Civic center
Design competition helps Brownsville, Tex. group six community buildings in one and win architectural laurels (p. 144)

City planning
New trends in railroading are giving cities buildable land where they need it most (p. 138)

New products
A catalogue of the 120 most significant new materials and equipment announced during the last year. (p. 152)

Building engineering
How to span big spaces with minimum materials—shell concrete (p. 156)

Small buildings
A three-story hospital that exploits two kinds of construction. . . .
An industrial school that looks its part . . . .
A library that uses split-level planning to gain patrons . . . .
A one-story office building that surrounds a "greenhouse" (p. 109)

Architectural showmanship
Olivetti display room calls Fifth Ave.'s attention to a typewriter (below and p. 98)
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Crestwood knob and rose-plates are made of solid cast brass, bronze or aluminum metal. Rose-plate is available in 3", 3½", 5", and 8" sizes.

For complete details on the Crestwood and many other refreshing new Corbin designs consult your Corbin sales representative or write P & F Corbin Division, The American Hardware Corp., New Britain, Conn.
Here is still another example of copper replacing a less durable material which was leaking badly necessitating considerable interior maintenance. A costly experience, but one from which you can profit. For the vital spots use the metal that has proven its enduring qualities for centuries... copper. In fact, there is not another metal or alloy that has all the outstanding construction characteristics of copper.

On the roof of the Lawyer's Club 4,000 lbs. of 32-oz. Revere Copper was used to line the gutters, 10,000 lbs. of 16-oz. Revere Lead-Coated Copper for the batten seam roof and 500 sq. ft. of Revere-Keystone* Lead-Coated, 16-oz. 3-Way, Thru-Wall Flashing under the coping stone.

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We do not make the panels, but will gladly send you complete information on where to get them. Write also for technical specifications and flame spread data on HETRON.
The First Methodist Church of Plainfield, Iowa, had to be more than just a church to warrant the expense of its construction. Consequently, architects Schweikher & Elting, although limited by a budget of $67,000, designed this remarkably flexible building for the 1300 church members. It includes:

- A church assembly room for 140 worshippers.
- A social hall with stage that will seat up to 90 people.
- A 350-sq. ft. kitchen to serve the social hall.
- Four distinct classrooms with sliding walls. Will seat 70 persons.
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For further information on the application of USS NATIONAL Steel Pipe to radiant heating and snow melting services, write:

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As these two recent photographs show, it's hard to guess the age of a well laid-up wall of structural clay Facing Tile.

Thanks to walls of durable Facing Tile, a 16-year-old school gymnasium (top, right) looks just as clean and bright today as a nurses' station in a brand new hospital (bottom, left).

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THANKS TO DAYLIGHT WALLS of L-O-F Glass, there will be no “penned-up” feeling for children attending the prize-winning Oak Manor Elementary School in Fairfax, California. Exterior and interior views here show the natural blending of outdoors and indoors. Architect: John Lyon Reid, San Francisco, California.
IN The School Executive's THIRD ANNUAL COMPETITION FOR BETTER SCHOOL DESIGN...

17 out of 17 winners used modern daylight walls!

That's quite a record—out of 139 schools entered, all seven winning designs and all ten honorable mentions have daylight walls, windows of clear glass extending from wall to wall and sill to ceiling. It's an indication of a sharp, decisive trend in school design.

In the words of the judges themselves: "Each (of the winners) showed a sensitive relationship between indoor and outdoor surroundings. Each was sensitive and responsive to its site. Each of them used the outdoors to enhance the environment of people occupying rooms. In each of the winners there has been a conscious effort to combat the confining effects of people contained in limiting boxes."

These words reflect the growing enthusiasm of educators all over the country for the use of daylight walls to eliminate "that cooped-up feeling". These daylight walls add a feeling of spaciousness... bring light and view inside... make the classroom a part of the world beyond.

School boards like daylight walls, too. They are economical to build (less masonry, lath, plaster and paint). Economical to maintain (glass is easy to clean, doesn't wear out). When glazed with Thermopane* insulating glass, heating costs are lower and areas close to windows are comfortable on coldest days.

For a more complete story on the use of daylight walls in school design, write for the book described briefly below or call your nearby Libbey-Owens-Ford Glass Distributor or Dealer.

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You'll enjoy—and get a lot of good ideas from—this 24-page authoritative publication on school daylighting: "How to Get Nature-Quality Light for School Children". For a free copy write Dept. 4284, Libbey-Owens-Ford Glass Co., 608 Madison Ave., Toledo 3, Ohio.

HERE'S A HEALTHY and stimulating environment for children in the Mirabeau B. Lamar Junior High School at Laredo, Texas. For fullest ventilation, these daylight walls are glazed with jalousies made of L-O-F Glass. Architects: Caudill, Rowlett, Scott Associates, Bryan, Texas.

*Awards announced at 1954 convention of American Association of School Administrators in Atlantic City.
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For more information on the Sanistand fixture and other quality plumbing products, contact your nearest American-Standard sales office. American Radiator & Standard Sanitary Corporation, P. O. Box 1226, Pittsburgh 30, Pennsylvania.

In the boys’ locker room of Canton Senior High School, a variety of American-Standard plumbing fixtures is used. They are the Neo Toric drinking fountain, New Buena lavatories, Casal urinal, and Glenco toilets. These wall-type fixtures make floor cleaning faster and easier.

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The black circles along each floor of this building are the hollow cores of fire-safe Flexicore slabs. They run through each slab from end to end. How would you use built-in raceways like these?

H. E. Beysteber and Associates used every fifth core for telephone cable or electric wiring in this addition to a building used by The Michigan Bell Telephone Co. Other builders use the cores for hot air ducts or piping.

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Hollow cores of Flexicore floors make possible a perfect comfort heating system that combines circulating air and radiant heat. It is widely used for one-story structures. The same duct system can be used for summer cooling.

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ARCHITECTURAL FORUM • AUGUST 1954
low-cost housing needs the

EXTRA STRENGTH
and FIRE SAFETY
of lath and plaster

This housing project in Peoria, Illinois, is a fine example of building wisely, though economically. Extra strength and fire safety are not considered “luxuries” here, not when you are going to house 360 families. To get the extra strength and safety they wanted, Architects J. Fletcher Lankton, John N. Ziegele and Associates specified plaster for all the walls and ceilings, and approved the use of Keycorner and Keybead wire reinforcing lath at corners and junctures. These plaster walls are much stronger than "dry wall" and give extra strength, longer life and better service to this housing development. And, of course, fire safety is greatly increased when you build with plaster, especially reinforced plaster.

Every day, more architects and builders realize that the use of reinforced lath and plaster is the best way to build housing that has the durability, protection, beauty and long-range economy that assures satisfaction to both dweller and owners. Ask your plastering contractor to figure your jobs with the "3 Keys to Stronger Plaster"—Keymesh, Keycorner and Keybead.

KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

makers of
Keymesh • Keybead • Keycorner • Keystone Nails
Keystone Tie Wire • Keystone Welded Wire Fabric
Peoria project architects say:

"When we want the best plastering job, we specify reinforced plaster, and we know Keymesh, Keycorner and Keybead do exactly the job we want. Even when price is a major consideration, we like to use lath and plaster because it is superior to "dry wall" construction and assures the durability, protection and long-range economy that makes the best investment."

J. Fletcher Lankton  
John N. Ziegele and Associates  
Architects—Engineers  
Peoria, Illinois

C. S. Miller, President of Mid-States Plastering Contractors, says:

"If you want a good, strong plastering job, I recommend the 3 Keys to Stronger Plaster—Keymesh, Keycorner and Keybead. These three wire reinforcement products give very good protection against cracking. They're easy to work with, too. Keymesh and Keycorner unroll flat, don't cut the hands, and are put up easily, quickly. Keybead is easily applied for a straight, solid corner. You can't beat the 3 Keys to Stronger Plaster."

Easy to use—Keycorner unrolls flat, cuts easily, handles easily, speeds the job. Cuts down waste, too.

Preformed—Keycorner is preformed for corners, joints, ceiling junctures. Flex it and it fits right in.

Solid Corners—Keybead's precision-formed bead on open mesh fits all outside corners, quickly, easily. Full, solid corners result.

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When you use the 3 Keys to Stronger Plaster, your finished job beats "dry wall" for strength, fire safety and beauty. The 3 Keys stop plaster cracks before they start. The superior strength and protection of your construction will last far longer. Be sure your constructions get the extra strength and fire safety of lath and plaster. And get the best plastering job! Insist on Keymesh, Keybead and Keycorner.
EASY TO INSTALL as the acoustical tiles themselves, Kno-Draft panels snap quickly into place. Ducts and flexible connections are readily accessible and connections can be made in a matter of minutes.

BASIC BEAUTY of the ceiling is accented by the Kno-Draft Panel Type Air Diffusers, which blend into the ceiling pattern and create a single unified surface that is absolutely level and pleasing to the eye.

SINCLAIR OIL COMPANY'S new modern 12-story building in Chicago. Acoustical ceilings with integral Kno-Draft Panel Type Air Diffusers are used throughout.

FLEXIBILITY of location is a big feature of Kno-Draft Panel Type Air Diffusers. Flexible connections permit diffuser panels to be offset from ducts. This allows partitions, offices, display areas to be relocated without moving ductwork.
These handsome, efficient Kno-Draft Panel Type Air Diffusers are especially designed for use with suspended acoustical ceilings, and can be moved anywhere on the ceiling to meet changing conditions of occupancy. They benefit everyone —

**Architects** can specify handsome, low-cost ceilings with completely integrated air diffusers and lighting units.

**Consulting engineers** have a welcome flexibility in design and avoid the exact calculations imposed by fixed outlets and rigid connections.

**Sheet metal contractors** save a lot of installation time and labor. Kno-Draft Panel Type Air Diffusers go up faster than any others.

**Building maintenance engineers** always have quick access to the concealed service lines, air ducts and wiring.

**Owners** enjoy the comfort of perfect air diffusion and can relocate diffusers and lighting units easily to meet demand changes.

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The story, in brief form, of the Honeywell Customized Temperature Control installation in Allstate's new home office is told by the pictures and captions.

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The key word here is "customized." It means that whatever your clients' control requirements, a Honeywell Customized Temperature Control installation designed to fit the needs of the building and its occupants is your answer. This applies not only to heating and cooling, ventilating and humidity control, but to industrial control as well.

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The executive who occupies the office at left likes to work in temperatures that are cooler than average. This atmosphere he can have, because the office is equipped with its own thermostat. Individual office temperature control is a feature of Honeywell Customized Temperature Control.
For comfortable, even temperature in new or existing buildings—of any size—specify Honeywell Customized Temperature Control

Whether it's an office, school, shopping center, factory, motel, hospital—or any size building—new or existing, Honeywell Customized Temperature Control can help meet your clients' heating, ventilating, air conditioning and industrial control problems.

Your clients will not only enjoy more comfort and efficiency, they'll save fuel, too.

For full facts on Honeywell Customized Temperature Control, call your local Honeywell office. Or mail the coupon today.

William Goodman, consulting mechanical engineer, says:

"Providing ideal Indoor Weather the year round sometimes gets to be quite a job. I'm sure glad to have Honeywell Customized Temperature Control available to help do the job."

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New York City, New York

Associate Architects:
R. B. O'Connor & Aymar Embury II

Interior Design & Decoration:
Dorothy Draper, Inc.

General Contractor:
Cauldwell-Wingate Co.

Acoustical Contractor:
William J. Scully Acoustics Corp.

The classic styling of the new restaurant is carried out by the marble-like appearance of the Travertone ceiling. Travertone's mineral wool composition is completely fire-resistant, an important consideration where large numbers of people congregate.

Ideas blend décor and sound conditioning

When New York's Metropolitan Museum of Art decided to include a restaurant in their extensive remodeling program, noted decorator Dorothy Draper and the architectural firm of O'Connor & Embury were called in.

In keeping with the nearby exhibits of Greek and Roman art, they decided on a classic décor with stately pillars, a palm-edged pool, and a subtly lighted glass overhead.

The acoustical material that keeps the busy new restaurant comfortably quiet also contributes to the decorative theme. Armstrong's Travertone, usually used on ceilings, was applied to the upper walls and painted a dark brown to carry out decorator Draper's interesting color scheme. Travertone can be repainted without loss of efficiency.

Besides its acoustical efficiency and decorative characteristics, Travertone is quickly installed. Here, it was cemented to the old plaster walls, simplifying the remodeling job.

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The high sanitary standards of the cafeteria's serving area are fully met by the easy-to-clean Arrestone ceiling. Installed by mechanical suspension, sections of this ceiling can be removed for repairs on concealed piping or wiring.
State of building

Construction outlays rise to a new peak and advance contracts hold up, too. Easy money makes building easy to finance and sends homebuilding to a new peak

Midpoint in 1954 was distinguished by more good news of construction volume. Total first-half expenditures were listed by BLS and the Commerce Dept. at a record $16.6 billion, with private outlays making up $11.4 (up 3% from the first half of record-busting 1953). Mainstays of building’s strength were mass housing and commercial construction. The latter, up 35% above last year to date, was booming at such a pace that professional building owners and managers were beginning to worry about the threat of rising vacancy rates in older offices (see p. 47). Shopping centers, another potent factor in commercial construction’s gains, were sprouting fast enough so some realtors were warning that the US may overdo the new-style marketplace (see p. 41).

Even more heartening to the industry than the whopping outlays for building was the way contracts were holding up, promising that next year will be a big year for construction, too. The government also was moving into the new fiscal year with confidence. As one economist put it: “Our forces for economic growth have been buttressed.” President Eisenhower’s proposal to the state governors’ conference for a ten-year, $50 billion highway building program reflected a rising national demand for better roads, suggesting that this segment of construction could look forward to a long prosperity. The new Housing Act (see below) promised—in the words of HHFA Administrator Albert Cole—“to make more money available to more people to buy more homes than ever before.” There was a flood of money available for mortgages already. June’s 120,000 housing starts (a peak for the year at an unusual time) were largely the result of big money, which in turn was the result of the Federal Reserve’s easy money policies. Some experts now wondered if still more money for building would begin to be inflationary.

The dip in industrial production was saucering out, as was the business sag in general. Some thought this would be the first postwar year in which a client’s dollar bought as much cubic footage as it had the year before. Whether the wage boost in steel would be reflected in a cost boost for construction was still being debated (see p. 45).

Housing Act provides new tools for redevelopment

Despite the FHA investigation and attendant demands by some segments of the press that the government get out of the housing-aid business entirely, the Housing Act of 1954 not only left the industry’s customary federal instruments in working order but added a few new ones.

The most comprehensive overhaul of US housing law in years—so public housers charged—also slyly throttled their program. The conference compromise (which two senators and three representatives refused to sign) called for only 35,000 units of public housing for one year, plus the 33,000 already in the pipe line. But the new 35,000 would be limited to rehousing families displaced by slum clearance, redevelopment and urban renewal. Some public housers insisted this was the first postwar year in which a client’s dollar bought as much cubic footage as it had the year before. Whether the wage boost in steel would be reflected in a cost boost for construction was still being debated (see p. 45).

Broader slum fight. The biggest of the act’s new tools for building was urban renewal—under which Title I redevelopment of the Housing Act of 1949 was broadened to include not only slum clearance but also— for the first time—slum prevention and rehabilitation. The broadened concept would have teeth in it. The law would bar urban renewal grants and loans (but not preliminary planning advances) to communities until HHFA approves “workable” official plans to attack existing slums and prevent growth of new ones. Even before preliminary planning funds could be advanced, city councils would be required to pass an ordinance or resolution requesting them. This would close the door to many a stunt by which public housers flimflammed projects through before cities understood what was happening. The law would also modify the requirement that blighted commercial or industrial areas be redeveloped primarily as housing. It was over this stipulation that the row over Manhattan’s Coliseum had revolved (AF, April ‘54 et seq.), leading to an ill-conceived move by Rep. John Phillips (R, Calif.) to bar all nonresidential redevelopment projects. As the act finally emerged, it retained the language of the old law, but provided a loophole through which the Coliseum apparently could squeeze. This permitted nonresidential redevelopment of nonresidential slums if the area contains a “substantial number of slum, blighted, deteriorated or deteriorating dwellings” and is unsuited for redevelopment as housing. HHFA would be limited to 10% of its capital grants for loophole projects.

Guinea-pig fund. HHFA was given a $5 million kitty to make outright grants to local public bodies to develop “methods, techniques and demonstrations” for preventing slums and blight. Each locality will have to foot one third of the bill, however, for each project—the standard by which all US redevelopment aid is measured. The fund will have a philosophy of Uncle Sam helping those who help themselves: it directs HHFA to parcel out the money to projects which will “contribute most significantly” to improve fight-blight methods and which will “best serve to guide renewal programs in other communities.”

Buildings on property acquired in blighted areas need not be demolished. They could be repaired if this is the cheapest way to wipe out or prevent slums. But costs of rehabilitation would not be included in renewal project costs and could not be financed by federal loans; they would have to be borne by the purchasers (in most cases) or by local agencies. As HHFA Administrator Cole noted: “To encourage this investment, the Housing Act for the first time authorized the FHA to insure mortgages, on the same liberal terms as elsewhere, for the construction and rehabilitation of homes in neighborhoods threatened with blight.”

