where it is impractical to avoid using dissimilar materials together the Bureau maintains they should be insulated from each other by means of paint, mastic, waterproof paper, or felt.

### For Roof Systems . . . Floor Joists

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FREE—Write us today for your file-size copy of our 138-page Architects' Reference Manual. Fully illustrated. Complete engineering tables. Virginia Square Shopping Center in Arlington County, Va., uses Stran-Steel joists on the first and second floors and roof. Roof construction includes poured Pyrogyp deck plus built-up roofing.



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