Building contractors would be limited to 85% of the terms available to owner occupants—a new and slightly less favorable concept which was threadied into most sections of the 1954 Housing Act. Moreover, they would be subject to antiamortigaging-out rules compelling them to return any mortgage money in excess of the allowable loan-to-value ratio (plus a reasonable profit and the cost of the land before development, as determined by FHA). Sec. 220 contained another deal for buildings with more than 12 units under which builders could get 90% mortgages up to $2,250 per room (or $8,100 per unit of less than four rooms), and $2,700 per room ($8,400 per under-four unit) for elevator buildings—plus $1,000 a room more in FHA-approved high-cost areas. Most experts expected little activity, Reasons: Sec. 220 is based on value (whereas the late, unlanmented Sec. 608 was based on cost) ; Sec. 220 is subject to the antiamortigaging-out rules; the pending tax bill would prevent taking Sec.
220 profits as capital gains. Said R. G. Hughes, president of NAHB: "Secs. 220 and 221 were born dead." He pointed out that "under the cost certification clause, the maximum mortgage under 220, for example, would be 90% of 1) the amount of outstanding indebtedness against land and improvements prior to rehabilitation, plus 2) the total cost of materials and labor used for rehabilitating the property, plus 3) not more than 10% builder's profit on materials and labor actually used in the rehabilitation of the property." To the owner, say, of an old apartment with a $100,000 mortgage, Sec. 220 offered only the prospect of winding up with a $5,000 loan after rehabilitation—a distinct loss. Somewhat red faced about this and other technical bloopers in the Housing Act, the banking committees of both houses made hasty plans to rush through a correcting legislation.

Apartment building hit. The antimortgage-out rules would strike hardest, it was generally agreed, at FHA's regular Sec. 207 rental housing program, under which 7,451 units (many of them high-rise apartments) went up in 1953. Sec. 207 provides only an 80% loan. With the antiwindfall rules tackled on, it means apartment builders would have to leave considerable capital in 207 projects. Few experts expected many more to go up under the new rules, despite an increase in mortgage limits for elevator buildings (to $2,400 a room and $7,500 a unit if less than four rooms).

Planning and public works. The new housing law would also broaden federal aid to localities in planning and public works. One section (701) would give HHFA a $5 million fund to make grants to communities of less than 25,000 population to cover not more than a third of the cost of surveys, land use studies, urban renewal plans, city and community plans (but not for engineering or architectural plans for specific public works). State regional and metropolitan planning agencies would also be eligible, and such planning would not be restricted by the 25,000 population limit.

Another little-noticed section (903) would shift to HHFA the old RFC program to help localities finance public works, set up a revolving fund of $50 million for it. Since 1932, the RFC had received 6,200 applications, approved 60% of them for a total of $1.5 billion in loans. It was expected RFC's policy of concentrating on small towns and small projects would continue. So far, the average loan has been about $220,000. Most projects involve sanitation or water treatment plants. The interest rate was to be set at 4 1/2% to force cities with better-than-poor credit ratings to borrow on the private money market.

The act gave HHFA $10 million fund for interest-free loans to local governments for planning public works. This was part of the GOP program to stimulate a backlog of anti-recession projects.

**For a summary of the Housing Act's provisions affecting home building and mortgage finance, see August House & Home.**

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**SIDELIGHTS**

**A 30-ton case of tilt**

At San Mateo, Calif., some 350 dignitaries gathered at the invitation of Vagborg Lift-Slab Corp. to watch the San Francisco area's first demonstration of lift-slab construction. Hydraulic jacks were smoothly hoisting the 70' x 65' slab roof of Serra Catholic High School. Inches short of the 16' high objective, the roof slowly tilted, buckling the 6' supporting columns on the west side of the slab. Five workmen dived to safety from under the crashing 30-ton slab. Eight persons who had been walking on top of it were injured, among them President C. Henning Vagborg of the lift-slab firm. What happened, explained Architect Vincent G. Raney, was "due to improper bracing of the supporting columns, which is only necessary during construction. The columns were braced in one direction, but the weight of the slab fell in the opposite direction." Said Raney: "The pipes were capable of holding twice the slab's weight, but the minute you get off center you lose strength."

**Should garages be compulsory?**

New York City settled a fight over parking in characteristic fashion last month: it decided to do nothing, pending more study. At issue was a city planning commission proposal to require parking garages in all new nonresidential construction (the city already requires garages in new housing). Merchants and realtors protested that the new scheme would stagnate building because Manhattan land values were too high for parking garages to be economic in the densely packed midtown area where most of New York's new construction is concentrated. Moreover, they cried, more garages would just invite more autos downtown to make Manhattan's traffic snarls thicker.

**Moving sidewalks**

Daniel V. Terrell, dean of the college of engineering at the University of Kentucky and currently president of ASCE, recently ventured a prediction that New York City residents might be forced in the future by heavy surface traffic to travel on underground conveyer belts. "Movement of traffic in New York today is hardly faster than the movement of traffic on horse-drawn vehicles 68 years ago," Terrell noted.

For New York, as the dean implied, such a solution—on a widespread scale—was probably a ways off yet. But pedestrian conveyer belts, moving sidewalks, speedwalks—call them what you will—had moved out of the idea stage into reality. In Jersey City, commuters on the Hudson & Manhattan Railroad a few months ago began using the nation's first moving sidewalk to go 227' up a 10% grade at an underground station. This pilot installation has been successful enough to encourage New York's Transit Authority to call for bids this fall on a more complex belt conveyer system to replace the shuttle subway under 42nd St. between Times Square and Grand Central Station. The scheme would have passengers step from a loading belt moving at 1/2 mi. per hour into belt-powered passenger vehicles that would speed up (on rubber rollers) to 15 mi. per hour for the half-mile trip. Decelerating rollers would slow the cars down at the other end, and they would ease around a U-turn channel return.

The idea has captured a lot of other imaginations, too. Ben Swig, the Massachusetts-born real estate operator who has dealt largely in hotels (both East and West), last month put forth a $50 million scheme for San Francisco involving speedwalks. In a run-down 3½-block area south of Market St. Swig would build 1) a 75,000-seat major league ball-park, 2) a 20,000-seat convention hall, 3) a 15-story office building, 4) a 7,000-car garage, 5) two transportation terminal buildings. He would hook the whole thing up to the shopping center of downtown San Francisco with a moving sidewalk along 4th St., under Market St. and over to Union Square along a landscaped mall replacing part of Stockton St., which would be closed to traffic. At Sacramento, Swig was proposing converting downtown K St. from 2nd to 12th Sts. into a $10 million traffic-free shoppers' mall, complete with you-know-whats. Cincinnati was considering a speedwalk in its business area and Houston, Tex., was contemplating a walk which would move right through major department stores and office buildings above grade.

In Los Angeles, Trailerman Roy Fruehauf let his imagination out, predicted America will some day ride 100 mph on rolling roads powered by the sun.

All in all, city planners, architects, realtors have a fascinating new idea to work with.

**Wasted words?**

Are building materials manufacturers wasting a lot of money in their efforts to communicate with architects because their copy misses the point? Enough architects in California think so for the forthcoming convention of the California Council of Architects (Sept. 30-Oct. 2, 1961) to have chosen this theme: "Manufacturers' Literature—From Mail Basket to Waste Basket."

The aim is to devise a system for "more adequate advertising distribution, filing and revision of building materials information." Said one recent announcement of the convention: "The advertising agency must revitalize its literature of all types so that this literature is a help to the planner and builder and not a source of confusion. The manufacturer must be made aware that the literature for which he pays the advertising agency is generally thrown away promptly and forgotten because it is so often too bulky, noninformative or useless to the builder and architect."
Shopping centers: how many are enough?

Developments leapfrog each other in rising competition for the shopper’s dollars

Take equal parts acres and automobiles, stir in borrowed capital and sprinkle with plate glass and whoppo—a shopping center. It used to be easier than falling off the mall. Not any more. Voices are now loud in the land decrying the precocious development of this stepchild of the gasoline age and builders contemplating such suburban bonanzas think twice and then call an economist. The worrisome—although quite logical—situation is that everybody is now in competition with everybody else.

Such a state of affairs is not surprising. The realty men who first started assembling store groups a few miles from the center of town knew that they were going to be in competition with the merchants left in the center of town. The first wave of informed opinion had it that the downtown districts would go bankrupt. This has not proved so. When it became evident that whole urban populations were not going to move en masse to the foothills and shop there, the opinion was revised to read that the downtown merchants would have to bestir themselves to stay in the black. In many areas this has proved so. But the inroads of the massed marts on the old-fashioned districts have thus far not been so severe as might have been expected. The fact that the shopping centers have now turned cannibalistic— are, in a manner of speaking, eating each other—has become an equalizing factor in the district-center tussle for the consumer’s dollar.

Blue sky expansion. Although facts and figures on shopping centers are notoriously open to question ("I have not heard of any subject in 35 years in the real estate business where words have been bandied about so loosely," observes one expert), there is no doubt that they are here and they are numerous. More important, hundreds more are planned. An estimate of recent growth: 1,800 centers completed in the past five years. One drawback to precise statistics is that there is still confusion as to the definition of a shopping center and few analysts in the field ever bother to distinguish between the neighborhood, district and regional varieties. Last month FORUM tabulated a round 875 centers from coast to coast as an indication of the astonishing size of the boom.

Among the centers where opening dates were discoverable, FORUM found that 43% either opened or were to open last year or this. And

*FORUM’s Reader Service Dept. will be happy to provide FORUM readers who request it with the list, which is also available by states.
During 1955 and 1956 another 24% of shopping centers planned and open will begin competing for customers' dollars. Thus by the end of '56, Forum's figures indicate, about 65% of all shopping centers will be less than four years old!

Construction cost of the centers varied from $500,000 (Northwest Village in Phoenix) to $60 million (Lakewood in Los Angeles). A large majority were operating or had scheduled more than 25 stores. Out in front numerically was California, where 131 were listed. Here, as elsewhere, it was obvious that shopping centers mushroom in populated areas. No less obvious was the fact that they thrive on the automobile—California leads the 48 states in auto registrations.

How many drive-in emporiums could one community bear? To some old hands in the business it looked like overbuilding in many areas. Forum's cross section showed a dozen on tap in Los Angeles; seven in Denver; nine in Indianapolis. Baltimore (more later) showed at least nine in operation or on the way. Texas was feeling its oats with 14 in Dallas and 16 in Houston.

The camel's back. Realtor Arthur Rubloff, who can preach because he practices large-scale urban redevelopment and himself has a successful shopping center, sounded off on the local situation. Pointing to the fact that there are some 30 additional shopping center projects planned for the area, Rubloff told a panel at the Merchandise Mart: "Our Loop, or downtown area, generates a volume of business approximating $700 million. If these 30 centers all become a reality, the spendable income supporting the already established business sections will be siphoned off considerably. While some may survive the competition, others will be affected with disastrous results."

Rubloff was talking about potential damage to downtown districts. Chicago is also an exemplification of the leapfrog system of center building which ultimately damages the centers themselves; and in Chicago this damage is not potential—it is there. Soon after families took up residence in the suburbs a clear pattern of building for merchants emerged. The trend was to capture, or intercept, shoppers as they started into town. On Chicago's Milwaukee Ave., for example—the great diagonal thoroughfare leading to the northwest—centers have leapfrogged out, about 3 mi. apart. Each tried to intercept the inbound traffic. Already the store group nearest the city is virtually a "ghost center." And the intermediate ones, now suffering from inadequate parking facilities, face competition from the even newer ones that boast relatively wide open spaces.

Push and pull. Suction and resistance, two terms applied to the desire or reluctance with which families face a trip to the store, are having a near-equal push-me-pull-you effect on shoppers. The main influence of the burgeoning shopping centers has been simply to provide more push and more pull. The consumer's dollar is not swelled by the advent of 1,000 more places to purchase. The basic, competitive proposition is still that a shopping center cannot create expenditures, but can only intercept them on their way to the location where they were spent originally. A rechanneling of disposable income therefore takes effect. Shopping centers have so far not upended the economy; they have merely spread it thin.

Nevertheless, some one has to lose. The Urban Land Institute, in a recent technical bulletin, commented that "The major shopping district is a common casualty of the rapid growth of American cities." But ULI noted that after an initial loss of business occasioned by the first exodus of families to the city limits, in-town shopping districts stabilized. Recent indications are that their function has been increasingly to serve the working population in offices, transients, residents of high density areas (where better, say some planners, to place a store?) and some periodic basic purchasers. But if the downtowners were successfully treading water—and there was increased prediction that they would not be able to forever without more positive action toward physical improvement—the so-called strip facilities were taking a beating from the competition. Consultant Larry Smith of Seattle mentioned at a seminar in New York last winter a study showing that only about 20% of these shopping districts (which mushroomed in the twenties) were "thriving" and that only about 10% had escaped hurt from shopping centers. The strip, neither fish nor fowl, had been caught between the still-solid downtown districts and the new extravaganzas farther out.

When in doubt: rebuild. There was a feeling that when in doubt an intown commercial landowner should rehabilitate. Some comment on the subject:

"Downtown stores are so busy looking for greener pastures they are not doing enough to counter deterioration and protect their existing investments," comments Harold B. Wess, former Macy executive now teaching at the American University.

Rex Allison, the extraordinary promoter of Seattle's famous Northgate: "I have been trying to find out who the downtown is that is going to make this heroic fight..."

"Retailers who have faced the situation squarely...see it as a challenge—not a mortal threat."—Lawrence B. Sizer, vice president of Marshall Field & Co.

Efforts to rehabilitate residential areas have had a head start on similar campaigns to ameliorate commercial sections. But merchants on Chicago's State St., according to Sizer, have "accepted the challenge" and spent some $60 million on capital improvements since the war. Others can follow, if they realize that the "vigorous counter-pull working continually to draw people toward the central city" is something to be capitalized on and not just taken for granted.

TALKING over the pros and cons of shopping centers at a conference at Chicago's Merchandise Mart last month: Lawrence Sizer of Marshall Field; A. C. Huffman of Huffman & Boyle Co.; Victor Gruen, AIA; and Realtor Arthur Rubloff.

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Everybody's boll gone. As the shining shopping centers ate up the acreage in big pieces on the California coastline, in the Pacific Northwest, Florida and Long Island, experts and advisers chipped in advice on all aspects. Some of the comment:

- New York Realty Consultant Robert H. Armstrong: "Although trading areas will vary greatly for different types of stores and for certain sections of the country, it is best to proceed with caution... In the case of regional shopping centers, the trading area must be reexamined with care because purchases from 50, 25 or even 10 miles distant may be woefully few."

- Victor Gruen, architect: "At present suburban shopping facilities grow helter skelter without analysis of existing need and in merciless competition with each other, very often duplicating and triplicating certain services."

- A real estate analysis from Hunter Moss & Co. in Baltimore, on the question of shopping center expansion there: "There is serious question concerning the need for this ever-multiplying number of shopping centers. Strong promotion and a small equity position, in most instances, have dulled the serious analysis of the long term prospects..."

It has been fairly definitely ascertained that the shopping center's best customers are upper middle bracket families with automobiles who do not care as much for bargains as for convenience; that a center must at the same time permit browsing by customers and not "knock 'em and soak 'em"; that a shopping center promoter would be silly not to ascertain the proven spendable income and extent of transportation facilities in his chosen area before he started building. About other matters there is less agreement. The vagaries of traffic and parking have not yet been sufficiently analyzed. Rubloff: "I question whether there is adequate proof or experience to date as to the actual parking requirements for a regional shopping center."

(Victor Gruen's formula for correctly interpreting figures about new shopping centers: "Claimed parking space: divide by three.")

Crossroads. The new trend that seemed to be gradually getting a grip on the men who knew store building best was that shopping centers were at a crossroads. The bonanza was a big baby. In numerous cases it was beautiful, but in others it had suddenly developed growing pains. Arthur Rubloff is a man with an enormous personal and financial interest in keeping things and people downtown, but his summation of the situation, if strong, was worth noting: "There are thousands of so-called shopping centers in the planning or building stage. There is absolutely no question that we have reached an overdevelopment of commercial real estate as it relates to shopping centers. If the trend continues... it will destroy the value of millions of dollars of real estate through the decentralization of many of our established business areas."

Congress cuts Eisenhower programs to aid building

Building statistics and hospital construction were a couple of fields hard hit by economy-minded Congressmen. The House appropriations committees turned down funds on a sought-after $35 million for beefed-up federal aid for the hospital program; the House, however, later restored almost half of this. More funds for more figures on construction activity ($1.1 million) were thrown out, leaving one chance—reinstatement of the appropriation by the Senate when it gets the supplemental appropriations bill.

In other action, military construction for fiscal '55 got the customary Congressional squeeze treatment and the House armed services committee moved that military housing be built with federal funds. The latter decision by the committee came after consideration of three other methods for financing such housing. As recommended, the bill would give the Pentagon about half what it had claimed was needed (original request: $350 million for 25,000 units) and eliminated some requested construction entirely.

Lease-purchase Act signed; $3 billion of building seen

President Eisenhower last month signed the long-delayed Lease-purchase Act, authorizing government acquisition of office buildings and post offices on the installment plan. During the present fiscal year, the General Services Administration is permitted by the law to take on contracts involving expenditures of up to $5 million a year. Government men figure this will generate a building volume of about $60 million. Over a period of years, GSA has estimated, the act could unlock some $3 billion of federal construction. The Post Office Dept., which also participates in the program, can commit itself during the present fiscal year, the General Services Administration, to contracts that do not involve annual payments of more than $3 million. Later on, Congress will take another look at the picture and decide how much more lease-purchase authority it will extend. But construction does not have to await appropriations, as is usually the case; the lease-purchase act permits GSA and the post office to use appropriations for rental space to make initial payments.

Under the program, the government signs a deferred purchase agreement with the sponsor of a building project. Lease projects are set at a level sufficient to pay off the cost, plus a fair return within a minimum of ten or a maximum of 25 years (30 years for the post office). After this, the government takes title. Under the act, the government signs a deferred purchase agreement with the sponsor of a building project. Lease projects are set at a level sufficient to pay off the cost, plus a fair return within a minimum of ten or a maximum of 25 years (30 years for the post office). After this, the government takes title.

The bill will apply a new concept to government space procurement and GSA has had to work out some new administrative policies. It wanted to avoid package deals, has come up with a three-part schedule unique because it involves lining up the bidders on the mortgage financing before deciding who will build and own the property and who will draw the plans. First, invitations to financing institutions; second, plans and specifications; third, request for offers from sponsors.

GSA hoped to get some jobs up for the required approval by the House and Senate public works committees during the summer recess and get some construction under way by late fall. There was nothing official yet on the interest rate for lease-purchase; informed sources guessed it would be under 4%—perhaps as low as 3½%.

At the moment, the post office is spending some $27.5 million a year for rent; GSA is spending about $35 million.

Building labor pay rises 1.6% in second quarter

When the 1954 wage bargaining season began in the construction industry, the watchword among employer groups was: "Hold the pay line!" But the building unions, seeing construction sprint ahead from a slow start in the first quarter of the year, pressed for more money. This month the results were in from BLS. They showed that construction labor—surveyed for seven major building trades in 85 cities—had gained 1.6% in wages during the second quarter. Contractor and worker pressure had balanced to a great extent, and the wage increases were not as great as they were last year in the same period (2.6%; average gain). BLS estimates of quarterly increases in union minimum scales and rate levels on July 1, 1954:

<table>
<thead>
<tr>
<th>Labor</th>
<th>Average Increase</th>
<th>Rate Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1, '54</td>
<td>July 1, '54</td>
<td></td>
</tr>
<tr>
<td></td>
<td>percent</td>
<td>cents-</td>
</tr>
<tr>
<td></td>
<td>per hour</td>
<td>avenge</td>
</tr>
<tr>
<td>Bricklayers</td>
<td>2.3</td>
<td>7.5</td>
</tr>
<tr>
<td>Carpenters</td>
<td>1.3</td>
<td>3.8</td>
</tr>
<tr>
<td>Electricians</td>
<td>1.3</td>
<td>4.6</td>
</tr>
<tr>
<td>Plumbers</td>
<td>2.0</td>
<td>6.1</td>
</tr>
<tr>
<td>Building laborers</td>
<td>2.3</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Northwest lumber strike goes into second month

By early August, with the West Coast fir lumber strike well in its second month, wholesalers and retailers across the nation were reminded that the law of supply and demand has a harsh as well as a pleasant effect. In the days following June 21, when over half of the lumber producers in the Pacific Northwest were shut down by a general strike of AFL and CIO lumber workers, prices began to shoot upward. Dimension lumber prices rose as high as 30% more than prestrike levels, board prices slightly less. As July wore into August, with both employers and employees deadlocked over a wage increase demand, and with stockpiling of logs for winter sawing at a dangerous low, lumber users lost interest in snatching at every last board and 2x4. Moreover, the output of nonunion and cooperative mills was greater than had been expected. So prices slipped off until early this month they were only a few dollars per Mbf higher than prestrike.
KENFLEX VINYL TILE FLOORS MAKE RESTAURANTS
MORE ATTRACTIVE...MORE ECONOMICAL TO MAINTAIN

Flooring for areas where food is prepared and served must always be sanitary...look fresh, clean and colorful...stay that way with minimum maintenance, effort and expense! KenFlex Vinyl Tile answers these requirements because it is grease-proof...impervious to spilled oils, greases, acids or alkalis. And, because it is non-porous, dirt, grit and grime can't be ground-in underfoot...can't mar the crisp, clear, modern colors. KenFlex seldom needs scrubbing...cleans quickly and easily with just a damp mop...never needs waxing except to add a bit brighter luster.

Specifications and Technical Data

Installation: Over any smooth, firm interior surface: wood, plywood, radiant heated concrete slab, concrete in contact with the earth—on or below grade.

Thicknesses: Laboratory and in-use tests have proven the wear-resistance and durability of vinyl flooring: Consequently, Standard Gauge (1/16") is recommended for normal residential and commercial uses. Where traffic will be very severe, 1/8" KenFlex is suggested.

Sizes: Standard tile size is 9" x 9"...also available are 9" x 9" decorative ThemeTile inserts, and 1" x 24" Feature Strip in four solid colors.

Approximate Installed Prices (per sq. ft.)

<table>
<thead>
<tr>
<th>KenFlex</th>
<th>Standard (1/16&quot;) Gauge</th>
<th>1/8&quot; Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>all colors</td>
<td>40¢</td>
<td>65¢</td>
</tr>
</tbody>
</table>

KenFlex is available in 15 co-ordinated colors, all of which are marbleized. The costs shown above are based on a minimum area of 1,000 sq. ft. over concrete underfloor.

Samples and technical literature available on request from the nearest Kentile, Inc. office listed below. Or, contact the nearest Kentile Flooring Contractor. He's listed under FLOORS in the Classified Telephone Directory.
BUILDING STATISTICS:

Steel goes up $3 a ton after wage boost; contractors predict industry will absorb it

Prompted by the 9 1/2 to 10 1/4 hour "package" wage increase granted CIO steelworkers, prices of standard structural shapes last month rose from $82 to $85, concrete reinforcing bars from $83 to $86, and galvanized sheets from $105.50 to $109.00 (at Pittsburgh). Average manufacturers fussed and fretted, but promised, in the face of fierce increase: $3 a ton. Contractors, steel fabricators and metal product CIO steelworkers, prices of standard structural shapes last month rose and Labor.

* Minor component! not tbown, to total exceed? sum of parts. Data from Depti. of Commerce if 400 tons of structural steel were used in the building and the companies, wouldn't it pay for us to absorb the $3-a-ton increase against both big contractors and a host of fly-by-night, shoe-box organization: "If we're in pitching hard for a juicy $1% million plant rises will be more theory than practice, and I think they will be

H. C. ("Chan") Turner, president of New York's Turner Construction Co., appraised the situation in these terms: "I believe . . . the price rises will be more theory than practice, and I think they will be largely absorbed along the way. I don't think we will have to absorb them. The manufacturers and fabricators will . . . No appreciable increase in building cost is to be expected."

Other contractors lacked Turner's optimism. They expected to feel the pinch personally. Said the president of one national building organization: "If we're in pitching hard for a juicy $1% million plant against both big contractors and a host of fly-by-night, shoe-box companies, wouldn't it pay for us to absorb the $3-a-ton increase if 400 tons of structural steel were used in the building and the increase amounted to $1,200? The subcontractors and manufacturers in turn would probably share the increase in such steel-consuming products as pipes, valves, ductwork, etc."

Eventually, some contractors felt, part of the steel increase would slip through to the consumer. But wasn't "high time," asked Andrew Eken, president of Starrett Brothers & Eken, "that the steel companies, through research and study, found some way to offset these steadily increasing costs?" Charged Eken: "Very few technological advances have been made to effect greater standardizations. . . ."

Already the bellwether influence of the steel wage pact was being felt. Anticipating a wage settlement similar to the steelworkers, aluminum producers and marketing men were debating a possible 1 1/2 a lb. increase. The prices of cement and strikebound lumber were also up. Copper and lead prices remained steady. Net result: a slight upsurge in four heavy building cost indexes (see graph).

NEW CONSTRUCTION OUTLAYS

(millions of dollars)

<table>
<thead>
<tr>
<th>Type of construction</th>
<th>June 1953</th>
<th>First six months</th>
<th>% change 1953</th>
<th>% change 1954</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIVATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential building (nonfarm)</td>
<td>1,123</td>
<td>1,148</td>
<td>+2.2</td>
<td>+2.0</td>
</tr>
<tr>
<td>Nonresidential building</td>
<td>479</td>
<td>530</td>
<td>+10.6</td>
<td>+9.9</td>
</tr>
<tr>
<td>Commercial</td>
<td>152</td>
<td>190</td>
<td>+25.0</td>
<td>+35.1</td>
</tr>
<tr>
<td>Other nonresidential building</td>
<td>142</td>
<td>174</td>
<td>+22.5</td>
<td>+19.7</td>
</tr>
<tr>
<td>Religious</td>
<td>38</td>
<td>46</td>
<td>+21.1</td>
<td>+20.7</td>
</tr>
<tr>
<td>Educational</td>
<td>34</td>
<td>47</td>
<td>+38.2</td>
<td>+28.4</td>
</tr>
<tr>
<td>Social and recreational</td>
<td>14</td>
<td>20</td>
<td>+42.9</td>
<td>+46.4</td>
</tr>
<tr>
<td>Hospital and institutional</td>
<td>27</td>
<td>28</td>
<td>+3.7</td>
<td>+18.2</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>29</td>
<td>33</td>
<td>+13.8</td>
<td>+11.8</td>
</tr>
<tr>
<td>Farm construction</td>
<td>174</td>
<td>197</td>
<td>-9.8</td>
<td>-9.8</td>
</tr>
<tr>
<td>Public utilities</td>
<td>399</td>
<td>398</td>
<td>-0.3</td>
<td>-1.2</td>
</tr>
<tr>
<td>All other private</td>
<td>13</td>
<td>11</td>
<td>+15.4</td>
<td>+15.5</td>
</tr>
<tr>
<td>*PRIVATE TOTAL</td>
<td>2,187</td>
<td>2,244</td>
<td>2.6</td>
<td>11,435</td>
</tr>
</tbody>
</table>

PUBLIC

Residential building          | 51       | 29              | -43.1         | -38.5         |
Nonresidential building       | 377      | 408             | +8.2          | +5.0          |
Industrial                    | 162      | 143             | -11.7         | -6.0          |
Educational                   | 142      | 175             | +23.2         | +18.8         |
Hospital and institutional    | 31       | 33              | +6.4          | +17.0         |
Military facilities           | 122      | 67              | -45.1         | -42.4         |
Highways                      | 310      | 385             | +24.2         | +20.4         |
Sewers                        | 73       | 88              | +20.5         | +15.5         |
Conservation and development  | 78       | 67              | -14.1         | -17.1         |
*PUBLIC TOTAL                 | 1,037    | 1,078           | 4.0           | 5,145         | 5,145         |

*GRAND TOTAL                  | 3,224    | 3,322           | 3.0           | 16,589        | 16,589        |

* Minor components not shown, so total exceeds sum of parts. Data from Dept. of Commerce and Labor.

MATERIALS PRICES

The wholesale building materials' index published by BLS dropped almost imperceptibly from May to June, from a revised 118.6 to 118.5. Nonmetallic minerals (flat glass, concrete ingredients, structural clay products) fell 0.3 point. Paint remained static and lumber and wood products showed a 0.2 point gain (the strike influence.)

TOTAL CONSTRUCTION EXPENDITURES

(in billions of dollars)

BUILDING COSTS

Building costs of apartments, hotels and office buildings, and commercial and factory structures rose slightly from May to June. The indexes, computed by E. H. Boeckh & Associates, gained about half a point to 254.1 and 254.5 (base 1926). Other indexes, on a 1947-49 base, showed similar small climbs: American Appraisal Co. from 124.7 to 125.3; AGC from 130.8 to 131.1. Smith, Hinchman & Grylls rose one point from 266 to 270 (1926 = 100). The Austin Co.'s index of industrial building costs advanced one point to 190 during the spring quarter, after three successive periods at 189.

ARCHITECTURAL FORUM • AUGUST 1954
for the nation's newest and largest airports

architects specify modu-aire

for individual room cooling and heating...

In the $14,000,000 Fort Worth airport, 67 usAIRco Modu-aire units supply individually controlled cooling and heating to each office in the terminal building and in American Airline's combination hangar and office building. Hot or cold water is supplied from central supply source and is distributed to each unit through copper tubing within the walls.

Individually controlled Modu-aire units were also chosen for the huge $33,000,000 Greater Pittsburgh Airport for installation in executive and ticket agents' offices, traffic control rooms and similar spaces, and in all 62 rooms of the unique hotel, which is the first especially designed for air commuters. A total of 225 Modu-aire units was installed.

For further details write Dept. AF 84

UNITED STATES AIR CONDITIONING CORPORATION
MINNEAPOLIS 14, MINN. Expirt Dept.: 13 E. 40th St., New York 16, N. Y., U. S. A.
**NEWS**

**DENVER OFFICE TOWERS** previewed by delegates included (r) the 23-story 400,000-sq. ft. Mile High Center designed by I. M. Pei for Webb & Knapp and the George A. Fuller Co., owners, and (l) the 20-story 267,000 sq. ft. Denver club building designed by Architects Raymond Harry Ervin and Robert Berne of Denver for John D. and Clint Murchison Jr. of Dallas.

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**Fresh acres of office space**

Building Owners & Managers, conventioning at Denver, worry about overbuilding, loss of federal rents from lease-purchase

The men who manage the nation's skyscrapers are beginning to worry about overbuilding. A second fear is that the federal government's new lease-purchase act, permitting the US to buy new office space on the installment plan where it now rents quarters, will accelerate the curve of vacancies, already on the rise for two years.

Both problems were aired at the 47th annual convention of the Natl. Assn. of Building Owners & Managers June 28-July 1 in Denver.

Graham Aldis, former head of NABOM's Chicago chapter and of NAREB's Chicago board, presented a survey that showed eight out of 23 reporting cities already had reached the saturation point or were overbuilt in office space. Aldis put his data together by asking local building managers and appraisers in the 25 biggest cities for "confidential low-down" on local conditions. "I classified a city as overbuilt," he said, "if I judged that its vacancy was below 9%. In Equitable Life's (AF, May '54), predicted Palmer L. Burch, local BOMA president. In another report on new Denver buildings, former President Hudson Moore Jr. set the prospective vacancy rate at "something under 18%" (contrasted with 18.8% now). He said conditions would be the "most competitive" since 1939.

- Denver will have a 20% vacancy in first-class office space within a year as a result of a 60% expansion (AF, May '54), predicted Palmer L. Burch, local BOMA president. In another report on new Denver buildings, former President Hudson Moore Jr. set the prospective vacancy rate at "something under 18%" (contrasted with 18.8% now). He said conditions would be the "most competitive" since 1939.

- Dallas acquired 2 million sq. ft. of new space in 12 postwar buildings, by Jan. 1 will have about 10% vacancy in its 4 million ft. of first-class space, according to E. H. Cary Jr.

- Pittsburgh expected a 15% vacancy from its flood of postwar construction, but on May 1 vacancy was below 9%. In Equitable Life's new Gateway Center buildings there was about 20% vacancy, however, said Frank T. Trohaugh, who blamed a city "mercantile tax" for driving an increasing number of office tenants beyond city limits.

Sterling Bigler of Philadelphia, who was elected NABOM president, commented that "many cities are creating too much space," and expressed specific concern over the outlook in his own city.

**Vacancies near 3%**. Supporting (if not stimulating) members' fears were results of NABOM's semiannual office space survey disclosed at the convention. Based on reports from 2,532 buildings in 162 US and Canadian cities, the survey showed a gross vacancy of 2.88% on May 1 compared with 2.26% last Oct. 1. It was the fourth straight rise in the vacancy index.

Most significant disclosure in the latest figures was a drop in space rented by private tenants, offset only by a big increase in gov-
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THE MAGAZINE OF BUILDING
Government office renting. Although total space for the base of the May survey went up 3 million sq. ft. over October space (230 million, compared with 227 million), gross private occupancy went down 766,000 sq. ft. Government occupancy rose 2.2 million sq. ft. Although gross occupancy was higher than reported in October, gross vacancy was greater too, in volume and as a percentage of the bigger base.

Government agencies rented 6.7 million ft. in surveyed buildings last October, but 8.9 million in May (2.9% of the total space surveyed last fall, 3.89% of total space in May). State and local agencies increased their rented space from 1.4 to 2.5 million ft. (up 78%), federal agencies from 5.2 to 6.4 million ft. (up 23%).

The convention adopted this resolution drawn by the policy committee headed by V. B. Walling of Detroit:

"There are indications that in office building construction some cities are nearing the saturation point, while some may have overstepped the line. These facts warrant the attention of lending institutions as well as private capital, and the sober consideration of governmental agencies."

"Pending legislation in Washington has given rise to apprehension of much new building financed on a lease-purchase plan. We remind those in authority . . . that unwarranted public construction can be as harmful as overbuilding by the industry itself."

How much, how soon? Because government renting provides private office buildings with revenue the industry has come to depend on, NABOM apprehension over the federal lease-purchase program (see p. 43) is understandable. The big question: how much would there be?

GS Administrator Edmund F. Mansure told the convention he wanted to correct false impressions, make it "clear" that the bill (then still in Senate-House conference) would not be "a signal for a vast public works program . . . is no blank check . . . GSA will be barred from making any commitments which might exceed its annual appropriation for rentals."

But the next day NABOM Counsel Harry J. Gerrity of Washington disagreed. He noted both Mansure's remarks and a specific limitation totaling $8 million for both GSA and post office buildings during the first year of the program. Nevertheless, Gerrity made a prediction that could make a lot of owners and managers unhappy: "pressure" on congressmen for local projects would soon cause Congress to boost annual appropriations sky-high. . . . Warned Gerrity: "If this legislation becomes law, government occupancy of commercial office space . . . will completely disappear within five years."

Slap at Congress. This year, at least, NABOM was still on the best of terms with GSA. It recently completed a survey and analysis for GSA on its operating methods and expenses in managing public buildings. In its annual address, retiring NABOM President James M. Bradford said this study had turned out "more of a chore than anticipated, was not highly profitable" for the association. He called results "largely confidential," but added: "Possibly our most constructive recommendation was that a substantial sum be set aside—we had in mind $100 million—for progressive modernization of antiquated federal structures and equipment. Only by bringing many properties up to good condition after years of penny-pinching neglect will it be possible to realize standards of efficiency in operation that the government should maintain and to which the public is entitled."

Ralph E. Thomas of Detroit charged that wasteful deterioration of government buildings from such penny-pinching was "all due to the fact it is possible for congressmen, without making a survey, to red-pencil appropriations and reasonable requests for funds. GSA has competent management and if allowed to operate as we do, would do a job equivalent to any Class A building in the country."

Thomas served on the NABOM team that studied maintenance problems in the Pentagon and other buildings for GSA, and he gave some unofficial observations of his own on this project. Said Thomas, after first pointing out that war conditions had dictated construction of the Pentagon to less than Class A standards:

"As a building manager I was very unhappy with conditions I found existing. Here was good management compelled to give all kinds of free service to stores that could well afford to pay standard rentals, operating crews working on curtailed schedules [so] they could only clean one third of their assignment per night, cleaning crews receiving materials that had to be doctored to get them through the machines. . . . The part that seems almost unbelievable is that there is actual physical deterioration to some of the buildings, and this enforced cleaning and maintenance procedure will cost you and me as taxpayers more in the long run than if done correctly as a standard procedure."

The convention elected Secretary-Treasurer Maynard Honsanson of Indianapolis as first vice president succeeding Bigler, and Regional Vice President John I. Hill of Houston as first vice president.
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The core of a Gold Bond "Firefighter" Roof Deck is incombustible gypsum concrete. 25,000 feet of natural fire resistance is molded over the bowstring structure of this Augusta State Armory. The 5-inch-to-the-foot rise of this installation indicates the versatility of poured-in-place gypsum roof decks.

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PEOPLE: John Lloyd Wright challenges California architect license law in court; Neal Hardy to quit HHFA

John Lloyd Wright and California's board of architectural examiners have come to grips in a court test which may bring as a by-product the revision—or at least a careful re-examination—of California's licensing procedures for architects. Wright, 61-year-old son of Architect Frank Lloyd Wright, has been charged with four misdemeanor violations of the California business and professional code, all involving the new clothing store (see cut, below) he designed for Salvador Villasenor of Oceanside, Calif.

Specifically, Wright was accused of (1) displaying a sign indicating he is an architect (it carried the letters AIA after his name); (2) failing to notify Villasenor that he is not licensed to practice architecture in California (he is licensed in Indiana, Nevada and Texas). The board and Wright differ emphatically over whether or not Wright gave Villasenor written notice prior to beginning the project. Villasenor told Forum that he received notice but neglected to read it; 3) practicing civil engineering without a license; and 4) designing a project which the examining board said required a civil engineer.

Wright has some defenders who see the controversy as something more than a technical matter. James Britton, writing in the locally circulated San Diego Magazine, called Wright the "victim of shameful persecution compounded of whisperings, plotting and legalistic abracadabra." He added: "What should most concern the public is that the elaborate machinery of government, designed to promote the general welfare, is not sensitive enough to protect the values of creative originality, but tends instead to make the world safer for mediocrity."

Last January, Wright was served with a warrant for his arrest. He would have spent the night in jail had a judge not released him on his own recognizance. When the case went to court, Oceanside Municipal Judge L. W. Cotttingham threw out two engineering charges on the ground that the complaint was too vague and the law itself badly worded. More important, he sustained Wright's objections to the architectural complaints on the ground that the business and professional code is contradictory (Wright had challenged its constitutionality). On contradictions in the code, the judge held: "The statute we are considering requires, on the one hand, years of study and experience followed by an examination by a competent board before one can obtain a certificate which entitles him to practice architecture, and on the other hand, permits one with no more education than is necessary to write the sentence 'I am not an architect' to practice architecture and enjoy the benefits from doing so to the same extent as if he were duly certified."

The engineering board was willing to let the case drop, but the architectural examiners insisted on pressing the issue. So, an amended complaint has been filed in Oceanside. If Wright wins again, the architectural board is expected to appeal; if Wright loses, he has indicated he will appeal. Wright's position is that the section of the code forbidding anyone to advertise in "any way which might indicate" he is an architect is unconstitutional under the first amendment (free speech and free press) and the 14th (due process of law). In practice, however, Wright insists he has followed the letter of the law.

Since 1946, when he went to California from Indiana, (where he is also a registered professional engineer) Wright has not, he claims, advertised himself as an architect. He describes himself as "John Lloyd Wright Services." He has been designing buildings in the US and abroad since 1912. In putting the letters AIA on his site placard, he points to a letter from AIA President Ralph Walker in 1949. Wrote Walker: "As far as the use of the letters AIA is concerned, we believe very strongly that this right is yours regardless of where you are and should not be in any way interfered with by people in California."

Wright was denied a California license in 1946 when, according to Robert Kelley, executive secretary of the architects' examining board, he failed to pass a civil engineering section of a test which, Kelley told Forum, was a standard one given to all architect-applicants. Wright has challenged the legality of the "schoolboy test." Wright was mindful of a decision of the Colorado supreme court, which recently threw out a statute comparable to California's because it granted too broad powers of discretion to examiners.

James Britton, writing further in defense of Wright, said, "Other architects freely admit that John Wright could qualify for a license if he chose to go through 'proper' channels. ... They think of him as simply stubborn, and some of them expand with the pride of pignies as they recall the similar troubles of Father Wright."

The reference is to Frank Lloyd Wright's brush with California's licensing board in 1924, when he applied for a license but, according to Kelley, never bothered to pick it up. He has since been accredited.

Villasenor, meanwhile, is a somewhat perplexed storm center. He is fully satisfied, he says, with Wright's design; he likes his new store. But he is "very unhappy" that a "nice man like Mr. Wright" should be put to any embarrassment on his account.

Neal J. Hardy, 39, for the last five years assistant administrator for HHFA, was hired away by NAHB as director of its new $2.5-million National Housing Center now rising in Washington.


Frank Lloyd Wright revised his plans for the proposed $2-million Guggenheim Museum on upper Fifth Ave. in New York; felt certain that the city's building department would approve them now and let the work get on. It has been over two years since Wright and the officials fell to discussing exits, overhangs and the like, while approval was held up. Among the changes: removal of a wing at the northeast boundary to meet objections to second-floor height and area and to provide an exit; reduction of overhang on Fifth Ave.; a dome of wire glass instead of plastic. Wright insisted the changes would not harm the building, in fact stated they would improve it. Expense was another reason for the changes, since costs are up about a third since the Guggenheim bequest of $2 million was made in 1949. The plans had been sent out to five firms for bids. Wright had rented the Presidential suite in the Hotel Plaza, overlooking the park, as a New York office.

Meantime, a civil engineer from Hopewell Junction, N.Y., purchased Wright's Usonian house, on display at the present museum during last autumn's "Sixty Years of Living Architecture" show, (AF, Oct. '53, News) for $1,000. Harold Hayward was the only person to bid more for the house than removal costs when the museum let it be brulted about that the famous model had served its purpose. He had moved it to Pleasantville, N. Y., at a cost of $1,800, planned to put the house together again and offer it for sale in suburban Dobbs Ferry.

OPINIONS: These intellects shed the following light on matters of moment to building:

- It is an established policy of the present administration to make money easy, cheap and readily available for sound ven-
NEW BUILDINGS

SOM to design Air Academy

Air Force Secretary Harold E. Talbott announced that Skidmore, Owings & Merrill had been named architects for the Air Force Academy to be built at Colorado Springs. Associated with the architects: Syska & Hennessy of New York; Moran, Proctor, Meuser & Rutledge of New York and Roberts & Co. of Atlanta. Talbott also named three individual architects to advise him on plans and construction: Wallace K. Harrison of New York; Eero Saarinen of Detroit and Welton Becket of Los Angeles. The seven-man board which picked the architects was headed by John M. Ferry, special assistant for installations to the Air Force undersecretary, but the Pentagon kept the other members a secret. The board had applications from 175 groups representing 260 individual firms. First, it whittled these down to a group of eight runners-up. Ferry said SOM was finally chosen on the basis of “experience, past performance, reputation, organization and fundamental approach to the problems.” He said the Pentagon wants a design “suitable to the forward-looking view of the Air Force” but added “we have no fixed views on designs...we’re not looking for stylized designs, nor for something very startling.”

Seagram plans a monument

There were critical catcalls in the architectural world last month when Seagram-Distributors Corp. made public a man-sized model of its proposed new headquarters. Some said the 34-story building, scheduled for erection by 1957 on Manhattan’s Park Ave., looked like an enormous cigarette lighter. Others thought it resembled a big trophy. Preliminary design for the building—marble and bronze for four floors and a “monumental tower” above—was worked up by Architects Pereira & Luckman and announced at the company’s annual sales meeting. Cost was put “in excess of $15 million.” The structure will go up a rivet’s throw across Park Ave. from Lever House, the cost of which was said to have been an issue when Charles Luckman left the presidency of Lever Bros. A Seagram official said the firm had not yet signed a contract with Pereira & Luckman.

Window shades outside

The six-story office building for the British Columbia Electric Co., Ltd. in Victoria, B.C. will wear its Venetian blinds outside. The client stipulated no inside shading. So Architects Sharp & Thompson, Barwick, Pratt of Vancouver striped the walls with horizontal aluminum sunshades to keep the load on the air-conditioning system to a minimum. The main block of the $1.2 million building will be glass-enclosed except for a service core and stair well. The pattern handling of the trellis over an outdoor area is the kind of thing that should make a mark when seen from the air, from where more and more cities are being seen by more and more people.

Specialized testing lab

Architects for the Trane Co.’s new $1.2 million research laboratory in La Crosse, Wis.—Magney, Tusler & Setter of Minneapolis—had to work in a number of extraordinary facilities necessitated by the type of work planned for the lab, which has been named the “House of Weather Magic.” The company had decided that the best way to estimate what the size of the lab should be was to determine what equipment should be in it and then multiply by three. Besides the extra space for expansion (total area came out to 35,000 sq. ft.), Trane engineers agreed there would have to be space for—among other things—a large, two-story craneway for testing refrigeration units; a dozen or more air tunnels; a soundproof room and two cold rooms. Inside, Trane is able to recreate any climate from Africa to the Arctic plus the searing temperatures needed for atomic research. The lab is one of the few in the nation devoted entirely to problems of heat exchange, which range from heating a home to cooling a guided missile in flight.
A cooler kitchen to work in. Cafeteria employes, like shop or office workers, can work better on a hot day when it’s cooler inside. Aklo Glass can shut out as much as 44% of the sun’s heat.

More and better work can result from a more relaxing lunch hour in this cafeteria glazed with Frosted Aklo Glass to diminish glare and keep the room cooler. Colonial Stores, Raleigh, N. C. Architect: W. G. Bursnall, Atlanta.

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LETTERS

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The critical analysis of the Livestock Vil lions in North Carolina by Paul Rudolph (AF, Apr. '54) is as brilliant as the building itself. We need more articles of this caliber.

WILLIAM W. WURSTER, Arch Prof. of Architecture
University of California
Berkeley, Calif.

Forum:
There is great merit in architectural criticism—criticism that makes one aware that architecture can be a form of art expressed today as well as performing its everyday duty. But, you must select good, unprejudiced critics, critics capable of seeing positive goof and not critics who measure good or bad in terms of how close the originator approaches the works of his own personal "hero." Creativity to me has greater virtue than selectivity.

MAX ABRAMOVITZ
Harrison & Abramovitz, architects
New York, N.Y.

Forum:
The May Forum on modernization impresses me as the soldest issue for a long long time.

I am also very enthusiastic about Paul Rudolph's criticism of the Nowicki "cow barn." It is good indeed to read solid criticism by real architect in his own words...

JOHN RANNELLS, research assoc.
Institute for Urban Land Use & Housing Studies
Columbia University
New York, N.Y.

FLLW IN VENICE

Forum:
"Question: is Venice ready for a FLLW palazzo?" (AF, May '53).

Mamma mia—not Venice! Let Frank Lloyd Wright build in other cities but not Venice! I don't even mind looking at the building I just finished a few yards south of my office on Rodeo Dr. in Beverly Hills—which is a photographic nightmare, but please no Venice!

Ah Venice—how it was and how it is! As a tourist I remember its sights and smells, its gentle gondolas and the bouquet of its beauty. A FLLW building in the midst of all this? Well, don't put it on the Grand Canal but in it—in the deep end! Mamma mia!

PAUL LASZLO
Beverly Hills, Calif.

PR POCKET GUIDE

Forum:
The Pocket Guide for Better Public Relations (AF, April '54) was well put together and will prove most useful to the profession.

JOHN WELLBORN ROOT, architect
Holabird & Root & Burgee & Associates
Chicago, Ill.

continued on p. 62
Now! WHITE Industrial SEATS

Olsonite Shock-Proof white seats won't discolor — keep that sanitary white appearance, under normal use, for the life of the building.

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Powers Control on Sitz Bath with Raised Base

Treatment Bath for Children. Note Powers Mixer

Section of Nursery

Powers Controlled Whirlpool Bath for Polio Patients

Controls on Forced Hot Water Heating System
ROOF CURBS: flash them with COPPER for lasting protection

Modern flat-roof buildings usually have one or more construction features calling for roof curbs. These are: penthouse for stairs, skylights, ducts, vent pipes for plumbing, flagpole base, stub columns and many more. Properly flashed curbs keep standing or wind-driven water from leaking into the building at these points.

Shown here are several curb flashing details for both fireproof and wood construction. Flashing for a piece of equipment with a metal housing, such as a roof fan or dust collector, is also shown. Lead strips and washers isolate one active metal from the other. In general, use 16 oz. copper of cornice temper for all curb flashing.

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LETTERS continued

Forum:
We understand that you have reprinted your Pocket Guide for Better Public Relations.
Inasmuch as we would like to furnish each of our members with a copy of this excellent article, will you please advise us of the cost of 175 copies?
Please accept our compliments on the service being rendered to the profession by you with the issuance of such articles.

DONALD H. NEWMAN
Westchester Chapter, AIA
Bronxville, N.Y.

• In booklet form the reprint is available without charge for quantities of five or less and at the rate of 10¢ each in lots of ten. Thus, 175 copies would cost $17.50.

Forum:
I have read your comments on the AIA public relations program in your "For Architects Only" column in the June FORUM and want you to know how apropos I think they are.
As a former member of the Public Relations Committee, the complete cooperation which the FORUM has shown in helping to forward this program for the betterment of the architectural profession is very pleasing to me.

HERBERT C. MILLKEY
Willner & Millkey, architects
Atlanta, Ga.

ACHING FEET
Forum:
Architecturally, I think the remodeling program at the Metropolitan Museum of Art (AF, May '54) is an excellent job from the point of view of lighting, maximum use of wall space, good vistas and an over-all interesting effect.
Editorially, the story is well presented and, with a limited amount of text, you have given a very good, clear picture of what was done and how it was accomplished.
But, I have visited the museum twice in the past few weeks and have the same complaint as always existed: when you get through an exhibit your feet still hurt. Why not some relief here and there for resting and contemplating an important picture or vista, such as an informal arrangement within a gallery itself, or perhaps between galleries—fix it so the girls can take off their shoes if they want to without being conspicuous! One goes to the museum to enjoy the pictures and, when the visit is over, the pleasure derived from seeing the picture should be uppermost in the mind rather than the feeling of how tired one is at the end of the visit.

J. GORDON CARR, architect
New York, N.Y.
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Write today for new catalog, "Coolite, Heat Absorbing Glare Reducing Glass." Samples on request.
LETTERS continued

Forum:
The article was excellent. I hope you continue such comments on museum buildings and renovations. My only regret was that it could not be longer, although this may be only the attitude of one professionally interested in a special problem.

GORDON BAILEY WASHBURN, director
Department of Fine Arts
Carnegie Institute
Pittsburgh, Pa.

Forum:
The story on remodeling of the Metropolitan Museum is of interest and we are glad to have it on record. I must say, however, that no old pile of masonry can be turned into a contemporary enclosure of space. Without prejudice to the efforts of the great museum of art, I question whether FORUM should report remodeings of any kind without also reporting the predestined frustration of them.

I think you know this better than I do, and that I am inviting the editorial remark that one reports what happens. Perhaps you should have a demolitions department.

L. V. COLEMAN, director
The American Association of Museums
Washington, D.C.

Forum:
I write to raise a point of order in respect to your comment regarding the architect's fee for the reconstruction program at the Metropolitan Museum of Art. No doubt in relation to designing for commercial and business structures the fee was inadequate. The art museum in America is a community achievement realized through contributions great and small, from millions of people. The architects were complimented in being selected to carry out this project; I am happy to see that in waiving fees substantially above costs, they rose to the occasion. Hence the spirit of noblesse oblige is not entirely moribund in this land; you would dignify yourselves and the profession of architecture by recognizing it.

THOMAS C. COLT JR., director
Portland Art Museum
Portland, Ore.

AS THE ROMANS DO

Forum:
I would like to rectify an error in your fine May issue regarding the new railroad station in Rome. You state (p. 132) that "Rome's new railroad station pays scant attention to sacrosanct ruin of city wall, despite theory (illustrated below) that unique form of concourse roof was determined by it. Once legal preservation requirements are met, new Italian architecture continues on its independent way."

The actual situation, as borne out by con-
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LETTERS continued

versation with the architect (and as brought out visually in your illustrations) is just the reverse. Very strict attention was paid by the architects and engineers to this fourth century BC wall. Indeed, it can be truthfully said that the whole concept of this front entrance sprang from this Servian Wall, in shape and the desire to integrate it intimately with the design of the new station.

This innate Italian regard for the old is one of the most rewarding facets of their new architecture. In addition to sheer respect, the best modern architects combine the old with the new with a wonderful, contrapuntal shock effect—as exemplified in this station—which works to the advantage of both old and new. No more dramatic statement could be made to emphasize the ancient depth and present vitality of the most fascinating city in the world.

In most countries of the world ancient architecture is either brutally bulldozed away or used as a stultifying model for the new. In Italy, however, the inspiration (and not the circumscription) of the old is a very carefully considered element in the design of the new—a lesson which we could all remember with profit.

G. E. KIDDEN SMITH
Springfield Center, N.Y.

MODERNIZATION Forum:
We greatly enjoyed the entire issue on modernization and congratulate you on the fine presentation.

REXFORD E. THOMPKINS
Executive vice president
City & Suburban Homes Co.
New York, N.Y.

Forum:
We are proud of your presentation of Fotteral Square in the May Forum as an example of the modernization of urban spaces. It seems to us that urban design, civic design or city planning is a direct challenge to many professions ranging from the civil engineer to the architect, in which planners, landscape architects, sculptors and public officials all have a creative job to do. In the case of Fotteral Square, we approached it as an architectural problem, that of creating an urban square which would be one “open-air living room” within a crowded row-house district in old Philadelphia.

However, the presentation contained two serious errors: 1) the project is the work of the office of Robert Geddes and Melvin Brecher and should not have been attributed to one of the partners alone; 2) we make no claim to being professional landscape architects. In fact, a landscape architect was one member of the team that developed Fotteral Square.

ROBERT GEDDES
Robert Geddes and Melvin Brecher
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Prudential Life Ins. Co. Bldg., Houston
Kenneth Franheim, Architect

Rugged Beauty...

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 EVENTS

City and Regional Planning, two-week summer program offered by Massachusetts Institute of Technology, Aug. 23–Sept. 3, MIT. For details address Prof. E. H. Horess, Room 7-103, MIT, Cambridge, Mass.

The Producers Council, annual fall meeting, Sept. 13-14, Commodore Hotel, New York.

Illuminating Engineering Society, annual meeting, Sept. 13-16, Chalfonte-Haddon Hall Hotel, Atlantic City, N.J.


Pennsylvania Society of Architects, annual meeting, Sept. 16-18, Great Lakes cruise on the South American leaving from Erie, Pa.

Midwest Conference of Building Officials and Inspectors, annual conference, Sept. 20-22, Hotel Commodore Perry, Toledo, Ohio.


National Hardwood Lumber Assn., annual convention, Oct. 5-7, Rice Hotel, Houston.

Pacific Coast Building Officials, annual meeting, Oct. 5-8, Denver, Col.

Architectural Woodwork Institute, annual convention, Oct. 15-16, La Salle Hotel, Chicago.

New York State Association of Architects, convention, Oct. 21-23, Lake Placid Club, Lake Placid, N.Y.


North Central States District, American Institute of Architects, regional meeting, Oct. 28-30, Kahler Hotel, Rochester, Minn.
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Small talk on big subjects.

Cover: Olivetti showroom by Belgiojoso, Peressutti & Rogers. Photo: © Eira Stoller
Lavish, unrestrained
and straight from Italy, this

TYPEWRITER PALAZZO IN NEW YORK

is blowing up
a summer storm
among designers

The new Italian Renaissance, unlike some wistful Italian wines, travels well. The latest importation is an intoxicating showroom for typewriters and calculating machines on upper Fifth Ave., a store interior and facade which (except for one sculptured wall) were designed in Italy by a leading architectural firm, made there piece by piece and transported here for assembly as a proud symbol of reconstructed Italian industry. The big display room is also a calculated commercial symbol for manufacturer Olivetti, for it has already proved to be box office along the world’s Broadway of merchandise, Fifth Ave. And as in his company’s other designs (AF, Nov. ’52) Olivetti here attains popular success not by going down to the mythical infantile level of public taste, but by attracting the public up to a professional design level.

But professionally, the new showroom has cast a chunk of richly veined Italian marble into the recently placid surface of New York advanced design. There are arguments at cocktail parties and in drafting rooms about this design, not because of the mastery of its execution, uniformly applauded, but just because of its own bold basic esthetic. Against the current preference for sharp, staccato, surfacey, angular shop design, emphasizing lightness and transience, this new Olivetti showroom opposes weight and hearty exuberant voluptuousness. It has deliberate excesses: a door 16’ tall, only 41” wide, solid walnut, in the otherwise glass front of the shop; a floor of beautiful marble which seems to have been pulled up like taffy to form display mounts for typewriters and calculators. Other boisterous touches (see next two pages) have combined to cause something of a turmoil of conscience in the profession. Some would like to dismiss this finished design as a baroque retrogression, but they cannot. For this showroom, bold, intricate and exciting, clearly is a step, perhaps a leading one, into the uncertain future of US shop design, which must always keep changing to keep the customers interested.
... its display devices are rich and bold

The great door, 16' x 3'-5", of matched walnut sections, has continuous brass hinge, can easily be hand operated, but is hard to keep quietly lubricated in New York's damp summer weather.

Suspended lighting fixtures are Venetian blown glass in spiraled colors, made by Venini of Murano. Spotlights are set in their tops, aimed at display stands below.

Display stands for machines are spotted around store (with one outside the glass wall near the sidewalk). Continuations upward of the floor, they are a rare malachite-green marble, quarried in a cave near Ivrea, the Italian headquarters of Olivetti.
Exterior sign comes close to qualifying as sculpture in both design and execution. Brass, inset into green bronze, it spans one of two bays of the building front.

Continuous conveyor revolving around wheel was intended to deliver typewriters up from storeroom below, but New York building laws prohibited the hole in the floor. The "pater­noster" has become a display.

Furniture was designed by architects. Cove lighting both above and below the "Sand Wall" gives its bland color a margin against the forceful colors of the materials which surround it.

Pale pink Condoglia marble is used for tabletops like the crescent above and the wall table (above left). Edges are tapered delicately.
... its plan is simplicity itself: a single big room with a floating mezzanine.

The big room, viewed from under front of mezzanine. Except for the very tall walnut door, the front is glass.
Stairway under rear of mezzanine leads to storeroom in basement. Beyond right wall are private elevators to Olivetti offices upstairs.

Mezzanine for office workers hangs toward back of store. Ceiling is a lively blue. Wall at right is painted sand color, has flues set into it. Note lighting cove at top and bottom of this wall.

Looking down from mezzanine on pink marble table against green marble floor. The table is "modern," but of poetic shape as well as material, and capsules the spirit of the whole design.
ENVIRONMENT and BUILDING SHAPE

Jet airplanes and fish are formed and modeled by the impacts of exterior environment. These storage tanks are shaped from within, like most buildings, whether they contain oil or house humans. But now, new research indicates that the masses of our buildings can be shaped to fit their exterior environment too, as are jet planes and fish.

It is easy to predict theoretically that the four different climates of the US (chart above) should require at least four different basic building shapes. Hundreds of years ago Vitruvius succinctly said why: "... the style of building ought manifestly to be different because in one part the earth is oppressed by the sun in its course; in another part the earth is far removed from it; in another it is affected by it at a moderate distance..." Our country, whose areas vary in climate as widely as they do in Sweden and Somaliland (Vitruvius did not even think of humidity), has cities looking remarkably alike. Yet a square, dense office building in the tropic of Louisiana may be as "unevironmental" as a fish out of water and a long lean slab in the subarctic of Minnesota may be a jet plane out of air.

The four reasons against regionalism of big buildings in the US have been:
1. The rush into construction which often precludes thorough design.
2. The air-conditioning and heating industries, which can correct any architectural mistake in climate, though for a price.
3. The lack of architectural research telling how a building should be shaped for any given climate. Only designers' instinct and old architects' tales have been available.
4. The assumption among architects and owners that there is little to be gained in shaping big buildings to conform with climate (shaping, not just orienting, or sun-shading).

But now this void of information is beginning to be filled. In this continuation by FORUM of the review of the research of Architects Victor and Aladar Olgyay at Princeton University's architectural laboratory, readers can discover what basic building shapes in the four climatic regions of the US should be, and why. The right shape building is not only an esthetic nicety, but can also save up to 10% in heating-cooling loads.
The impact of thermal forces on buildings . . . and their effect on various shapes . . .

How to read the charts above: Four cities were selected inside the US to investigate the effects of climate on structural shape, representing the various typical areas. The coldest (Jan. 21) and warmest (July 21) days were chosen in each region to indicate for winter (left) and summer (right). First measure of impact of external thermal forces on a building dealt simply with air temperature and radiation.

Each concentric circle represents with each line a 2°F fluctuation of outside air (based on the lowest daily temperature). White arrows show direction of radiation impact; i.e., where the sun stands as the marked temperatures occur. Black arrows each represent 250 Btu's per sq. ft. per day direct radiation impact on various sides and on flat roof of typical building calculated on clear days. Diagrams are based on total radiation; i.e., the total effect of direct and diffuse energy.

Graphs of various plan shapes in each of the four climatic areas were used (above) to determine which shapes are most favorable thermally—those optimum shapes, for each locality, that lose the fewest outgoing Btu amounts in winter, and receive the fewest incoming Btu's in summer (diagrams of the plan shapes are atop charts; numbers give ratios of lengths of sides). The building assumed covers 10,000 sq. ft., is one story high, and has insulated frame construction, 40% glass on the south wall, and 20% glass on the other walls. The thermal impacts on the interiors of the buildings were computed on a quantitative basis, and the combined effect of temperature and radiation was calculated with the heat-flow method. On the graphs, the amounts of heat received by the square building both in winter and summer were considered as starting points.

Interpretations:
1. Adverse air temperature acts to compress buildings into a compact form to present the least surface.
2. Radiation tends to elongate certain sides, usually the north and south, to receive more sunlight.

Indications:
1. All the shapes elongated on the north-south axis work both in winter and summer with less efficiency than the square one.
2. The square building is not the optimum form in any region.
3. The optimum lies in every case in a more elongated form somewhere along the east-west direction.
suggest four optimum building plans

The four optimum plan shapes are shown in block form, and in typical schematic plans. Starting from the basis of the square plan, the optimum shape for each climate is indicated above. The shaded extension at the right of the square in each case denotes the area of "stretch" within which the plan proportions are generally good, and the specific optimum is lined—in each case the cheapest to cool and heat. How much cheaper than the square plan?

<table>
<thead>
<tr>
<th>Location</th>
<th>Heating Comparison</th>
<th>Cooling Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minneapolis</td>
<td>1.4% cheaper</td>
<td>1.6% cheaper</td>
</tr>
<tr>
<td>New York</td>
<td>4.5% cheaper</td>
<td>4.2% cheaper</td>
</tr>
<tr>
<td>Phoenix</td>
<td>20.7% cheaper</td>
<td>20.9% cheaper</td>
</tr>
<tr>
<td>Miami</td>
<td>16.3% cheaper</td>
<td>8.1% cheaper</td>
</tr>
</tbody>
</table>

Schematic plans show how the knowledge can be applied. The New York plan, for instance, is bent to the NE, to show flexibility in direction in temperate zone. (This study concerns shape of building mass only.)

The percentages in Minneapolis are small because the square form is very near to the optimum. Here a comparison to a 1:3 plan on the east-west axis would be more eloquent, where the saving in winter heating will be 13.9% and in summer cooling 6.8%. Other comparisons can be read from the graphs.

As buildings grow upward, the volume effect changes the scale of climatic impacts. The cause is the obvious geometric law that the growth in a linear direction is on the first power, in a surface on the second power, and in volume on the third power. This means that the same form enlarged four times will scale down its proportionate surface and hence the environmental impact to \( \frac{1}{8} \).

Shown (above) are good multistory solutions for various climate types. In general the stresses in climate like Minnesota's and Arizona's are about \( \frac{1}{2} \) times greater than those in Miami and New York, therefore it is eminently advisable to build up masses in cold and hot, arid regions where the adverse impacts are excessive.

In the cool zone, closed compact forms are preferable, because of their relatively dense cubature. Elongated unilateral buildings are not favorable. The environmental pressure definitely suggests higher buildings.

In the temperate zone there is the least stress from any specific direction, therefore this environment allows considerable freedom in form. However, forms on the east-west axis are preferable.

In the hot-arid zone massive shapes are advantageous. Cubical, or slightly elongated forms towards the east-west axis are most adaptable. High buildings are preferable.

In the hot-humid zone elongated buildings in the east-west direction are good. Buildings located on the north-south axis receive relatively the most penalty compared to all the other climatic zones.
Towns too should be shaped by climate

Although the forms of towns and cities represent composites of influences ranging from racial problems to sewage layouts, they are ruled by the same tendencies and characteristics that influence single buildings. One good example is the portion of an Arab village in Tunis shown above. Under the excessive stress of a hot-arid environment, individual dwellings congregate and pile together in collective mass protection, much as the spurge plants do (shown on p. 105). Here are other guides for the town planner, with illustrations, right:

In the cool environment the layout should provide shelter against winds. Larger building units should be grouped closely, but spaced to utilize beneficial sun heat treatments. The houses should be joined to minimize heat loss. The correct town structure in an isolated, dense layout.

In the temperate zone plans can be open, with nature and houses merging. The town structure should utilize the possibilities of a free arrangement.

In the hot-arid zone the walls of the houses and the gardens should shade both the living areas and the street like a horizontal egg crate. Unit dwellings should be arranged around closed courtyards imitating cooling wells. Here the town layout should react against the heat with shaded dense structure.

In hot-humid areas the buildings should be elongated, and this should be emphasized in the layouts. Separate the buildings to utilize air movement; shade trees are important. The character of the town fabric should be scattered and loose.
Expansible hospital uses two kinds of framing for two kinds of planning:

1. Cantilevered concrete for the long, narrow nursing wings
2. Steel frame for the compact medical core

This hospital is notable because Architects Pereira & Luckman have recognized that the nursing wing and the medical core of a hospital are basically two different problems. They laid out the building so that structural and planning solutions chosen for one of these elements need not hamper what was done in the other.

The nursing wing is lengthened, creating wider rooms, so the patient in the inner bed can see out the window past his roommate on the opposite side, even when his roommate's bed is screened. To achieve this generous space economically (28' bays in maternity wing, 24' in general nursing), and to get maximum window area uninterrupted by columns, they chose a cantilevered concrete and pan-joist construction.

The medical core is compact (tightly relating all clinical, diagnostic, central supply, surgical, delivery and emergency facilities) to consolidate supervision, personnel and supply, reduce the cost of air conditioning, plumbing and electrical work. To get flexibility for possible future rearrangement and for horizontal expansion, the architects framed with steel trusses over much of this area, eliminating columns, and built all walls and partitions (except earthquake shear walls) of easily removable metal lath and plaster.

Costs (including Group I equipment and architect's fee): construction: $1,383,724; $21.96 per sq. ft.; $16,280 per bed, based on normal capacity of 85. Financed by Hill-Burton, state aid and $800,000 local bond issue.

Glazed facade of nursing wing is given room-scale by fins and perforated horizontal sunshades
Site plan and floor plan provide for lateral expansion in three directions

The medical core can be expanded three different ways with minimum disturbance to the hospital's operation and with minimum alteration costs: 1) south side of core can get 35' addition containing two new major operating rooms and additional clinical area for recovery, X-ray and so forth; 2) delivery can be converted to surgery, labor-room space can give leeway for clinical expansion, with maternity wing converted to acute surgical nursing and separate, complete maternity pavilion can be built; 3) entire east wall of core can be expanded over service court with additional operating rooms at surgical end, additional delivery rooms at maternity end, clinical expansion between. The architects are realistically aware that medical changes five years hence will possibly make any one of these expansion plans impractical, are relatively certain parts of all three will be adopted, think that expansion in three directions makes good insurance. Convalescent unit will likely be added to north of hospital.

Present elevators are considered adequate for future expansion, with possible addition of hydraulic lift between core and service floor below.

Ambulatory patients use the same entrance, reception, business and record facilities as inpatients, and use treatment areas associated with emergency suite. The ambulatory load is expected always to be very light because the hospital, in a well-to-do suburb of San Diego, is a considerable distance from doctors' offices. This distant location will unhappily limit the hospital's usefulness in a field of service increasingly important to both doctors and patients. It also will limit the hospital's potential income from ambulatory use of the medical core.
Nursing-wing structure yields full windows. Orientation is actually northeast-southwest, hence vertical shades on both sides. Note good relationship of nurse's station, consulting room, elevator, waiting.

Stone-faced stair block at west end of general nursing wing has fully glazed end wall. Fourth story will be added when needed.

Cantilevered concrete nursing wing will carry vertical expansion

Nursing-wing construction was chosen after the architects investigated nine possible schemes and computed comparative costs. The three leading contenders:

- Concrete frame and pan-joist, suspended ceilings, 24' x 32' bays, $2.18 per sq. ft. (scheme chosen).
- Plate girder cantilevered over columns fireproofed with lightweight aggregate plaster, suspended ceilings, 24' x 32' bays, $2.41 per sq. ft. (Rejected on cost and tight duct space through girders.)
- Lift slab with columns 24' o.c., three columns to slab width, $2.08 without ceiling, $2.38 with. (Rejected because not suitable for all nursing areas and because ceiling would be needed in most instances.)

Other schemes investigated were a more suitable but more expensive ($2.51 with ceiling) lift-slab construction with two columns per slab width, and various combinations of steel beams and columns fireproofed with lightweight aggregate plaster. Costs varied from $2.25 per sq. ft. for 2½" concrete slab, suspended ceiling and 16' x 12' bays, to $3.09 for steel decking with lightweight concrete fill, suspended ceiling and 12' x 20' bays.

Normal bed capacity of nursing wings is 85, but with virtually all rooms used for two beds, peak capacity would be 105. Vertical expansion of nursing wings will bring normal capacity to 200, peak or emergency capacity to 250.
By day, simple glass and stainless-steel front meets competition from commercial neighbors.

By night, inviting lobby and both floors go on display from street.
puts its split-level floors on public display and under easy supervision

Unlike most libraries which hide from people behind a landscaped plot and a parade of pillars, Philadelphia's new Mercantile Library is an extrovert. Its open show-window front removes all library mystery, does away with steps, makes using books seem natural, easy, popular.

Tired of rattling around in a cast-off railroad depot, the library two years ago traded the property with the local parking authority for a new lot, plus $350,000 of building money. At the same time, it gained a better address (on busy Chestnut St.) and an opportunity to erect this attractive building—both of which have boosted the library's patronage. Finally, it won the top award in the annual exhibition of the local AIA chapter.

Because the lot is only 35' wide and is squeezed between tall buildings, the architects suggested not the usual monumental public building, but a glass-fronted structure which would meet the competition of its commercial neighbors. Through this transparent front passers-by plainly see the inviting lounge at street level and both of the two working levels which are staggered a half flight up and down. (This arrangement also helps the circulation desk in the mezzanine lobby control the other two floors.) The view into the 163'-long building is improved by the even fluorescent lighting through continuous transverse strips of corrugated plastic suspended between acoustical baffles. This luminous ceiling is also part of the air-conditioning system, for it is the lower face of a plenum (see section above) which feeds conditioned air into the building through the loose joints between the edges of the corrugated plastic panels and the supporting acoustical baffles.

A division of Philadelphia's Free Library System, this building has shelf space for 40,000 volumes and a circulating stock of 10,000. Construction cost: $298,000 (including $16,300 architectural fees and $9,500 engineering fees), or $24.73 per sq. ft.
Upper level is divided into reading "rooms" by free-standing book cases. Above shelves, warm buff-colored cinder block is left exposed.

Both library levels are lit by luminous ceilings.

Lower-level reading area is half flight down from entrance lobby. Woodwork is mainly maple and red birch; floor is asphalt tile. Note luminous ceiling of corrugated plastic strips supported between acoustical baffles.

MERCANTILE LIBRARY, Philadelphia
SIDNEY E. MARTIN, architect
HARRY G. STEWART
& ROBERT W. NOBLE, associates
CHARLES S. LEOPOLD, mechanical engineer
WILLIAM H. GRAVELL ASSOCIATES, structural engineer
FREDERICK W. PECK, landscape architect
IRWIN & LEIGHTON, general contractor
Reading area at rear end of first level extends during summer months out into small landscaped court which otherwise serves as light well.

and rear walls of glass

Wall of glass at rear of building opens both floors to garden, compensates for absence of windows along side walls.
Front facade of classroom wing. Glass-block panels are set into steel frame, alternating with brick panels and clear glass.

Central courtyard is sunk below ground level of classroom wing, functions as service space for the shop wing (right). Gym-auditorium wing (at left) has wide gallery windows.

Handsome entrance to auditorium-gymnasium wing. Beams of structure are left exposed in brick exterior wall.
Several years ago Parkin Associates were engaged to design the York Hydro Plant at the end of a long stretch of land outside Toronto; a year later, they won the opportunity to design a vocational high school for that stretch of land itself. That they have been able to bridge the two clients—the Hydro Commission and the Board of Education—and create a common interlocking scheme of coherent siting and architecture, a good-looking harmony of diverse public buildings, shows the wide applicability of today’s design techniques and shows also the designer’s large view.

The school (shown on these pages) is split with industrial directness into three wings: classroom, shop and community center. The first of these is long and lean; the others are bulky. Only minor circulation is needed between the classroom wing and the massive shop wing; the curricula pretty well split the students either to academic or shopwork. The third unit has facilities to be used by the whole community—auditorium, gyms and exhibition gallery—and it too forms virtually a separate structure in function. Structurally these facilities also are isolated, to be used at night without lighting or heating the whole school.

Natural lighting is one of the big pluses endorsed by the users: directional glass block is used to advantage on the east side of the classroom building, and a big sawtooth-skylight roof floods the shops with light—particularly important since this wing is dug into the ground to avoid overshadowing the classrooms.
Skylighted shops. Partition walls, which go only as high as necessary for functional division of space, allow the bath of natural light to flood equally through the space under each rigid-frame sawtooth skylight.

Its interior, too, has the efficient look of an industrial plant

**George Harvey School**

York, Ontario, Canada.

- 12 student classrooms, three commercial rooms, 3 typing rooms, 2 music rooms, food preparation laboratory, sewing and homemaking room, physics and chemistry rooms.
- Shops for building trades, auto, electrical, cabinet making, machining.
- Drafting room, blueprint-reading room, barber shop.
- Double gymnasium, exhibition gallery, auditorium seating 500, library with protected terrace for outdoor study.

**Construction:**

- Steel frame, with brick, glass and directional glass-block fillers.
- No wood used in entire building.

**Cost:**

- $1,263,000, excluding land (480' x 500' plot), landscaping and furnishings.
- $13.15 per sq. ft.
Classrooms, well-separated in their own wing from noisy shop and gymnasium wings, are liked by teachers and students for their light, airy quality (glass block is east).

Gymnasium can be split with large folding partition. Its edge is shaped to fit the irregularities of the mezzanine seating space, which also is divided in two.
Industry builds

KITIMAT
America's "new town" prototype

The story of its planning told by the planners* (continued from the July issue)

Kitimat is now being built in the British Columbia wilderness, under direction of the Aluminum Company of Canada, Ltd. The first neighborhood will be occupied this summer. This is, as FORUM said, "the first completely twentieth-century 'new town,' completely new, completely modern, in North America."

One kind of opportunity in Kitimat is shown on the map; the other, almost more important, was the opportunity to learn how to get modern planning off the map, off paper into a living, effective program.

On the map, Kitimat is a realization of guiding ideas long seeking an effective outlet: the Garden City idea that a town should be planned for calculated expansion, after which new growth is in a separate new community; the Radburn idea of separating through traffic from the pathways of the local citizen; the Greenbelt idea of surrounding a well-defined town with a belt of farm and forest in place of amorphous "string" development; a balancing park and greenway system within the town; and finally the idea of the neighborhood.

Off the map, the Kitimat project gave a chance to work out methods so the planning could be realized as visualized by the planners, not hurt and upset all along the line by incomprehension.

The story in this issue deals with the brand-new idea of a separate service center for the city; with the planning of the first neighborhood unit; and with the development of the first neighborhood center.

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Charged with Kitimat:
Vice President Du Bose of Alcan

THE PLANNING TEAM
CLARENCE S. STEIN
MAYER & WHITTLESEY
coordinator and director of planning; architects, engineers and
town planners;
Roger Willcox, assistant
M. Milton Glass, associate

* Through an error the first installment was called "the planner's story" instead of "the planners'" in the plural. Several contributed.
The service center is perhaps Kitimat's most original contribution to town-

Kitimat's service center combines ideas taken from Planned Industrial Districts (AF, April '54), Regional Shopping Centers (AF, June '54), roadside observation, common sense.

The center is basically a device for taking out of town but close to it the “dirty” or “working” side of town, combining it with stuff usually strung out along the roadside, working both into a planned, designed complex more attractive and more economical.

**Elements brought together** “outside town” include: 1) rail-side facilities—freight yards, warehousing, building material and contractors’ yards, public work yards; 2) land-eating operations that cannot afford downtown prices and are usually messy—heavy repair, auto repair (showrooms associated with this for convenience), laundry, milk plants, bakeries and the like; 3) service to the center’s work force—eating places; 4) limited retail outlets attached to sheet-metal shop, the lumber salesroom, the electrician.

The advantage of association together is that none of the activities is large enough alone to command correlated service facilities, eating or recreation, which all descend into the isolated road-defacing hot-dog roadstand type. Grouped together, these facilities command profitable services attracting better shopkeepers, and creating a dignified place.

Adjoining or outlying from the service center are sites for light industry not requiring direct access to the port.

**Major features of the plan:**

1. Initial development may start using cleared areas and alignments already established in the field.
2. Each major land use may be expanded from the central area so that a consolidated development may be maintained at all stages.
3. Simplicity and directness of circulation at all stages.
4. Adequate industrial siding without deep penetration of rail into site.
5. Economical operational layout for sidings so as to avoid high costs for switching.
6. Industries requiring relatively large sites may expand back from their rail sidings.
7. Concentration of warehousing in one area adjoining freight yard.
8. Central entrance square for consumer appeal frontage.
10. Consolidation of CNR facilities including housing site close to station and freight yard. (The latter is Canadian practice.)
11. Development all on one side of main rail lines.
12. Area for independent industry at north end of center.
13. Town-to-plant traffic may by-pass main intersection at central entrance.

**Size of service center:** the center is laid out with a liberal site area, with street and rail allowances for the various uses. The areas shown will probably prove more than ample. They could be further consolidated if all elements of the center were strictly controlled by one proprietary corporation with a formulated engineering concept for transit, storage, distribution, etc., tailored to known or prearranged retailing and service methods. On the other hand the areas shown could prove quite inadequate if there were complete absence of proprietary policy on these matters, and if there were no control of location, amount, tenure and use of land. Under such circumstances an efficient center might evolve only after years of costly adjustment, excessive road and utility building and filling.

The plan contemplates that the service center will not be subject to either extreme, namely complete proprietary control or complete absence of control. In other words, the land area shown is considered an envelope within which there is room for
planning techniques

give and take but not room for wasteful or inefficient relationships. Large initial land allocations for first occupants are avoided that would lead to a spread-out and costly layout.

Warehousing: among the policies recommended is that of establishing or encouraging consolidated warehousing to serve several businesses. This policy alone can save much in land and utilities. It can save friction and the expense of building and operating a horde of small individual storage facilities. This applies particularly to the transit storage and warehousing of community-support rail cargo. We believe that this policy, if adopted, will encourage those wishing to go into business in the service center.

Land leasing: another policy recommended is lease of land, rather than outright sale, with right of recapture subject to purchase of improvements made by the lessee. Outright sale of land may often block later adjustments beneficial not only to the service center as a whole but to the individuals doing business.

(A similar concept underlay the planning of the city center—see July issue, p. 146.) Initial arrangements, while efficient and satisfactory at an early stage, must often yield to expansion and moving of businesses, at later stages. Unless expansion and relocation within the service center is facilitated in an orderly way under the master plan for the service center, the later stages can become chaotic and more costly to users. There is a twofold purpose in back of land leasing. Firms going into business in the service center should be assured they can expand easily later on, and need not protect themselves today by taking up all the land that they may conceivably need tomorrow. It is also to Kitimat's interest that these firms should not be in a position to dispose in any way they see fit of excess land, or of land from which they move as a result of expansion on another site to which the service center may have spread.

Location factors:

Services having consumer outlets and need for display are on or close to the central square and the station plaza. Those likely to need early expansion calling for sidings are on main railroad line in the block closest to station. Temporary large yards on leased land beyond this and adjoining the main line.

Independent Industry, not primarily dependent on the community, is kept off the valuable and limited space in the service center proper, is placed north of the warehousing and freight area.

Warehousing for community-support cargo is concentrated next to the freight area and has separate track sidings. Initial warehousing will not be built to full block depth. Expansion is possible laterally and in depth.

Public works, which require rail siding, adjoin main line. Larger service industries using rail spurs are separated from those requiring less rail frontage.

Automotive prime sales space is on the entrance square with accessory businesses close by.

Commercial space is strictly limited to serve the working population of the center when at center and to avoid competition with downtown business. The commercial center may best be built as a whole and leased, so as to retain architectural control at a focal point of the center.

Parking and loading is mostly off street.

Zoning: land use is classified under the following major heads:

- Service Industry
- Warehousing
- Automotive
- Public works

Commercial
C.N. RR land
Independent industry

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Kitimat is based on neighborhood concepts; first neighborhood for 5,000 is under construction

The best neighborhood size is one that can support a local shopping center and right-sized elementary school as the two focal points of local culture. Starting from a norm of about 1,500 families and distances not to exceed 1/2 mi. from the center, we were less concerned with pinpointing an exact standard than with setting the permissible extremes of deviation. Kitimat's irregular conformation and our aim of setting up a range of different living characteristics meant we must be better than strictly statistical.

Intangibles can override accepted ideas of economies. For example, too big a neighborhood center sets up habits that draw economic and cultural strength not only from other neighborhoods but from the city center too. Topography, configuration, concentration or dispersion count also. A given distance to local shopping may be convenient in a low-density area but unacceptable where density is high.

The neighborhood optimum was found to be about 1,200 families which would support one supermarket plus competitive food stores in the same center, and two elementary schools of 300 to 500 pupils. The minimum figure was 500 families who could support one supermarket and school. This minimum would be socially desirable only under favorable circumstances of density, income, location, natural physical boundaries. The maximum figure of 1,800 families was limited chiefly by the distance of the more remote households. Such a center could develop two K-6 schools and two K-3 schools, all of maximum desirable size.

Every neighborhood has a periphery, a circulation system, a neighborhood center

Peripherals are through roads which carry traffic around neighborhoods not through them, which provide alternate main routes and shortcuts connecting different levels of town, which flow by and around the city center, and which take people to Minette Bay.

The internal circulation system of the neighborhood, and indeed of the whole city, is a greenway system balancing the peripheral paved throughways. These pedestrian greenways, which widen into parks at the center of the neighborhood, serve to interconnect home, local shopping center, school and recreation areas of all sorts and sizes ranging from yard to park to wild ravine to surrounding greenbelt. Underpasses interconnect greenways and provide a safe way to school, where grades permit.

Local access roads lead inward from the peripheral throughways in the form of loops or cul-de-sacs producing a lacy fringe of houses around the central park. These access roads are of no conceivable use to through traffic and are cheaply built.

Local stores, limited to three locations per neighborhood, are really small, about 700 sq. ft. including storage, have very moderate parking space, and are not closer than 1,000' to the neighborhood center or to one another, so they serve strictly for local convenience. They came in through the recommendations of Lewis Mumford; on seeing plans for Greenbelt years ago, he said: "Isn't there something you have forgotten—the little neighborhood stores where you could get a spool of thread or a loaf of bread?"
Neighborhood A—the pilot neighborhood

Neighborhood A was chosen as the first to be developed, because its high land would dry firm faster than other, low, land apparently more accessible, but still damp and requiring drainage. Rending the beautiful high forest was a heartache, mitigated as light and warmth, air and beautiful views began to come through.

Based on trial density figures established by studies of housing composition, Neighborhood A called for relatively high density and a generous ratio of multiple housing to single housing. This was partly because the first neighborhood must absorb heavy costs of utilities and roads, attributable to the city as fully developed, but meanwhile levied taxwise on a relatively small town.

Density was expressed in families per gross acre of buildable land within the neighborhood (after excluding gullies and ravines), including allowance for grade schools, internal parks, the neighborhood center, sites for public and institutional buildings and roads within the neighborhood. Neighborhood A was projected with 40% in single and twin houses, the balance in terrace and row houses and apartments. This composition, as applied to the difficult configuration of Neighborhood A, resulted in a density of some five families to the acre. A density of 4.5, however, applied on the easier land of Neighborhood C, would permit a considerably greater proportion of single-family houses. The density where only single houses were contemplated, on larger properties, as in outlying neighborhoods scheduled for later stages, was taken at three families per acre.
The focus of the neighborhood is its community center

... which provides shopping for daily necessities, for cinema, churches, and school and community building in conjunction. Usually the school is a grade school, but in Neighborhood D it will be a junior high, drawing from two or three other neighborhoods as well.

The local shopping centers are planned around small pedestrian malls. Parking is off street in back of the shops. One may reach the shopping mall from the street, or from the internal park or from the parking areas. This is not simply a roadside store group where parking, pedestrians and service all vie for the same curb and sidewalk.

The school is sited between the shopping mall and the park. This sets it somewhat apart from the center proper. Classrooms are on the side away from it and toward the park. The administration and assembly of the school are toward the center. But when leaving the shopping mall to reach the school, one first passes the community building. So the school, though detached, is closely related to the center and particularly to the community building, which in fact may actually connect with it. The intention is to promote dual use of school facilities for community activities, and to connect parents more closely with the affairs of the school, because of its proximity to the center, which they frequent.

A hostel for single workers is another social link in the neighborhood center, closely tied in with the community center building. It is estimated that about 20% of the workers will be single men (aluminum and pulp processes require mostly male labor), among whom about three fourths are expected to live with families either as lodgers, or as relatives of families. The hostel is for the others who in so many cities gravitate to a segregated downtown cheap hotel which has little relation to the community as we think of it. Placed at the neighborhood center, the hostel will bring an element of "town life" close to the pavement and to public transportation, while linking single workers with the local community life and families.
First neighborhood center faces in on mall and is surrounded by parking. Commercial buildings, in site plan by Semmens & Simpson, are nearest street. Hostel and recreation buildings toward rear of mall are closest to school (by Sharp & Thompson, Berwick, Pratt). Construction will be in stages. First units to be built are shown black-topped in model. Rendering above shows supermarket, shops & offices.

(To be concluded in our next issue)
Main entrance opens into reception hall from covered gallery, with offices at either side.

WINDOW MAKER'S OFFICE IS SHOWCASE

ANDERSEN CORP. office addition
LOCATION: Bayport, Minn.
BROOKS CAVIN, architect
JOHNSTON & SAHLMAN, structural engineers
RICHARD W. EVANS, mechanical engineer
THOMAS ROCHE, electrical engineer
ALONZO HAUSER, murals
GEORGE SIEGFRIED, general contractor

Rear entrance opens on employees' garden. Note orderly, easy-appearing incorporation of many window types in building's exterior.
Who can get more excited about use of a building material than the people who make it? Answer: an imaginative architect.

When young Architect Brooks Cavin was called in on this job, the scheme was simply to add workaday one-story and basement space at each end of a too-small office building on a factory site. As the architect studied office needs, he became convinced that a single one-story addition would do a better job and in the course of rethinking that problem he began to envision the new building in an advertising role—a striking demonstration of his client's products. Thus came the idea for the building's most charming and dramatic feature: a domed, skylighted inner garden as a "residential" background for display of the client's windows.

Building procedure was unusual. Individual suppliers and contractors were negotiated with directly, the client's plant engineer acting as coordinator. This simplified handling changes. The architect reports: "I do not believe the same quality of space would have resulted from the normal method of taking competitive bids on contract drawings. Many of the pleasing effects resulted from living closely with the building as it grew and determining some of the finishing details on the job.

"This also turned out to be one of those rare instances where the client has followed through with the complete design, instead of cutting out special features in an economy drive—and thus cutting out the life and sparkle of the project.

"The role of the plant engineer, who has an architectural background and a viewpoint both sympathetic and challenging, was very important. He facilitated interchange of ideas between architect and corporation so each decision balanced architectural effect and effect on business operation."

Cost, including fee, was $223,564; $22.10 per sq. ft.
Domed inner garden, tantalizingly glimpsed from entrance, also provides delightful vistas from work area

Office space is well planned, well lighted

Storage wall between general office and display room has sliding-door coat closets; rear of conference-room storage unit is at right.

General office has all-purpose ceiling (radiant panel heating and cooling, acoustic control). Chosen late in program, it faced delay, "but was worth it."

THE MAGAZINE OF BUILDING
Reception area looks out on garden and perforated corridor wall beyond. Architect reports both factory and office employees realize building's drama represents good business and directly benefits them through company's profit-sharing plan.

Typical private office shows fruits of architect's close attention to all details of furnishing, fabrics and lighting.

Engineering offices have luminous ceiling, downlights. Several days' open house for workers and families preceded opening building to public.
**Dome structure** consists of ¾" welded steel bars; wood members hold glass, insulate steel. Design is frankly empirical; visual pattern, rather than mathematics, determined divisions.

**Glass dome creates climate-free patio in center of showcase office**

Display and conference rooms, separated by sliding partition, look out on glass-topped, always-summer garden, a charming setting for display of windows.
Lucy dome, inspired by work of Buckminster Fuller, makes greenhouse of central garden, gives spaciousness and sparkle to inside rooms and highlights architect's deft use of color and materials in interior. Complete design job, including furnishings and landscaping, was entrusted to architect.

Pierced brick wall screens office corridor from garden and conference room. Photo (at left) is taken at juncture of this corridor and general office space, looking through conference room to garden court beyond.
Can your city put its downtown railroad

From the dawn of history cities have grown up where transportation is cheapest. In the last century the great cities grew up around the passenger and freight terminals of the railroads, which offered the cheapest, fastest transportation. Today, these railroad facilities cover much of the best land in almost every city.

The past 20 years have brought a revolution in transportation. Electrification, the Diesel engine, trailer trucks and now piggy-back freight—all are bringing big changes in railroading. And these changes in railroading are bringing big changes in what land the railroads need downtown, big opportunities for almost every city to solve some of its worst problems by making better use of land—and air rights—the railroads no longer need.

For example, electrification enabled the New York Central to cover its tracks into Grand Central Terminal with Park Ave., and its flanking apartment and office buildings. Today the Diesel, which
Chicago has not

Railroads made Chicago the hub of the nation, but now the yards all around the Loop are at once the No. 1 problem and the No. 1 opportunity for better city planning. In fact, the railroads own so much land in the heart of Chicago that it may be years before the city's economic expansion can put all of it to better use.

The new Prudential building (AF, Aug. '52) starts the exploitation of the air rights over the lake-front tracks. Consolidation of the railroad terminals east of the river hinges on the creation of a terminal authority able to assure the carriers that a modern union station would not be penalized by higher city taxes (as it was in Cleveland, Cincinnati and Syracuse).

New York City has

At least part of Manhattan's railroad property is being put to good use. The photo (above) shows the Grand Central area in 1906 (looking south from 50th St. and Park Ave.); the one below shows the same area today. By building a mall and a parkway over the tracks, the surrounding property has been turned into one of the city's top apartment and office sections.

Now William Zeckendorf plans to put up the world's largest commercial building over the Pennsylvania's tracks on Manhattan's west side.

land to better use?

has almost replaced the smoky steam engine, has made it possible for any railroad and any city to use such air rights without the cost of electrification. Many are already doing so (see p. 140).

In the days of horse-drawn trucks, shippers wanted the rails to carry the freight as far downtown as possible, and so many freight terminals are right in the heart of the city (in Chicago, the rails cover nearly half the land between lake and river around the Loop—photo above). But with today's motor trucks, it might be far easier to pick up goods from terminals on cheaper land a little farther out, where the trucks would not be trapped in traffic congestion.

Now comes piggy-back freight to combine the pick-up economy of the trailer truck with the long-haul economy and speed of the 100-car freight train. Will this offer the biggest opportunity of all for re-using downtown railroad land more efficiently? (See p. 142).
By putting its downtown railroad land to better use...

Atlanta may heal its cut
Today, Atlanta's business district is scarred by a deep railroad cut. Here is Architect Henry Toms’ plan for "Peachtree City," which would deck the tracks over with a pleasant mall, make the land now blighted along the tracks a prime site for new offices, stores and badly needed parking.

Boston plans new center
On this 28-acre railroad yard the Boston & Albany wishes to abandon, Roger L. Stevens had famed Architects Belluschi, Gropius, Bogner, Koch, Stubbins, et al. plan a $75 million business-entertainment center (model below) in the heart of Back Bay (AF, Nov. '53).

Philadelphia is rebuilding
When the Pennsylvania Railroad gave up an obsolete terminal and right of way that was lowering downtown property values, it insisted that the site be used for a fine Rockefeller Center-type development. Now Realty Tycoon Bob Dowling, City Planner Ed Bacon, Architects George Howe and Vincent Kling, Builders Uris and the Sheraton Hotel chain are all in the act (AF).
Pittsburgh redevelops its Golden Triangle with office towers in a park

Some of the 59 acres for Pittsburgh’s famed redevelopment at the tip of the Golden Triangle were either used for or blighted by a freight terminal and a station. The latter was abandoned, the former replaced by a new terminal more economically located just outside the Triangle. The result is Gateway Center (above and AF, July ‘49, Dec. ‘53) with its three office towers at the northern end of a proposed park.

New Orleans eliminates terminals and crossings

Although New Orleans is not so hard-pressed as some other towns for mid-city commercial property, the Crescent City set up a terminal authority to build a union terminal, thereby got rid of five scattered stations (three of them are marked with an X in the pictures above), speeded up traffic by eliminating half the 144 grade crossings where all cars had been required to stop, look and listen. The remaining grade crossings are used mostly for freight movements at night. The terminal authority may be the model for solving similar problems in other cities.

Sacramento seeks a waterfront park

The railroad right of way has turned the Sacramento river front into a slum. Now a comprehensive redevelopment plan (AF, June ’54) proposes to build hotels, restaurants and parks where tracks now exist. Willing to go along with the plan, the railroads are prepared either to move their tracks or to have them covered.

San Francisco: rapid-transit use of tracks

Instead of building new rapid-transit lines, San Francisco hopes to save money by renting trackage rights on the railroads around the Bay.

Buffalo will get a freeway

In Buffalo the Lehigh Valley Railroad has sold its right of way into the downtown area to the New York state thruway and disposed of downtown passenger and freight facilities. Reason: with the advent of piggy-back freight (see p. 142), the Lehigh Valley decided that it could operate more efficiently on the outskirts of town. Current plans call for turning one old passenger station into an office building; another may become a bus terminal; and there are plans to turn the freight yard into a truck terminal. Thus, Buffalo will gain a fast highway approach, and some of the commercial facilities it needs in the middle of the city.
Can your city put its downtown railroad land to better use?

Piggy-back freight seeks to combine the best economics of truck and rail by shipping the loaded truck from city to city loaded two to a flatcar. Since trucks already carry most of the freight shipments originating in big cities and most freight movements into big cities not consigned to lumberyards, stockyards and similar trackside facilities, piggy-back freight promises a major revolution in transportation.

For shippers this will eventually bring big economies. For the railroads it will bring big added revenues (the New York Central hopes for $50 million a year). For the highways this may bring sorely needed relief by shifting to steel rails the heavy trucks that now crowd the roads and pound them to pieces. For the cities, it will almost certainly speed up the re-use of railroad land downtown. It will decrease the importance of a railroad siding and so encourage industry to move away from the tracks. It will encourage the railroads to relocate their freight terminals outside the most congested areas.

The full economy of piggy-back freight calls for a radically different kind of terminal, where the freight can go to its car (like a passenger) instead of waiting for the car to come for the freight. Trains can be made up before the cars are loaded, instead of after. Room for the trucks to maneuver will become more important than extra tracks for switching.

Here is one concept of what a piggy-back freight terminal should be like: Tracks are depressed so trucks can drive up level with the flatcar floor, where they can be shunted aboard easily by a lift truck.

The New York Central is now spending $1 million apiece on such terminals on the outskirts of New York, Chicago, Cleveland, Boston, Detroit and Buffalo.
Close-up of terminal shows truck cabs parking trailers and fork lifts backing trailers onto specially designed railroad cars. Since freight is never uncovered, no protective buildings are needed in this type of terminal.

Section shows how terminal track is depressed to bring floor of railroad car flush with terminal floor.

by changing the shape of freight yards—and their location
Design competition helps Brownsville build

**Jury comment**

**FIRST PRIZE:** the outstanding characteristic of early Brownsville architecture was the direct and straightforward simplicity. . . . In placing this design first, the jury felt that it was following in the footsteps of the early Brownsville builders. The first-prize design appeared to be the most direct, the simplest and most straightforward of all the 25 designs submitted. . . .

The required elements of the civic center are well integrated in this plan. The clarity of circulatory elements appealed to the jury; it was felt that even a stranger could find his way about easily. Sufficient means and areas for handling large crowds appear to have been well devised. . . .

**SECOND PRIZE:** this design reflects many of the commendable features of the winning design, including compactness . . . without crowding. . . . Placement of the . . . youth center received favorable notice. Its playful conception as a circular room with ample light seemed appropriate. . . .

While the exterior elevation, in the main, is quite simple and pleasing, the jury felt that the scallop-roofed walkway and covered carport . . . would "date" the building in years to come. . . .

**HONORARY PRIZE:** a great deal of favorable consideration centered on this design. . . .

The jury was critical of the auditorium arrangement, placing the playing area perpendicular to the stage, thereby elongating the auditorium and creating a poor vision and hearing area in a large portion of the room. Also, walking distances between the farthest elements of the plan would be long and monotonous. At first glance the exterior seemed pleasing. Upon analysis, however, it became apparent that the auditorium element by its overpowering massiveness might lose the graceful monumental feeling desirable in a center of this kind. Certainly the other elements would be dwarfed by the central auditorium and would be relegated to insignificance. . . .
Almost every community in the US needs a new building like this—a civic center providing a place for all the various activities of community life from square dances to town meetings. This one has reflected great credit on the architects and on the border city of Brownsville, Tex., and has set a planning pattern for other communities. It is a double prize winner.

In 1951 all the architects in Texas were invited to compete for the honor (and $50,000 fee) of designing his $800,000 building. At the left is the prize-winning design—along with two of the runners-up—and excerpts from the jury’s comment. Above is the finished building—a somewhat modified version of the original but still a prize winner: it won one of the five 1954 honor awards in the annual design competition for finished buildings at AIA’s convention in Boston (AF, July ’54, p. 118).

Brownsville’s feted civic center is actually six public buildings in one, each one of which would be a welcome addition to any community: 1) a youth center, including an indoor-outdoor game room, a lounge and a snack bar, 2) a 2,500-seat auditorium convertible into a gymnasium, 3) a regulation-size (30’ x 75’) swimming pool, 4) a library, 5) a women’s center consisting of a lounge, 75-seat meeting room and kitchen, and 6) a small 265-seat town hall.

Integration of these six parts into one coherent building is shown in the photograph (above); close-ups of each part along with the pertinent requirements of the design competition are shown on the following pages.
Prize civic center
is six community buildings in one

1. YOUTH CENTER: this unit need not be large as it is contemplated that the various activities will be supervised and programmed well in advance. Requirements: a small lounge, a play and dancing area, storage space, food preparation space and rest rooms. The food preparation room need not be equipped with a steam table as hot food will be prepared elsewhere. Sports will not go beyond the requirements for Ping-pong and similar indoor games. (This and other captions consist of excerpts from the mandatory requirements of the competition design program.)
Entrance to center is a sheltered area between auditorium, library wing (background) and youth and women's wing (camera position).

2. AUDITORIUM: this room shall be designed for the greatest possible number of purposes: community meetings, conventions, dances, concerts, entertainment, dramatic presentations, recreation and indoor sports events but nothing greater than can be played on the standard AAU basketball court, 50' x 94'. Other requirements: a level floor, movable chairs for easy stacking and storing, a capacity of 2,500 to 3,000 people including balcony, adequate stage with dressing rooms, shower and dressing room facilities for athletes, rest rooms, storage and utility rooms, administrative space, concession space, projection booth.
Brick “fences” partition outdoor areas of six-in-one civic center

3. SWIMMING POOL: a standard AAU six-lane, 30' x 75' swimming pool shall have such accessory areas as dressing rooms for men and women, life guard's station, control office and space for concessions. A small wading pool for children shall be located conveniently near. [This and other captions consist of excerpts from the mandatory requirements of the competition design program.]
4. **LIBRARY**: A library unit to serve both Brownsville and Texas Southmost College will be an important feature of the center. The present combined 10,000 volumes of both groups will probably be doubled by private contributions once adequate space is available. Basic requirements: general reading room, stack room, administrative office and public space, toilets, receiving, repair and storage space, one or two children’s rooms which may also be used for storytelling, two or more private study rooms for adults.

5. **WOMEN’S CENTER**: Space shall be provided for activities of Brownsville’s various women’s clubs and will consist essentially of a general meeting area to accommodate 60 people in movable seats, a small lounge adjacent to toilet facilities, possibly one or two small rooms to accommodate 12 to 15 people each, speaker’s platform and food-preparation and storage space.

6. **TOWN HALL**: This unit is to be designed to accommodate small groups and should be attractive but not lavish. Its seating capacity need not exceed 200 in movable seats. It will be used for public or organizational meetings and other like gatherings. Provision should be made for a small speakers’ platform, a screen for illustrated lectures and a projection booth, a checkroom or storage room, rest rooms for men and women.
HOTEL ROOMS—part 1

This and the following page show examples of typical hotel rooms, with possible furniture arrangements. The following diagrams are for three basic types of rooms:

A. Minimum. Approximately 220 sq. ft. in room.
B. Average. Approximately 260 sq. ft. in room.
C. Luxury. 330 sq. ft. in area, or larger.

Studio-type rooms are those which are so arranged and furnished that they function as livingrooms during the day. Where communicating doors are desired, the furniture may be rearranged or certain items omitted, to allow sufficient wall space for a door.

It may occasionally be desired to set back the entrances to the rooms, particularly when the corridor is narrow and this device would give a certain additional corridor width.

KEY TO FURNITURE

B - single bed
FB - folding bed
D - double bed
C - chair
T - table

A. MINIMUM ROOM

Studio-type room
Area: 220 sq. ft.

Bedroom-type room
Area: 260 sq. ft.

B. AVERAGE ROOM

C. LUXURY ROOMS

Luxury rooms are generally studio-type.
NEW PRODUCTS

Special edition of FORUM'S regular department reviews and catalogues a year's accomplishments by the manufacturers of building materials and equipment

Each month FORUM presents manufacturer's new products which contribute to the progress of the building industry. This month this department is expanded to include not only the unpublished new products released during the last few weeks (below) but also a handy review and classification of all the new products published in the preceding 12 issues (p. 156, et seq.). This New Products Review should prove useful to architects, engineers, builders and their clients in the selection of modern building materials and equipment.

Abbreviated phone booth
does job of full-length model

This new model doorless telephone booth is triangular in shape and surprisingly efficient, effecting a reduction of 50% in outside noise and affording complete privacy to the user. The 45° triangular plan was adopted for reasons of compactness, especially when combined in multiple-booth installations. Two units will go in a corner, four make a semicircle against the wall, and eight form a full circle. The triangular shape also contributes to the acoustic quality of the booth, which when tested proved to be better than the theoretical calculations of Armour Research Foundation had indicated. The theory behind all doorless telephone booths, which are a specialty of Burgess-Manning, is that the torso of the person telephoning forms the door. The trick is to design the booth so that the user will invariably put his body in exactly the right place acoustically, and keep it there. When properly designed, the short-length doorless booth equals the full-length model in performance but costs only half as much and has no glass, or hinges, or ventilation problems. The new booth is of all-metal construction, finished in silver-gray baked enamel. It weighs 100 lb, and sells for $100 F.O.B.; available at extra cost are mounting bracket ($6), light ($9) and floor stand ($85).

Manufacturer: Burgess-Manning, 5970 Northwest Highway, Chicago 31, Ill.

Slotted angles bolt together to build utility structures

Flowstrut is a grown-up and engineered version of the Meccano set. Like the familiar construction toy, it makes it possible for an unskilled man to build almost anything that may be required. Detail drawings are not necessary—a rough sketch is sufficient. No drilling, riveting or welding is required and the only tools needed are a cutter and a wrench. The basic component of the system is a 14-ga. steel angle, about 3" x 1 1/2", 12" long, prepunched with 40 holes per lin. ft. and marked for cutting at 3/4" intervals. A single angle with the long leg down will support a uniformly distributed load of 1,630 lb over a 2' span. For greater loads, angles can be combined to form channel, T, I or box sections. Shelving of 20-ga. steel is also available. It is channel-shaped, 1 1/2" deep, 9" or 12" wide, and 3' or 4' in length. Channel stiffeners may be installed under the shelving for extra-heavy loads. All parts are bonderized and finished in gray baked enamel and may be safely exposed to the weather. The principal use foreseen for the system, recently imported from England, is in factories and warehouses where it can be stocked and used as needed for racks, shelves, benches, catwalks, bridges and supports of various types, as well as for minor sheds and buildings. Flowstrut is easily demountable and stores compactly, 1,000 lin. ft. requiring only 3 1/2 cu. ft. of space as compared to the 51 cu. ft. needed to store 1,000 lin. ft. of 2" x 4" wood studs. Gable-roofed buildings up to 17' in span are easily constructed; greater spans are possible. Plywood, corrugated metal or asbestos-cement cladding may be readily bolted on to the Flowstrut frame, and insulation and interior finish can be installed if desired. The truss jointing detail of the short-length doorless booth equals the full-length model in performance but costs only half as much and has no glass, or hinges, or ventilation problems. The new booth is of all-metal construction, finished in silver-gray baked enamel. It weighs 100 lb, and sells for $100 F.O.B.; available at extra cost are mounting bracket ($6), light ($9) and floor stand ($85).

Manufacturer: Flowstrut Corp., 23 Leonard St., New York 13, N.Y.
The following diagrams show variations of basic hotel rooms with possible furniture arrangements. The types shown are:

A. Rooms with baths on outside wall. Economy and desire to devote available outside wall space to rooms generally prohibit this arrangement from being used in most transient hotels.

B. Rooms with balconies. Generally found in resort and transient hotels where warm-tropical climates permit outdoor living. Balconies are shown with three types of rooms; actually may be used with any type.

### KEY TO FURNITURE

- B - single bed
- FB - folding bed
- C - chair
- T - table
- DTC - dining table and chairs
- DC - desk and chair
- DR - dresser
- L - luggage
- RT - radio-phonograph or television

### ALL ROOMS SHOW SLIDING GLASS DOORS TO BALCONIES.

- Minimum room. About 300 sq. ft. in floor area. Balcony wall turned for view or breeze.
- Average room. About 325 sq. ft. in floor area.
- Luxury room. About 430 sq. ft. in floor area.

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**A. ROOMS WITH OUTSIDE-WALL BATHS**

- Outside-wall bath with dressing area.
- Outside-inside baths.

**B. ROOMS WITH BALCONIES**

- Corridor
- Corridor
Fire resistant polyester opens new fields for plastic sheets

Translucent plastic sheets have achieved notable popularity in recent years but the highly combustible nature of many of them has prevented their use in many locations. Efforts to lessen the inflammability by adding mineral fillers and antimony oxide generally result in a reduced strength and light stability. Hetron, a polyester resin based on Het acid, makes possible a strong translucent plastic sheet of greatly improved fire resistance. Flame-spread tests were performed by an independent Chicago laboratory in accordance with ASTM E84-50T (Tunnel test) on five samples of Hetron made by five leading fabricators. Ratings ranged from 40 to 70, as compared with 100 for red oak and over 400 for ordinary polyester resin sheet. The Building Officials Conference of America (BOCA) has adopted the following classifications, based on the standard flame-spread test:

- 0-25 noncombustible
- 25-50 fire-retardant
- 50-75 slow-burning
- 75-200 combustible
- over 200 highly combustible.

The Hetron samples are thus entitled to a classification of “slow burning” or better. The few cents extra that must be paid for the greater degree of fire resistance are well worth it in cases where ordinary plastic would not be permitted. Where there is no fire hazard, the ordinary plastic will no doubt continue to be used.

Hetron sells for 43 to 48\(\frac{1}{2}\) per lb. in truckload lots. Manufacturer: Hooker Electrochemical Co., Niagara Falls, N.Y.

Cross-corrugated aluminum roll roofing eliminates side laps

Corrugated aluminum roofing, with the corrugation running across the sheet, is now offered in rolls of 50', 100' or 200' length. Since in most cases a single piece can be used for the entire length of the roof, side laps are entirely eliminated. The new product comes in 2' and 4' widths, in three gauges (22, 24 and 26), with 1\(\frac{1}{4}\)" or 2\(\frac{1}{2}\)" corrugations. Like all corrugated metal roofing and siding, no sheathing or decking is required. The new material is installed in horizontal courses beginning at the eaves with head laps of 4" to 6", depending on the slope of the roof, secured by aluminum nails and neoprene washers 8" o.c. The new roll roofing costs about 10% more than corrugated aluminum in sheet form, but labor savings are said to be more than offset this premium. Price of 4' x 100' roll, 26 ga., in less than 16,000-lb. truckload lots, is $45.28. Such a roll weighs 117 lb. and is easily handled on the job.

Manufacturer: Quaker State Metals Co., P.O. Box 1138, Lancaster, Pa.

Conveyor belts move human cargoes horizontally or vertically

Having found that conveyor belts can successfully handle every other commodity, Goodyear has recently extended their use to the transportation of human beings. The “moving sidewalk” is not a new idea. Old-timers may remember the one at the Chicago World’s Fair in 1893. Nevertheless, the first practical installation of a moving sidewalk was opened only a few months ago in the Erie station of the Hudson & Manhattan Railroad (better known locally as the Hudson Tubes). This Speedwalk, as Goodyear calls it, is 227' long and negotiates a 10% grade. It moves at a speed of 120' per minute or a little less than \(\frac{1}{2}\) mph. The \(\frac{5}{8}\)"-thick belt is 460' long and 5\(\frac{1}{2}\) wide and can carry 10,800 people per hour. It runs on a bed of closely spaced steel rollers and is operated by a 20-hp motor. Goodyear has an experimental Speedwalk at its continued on p. 172
NEW PRODUCTS REVIEW
Capsuled descriptions and prices of the 120 products presented in the last 12 issues of FORUM, grouped by type for easy reference

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Prefab walls and structures

CURTAIN WALLS. Factory fabricated, this low-cost building wall allows flexible design through wide choice of facing, insulation and window arrangement. Complete walls (70% glass, 30% insulated panels) run $4 to $5 psf installed, unglazed. The crisp curtain has two unique features: instead of weep holes, enclosed gutters channel condensate to nullons; and the "soft" part of the panel is segregated from the face by an air space, preventing condensation from forming inside the insulation. Michael Flynn Mfg. Co., 700 E. Godfrey Ave., Philadelphia 24, Pa. (April '54, p. 160).

Steelcraft's slim interlocking panels can be secured to the structural frame horizontally or vertically with special speed rivets, removed and relocated at any time. Gaskets and the 3" glass-fiber core isolate outside and inside metal skins to prevent conduction. Entire wall surface has a "U" factor of .15—about the same as 8" masonry. Weighing only 6 lb. psf with steel skins (3 lb. with aluminum), the 2'-wide curtain panels sell for a modest $1.50 to $2.25 psf. Lengths are available up to 20', and various textured facings are obtainable. Steelcraft Mfg. Co., Rossmoyne, Ohio (Sept. '53, p. 230).

PREFAB BUILDINGS. This rigid-frame steel structure for factories and farms spans 40' without central columns. The 20'-long bays may be stacked side by side as well as end to end. Delivered knocked-down, buildings are assembled with patented clips and wedges; no riveting or welding is necessary. Each 20' bay can be put together in 160 man-hours. Stock doors, windows, skylighting and special clips for 2" insulation board can be provided. Price for the knocked-down 40' x 120' structure, F.O.B. plant, is around $7,392. United Steel Fabricators, Inc., Wooster, Ohio (April '54, p. 219).

Clear spans of up to 100' are achieved without ribs, trusses or other framing members by simply bolting together 2'-wide sections of curved sheet metal. Panels for 100' span consist of curved 20-ga. sheet between two 16-ga. sheets, resulting in smooth surface inside and out. Smaller buildings use single thickness of 18-ga. steel, doubly curved and corrugated. Cost erected, including concrete floor slab, $3.68 per sq. ft. for 100' span, $1.40 for spans up to 60'. Wonder Building Corp., 30 N. LaSalle St., Chicago 2, Ill. (July '54, p. 165).

GATE HOUSE. An efficient guard building for factories, tollgates and drive-ins, the Erie Gate House stands up on its own load-bearing walls over any level surface. Its porcelain-enamed sandwich wall and hip-roof ceiling panels have glass-fiber insulating cores. A two-attendant size (4' x 11' x 7') structure costs $2,425 preassembled and $2,150 in knock-down panels F.O.B. plant. Erie Enameling Co., Erie, Pa. (Jan. '54, p. 204).

Roof decks


INSULATING. Where exposed web construction is called for, the deck for built-up roof, insulation and painted ceiling can all be provided with Insulite Roof Deck. The 2" x 8" wood-fiber board (1 1/2", 2" or 3" thick) has an integral vapor barrier laminated near its undersurface which suits it to almost any climate. (Gaskets prevent moisture from moving up through T&G joints.) Ten squares can be laid in seven man-hours. Priced at 33¢ psf, it can save $20 to $40 per square over separate materials. Insulite, 500 Baker Arcade Bldg., Minneapolis 2, Minn. (Feb. '54, p. 218).

STEEL BEAMS. Light-gauge steel Double Hat "D" interlocking panels can span bearing walls up to 33' apart, doubling as structural roof deck and finished ceiling. The economical unit ($1.15 psf, installed) is made of two beams 9" wide, 1 1/2" to 7 1/2" deep. Used flat side up, the "D" panels create an unbroken surface for built-up roofing. Turned as underside they present a smooth stri...

**CONCRETE BEAMS.** A fast-construction floor or roof deck, Rapidex lightweight concrete beams span up to 29'-4" under a 30-lb. load. Assembled from 8' x 16" block (cast of concrete and expanded extrusions can be applied sideways or up and down as complete store-front facings or trim. Four basic interlocking members comprise the series: a top angle ($1.10 per lin. ft.), a 2½" single concrete flange ($1), a double flange ($2.20) and a single flange with drip flange ($1.50). Desco Metals Co., 2264 Wilkins St., Detroit 7, Mich. (June '54, p. 204).

**Plastic panels**

**V-CRIMPED.** A glass-fiber reinforced structural plastic, 29" wide V-beam is deeply corrugated to correspond with 5¾"-pitch metal siding for wide purlin and girt span. Economical for side or top lighting, the shatterproof and chemical-resistant

**Rolled.** Rolled in continuous sheets, Span-Lite glass-fiber reinforced plastic costs less to apply than conventional 4'-wide panels. Fewer joints not only mean less labor but also less chance of leaks on outdoor applications and neater jobs indoors. Flexible enough for a 100' strip to curl into a 25' x 3' carton, the material has high impact resistance. Made in 1'-to-5' widths, it can be ordered flat or corrugated, shiny or dull, rippled or smooth at $1.25 psf. Span-Lite Corp., Miami, Fla. (Jan. '54, p. 192).

**Concrete and masonry**

**BLOCK.** This ingenious masonry block can be used right side up for cavity walls, or bottoms up in reinforced construction. Each 35-lb. unit consists of two 7½" x 15¾" slabs joined by two 3'-high webs. Coned slots on each side of the block serve as insulated core and as mortar keys. For cavity walls, loose insulation is poured into the 2" space between faces. Laid with web at bottom, the block takes vertical or horizontal reinforcement, and grout is poured into the trough. Price: about 25¢ a unit. Morris Lapidus, 9031 Ft. Hamilton Plwy., Brooklyn, N.Y. (Sept. '53, p. 256).

**Similar to conventional block in size and weight, Wenko is 25% stronger because of its more numerous cells. Since no webs run directly through, the new block is also superior in resistance to sound, moisture and heat transmission.**

**CONCRETE BEAMS.** A fast-construction floor or roof deck, Rapidex lightweight concrete beams span up to 29'-4" under a 30-lb. load. Assembled from 8' x 16" block (cast of concrete and expanded extrusions can be applied sideways or up and down as complete store-front facings or trim. Four basic interlocking members comprise the series: a top angle ($1.10 per lin. ft.), a 2½" single concrete flange ($1), a double flange ($2.20) and a single flange with drip flange ($1.50). Desco Metals Co., 2264 Wilkins St., Detroit 7, Mich. (June '54, p. 204).
Doubly curved, nonbending surfaces for wider, more flexible roof spans

SHELL CONCRETE TODAY

Skeleton framing with reinforced concrete is an unimaginative copy of steel or timber construction. Because all concrete below the neutral axis of a beam is parasitic dead load, it cannot efficiently withstand bending forces. At MIT last month, 450 leading architects, engineers and builders discussed how to use concrete more efficiently—in thin, graceful shells that are designed as space frames to minimize bending moments. The results are more akin to natural forms than to conventional framing.

The three-day conference* covered architectural, engineering and construction aspects of thin shells besides giving brief attention to lighting and acoustical problems. Main interest fell on the wide variety of highly functional and expressive shapes—where structure and enclosure are one—that have already been achieved:

Barrels, in effect slabs that are arched upward to reduce bending forces, are built as vaults (left), precast and hipped (pp. 159, 162), also as ribbed arches (pp. 160-161).

Domes, of various types and supports, are precast for speedy construction and prestressed for maximum strength (pp. 166-167).

Warped surfaces, disarmingly simple hyperbolic-paraboloid shapes in which, under uniform loading, bending forces are practically zero, have been built by Architect Candela (pp. 163-165) and by Italian Engineer Giorgio Baroni (AF, Jan. '54, p. 150).

Because they are prefabricated in certain limited shapes, traditional building materials like timber, stone and steel normally transmit loads in one direction only, along a beam or down a column. In contrast, a properly reinforced concrete slab can transmit loads in any direction in its plane. Further, since it can be cast in any desired shape, the slab can be folded or arched upward (figs. 1-3, left) so that forces act in the plane of the slab, resulting in lower bending moments. When the folded slab is braced by end diaphragms, the structure becomes a space frame able to distribute concentrated loads throughout the entire structure (AF, Feb. '53, p. 150).

Barrel vaults are classed as either long or short (figs. 4-5), depending on whether the length of the arch is greater than the span or vice versa.

The simple dome (fig. 7) can span a rectangular area (fig. 8) by means of a larger radius of curvature over the longer span. The more advanced groin vault (fig. 9) is used at St. Louis, Mo. (p. 163).

The hyperbolic-paraboloids (fig. 10) are the shell equivalents of suspension bridge cables. Simply generated by straight "joists" laid between two "main beams" parallel in plan but not in elevation, they form doubly curved surfaces that effectively follow the polygon of forces due to uniform loading, and thus produce no bending moments. The conoids (fig. 6) act likewise.

Greater strength in thin shells

Properly designed, reinforced concrete shells develop surprisingly low stresses. Candela's double-curved Cosmic Ray Pavilion, for instance, spans 33' with a shell only 3/8" thick, mesh reinforced, yet maximum stresses are only 30 psi (AF, Sept. '52).

Stresses in concrete shells are mainly due to dead loads; consequently, a thicker shell is likely to add more weight than safety, besides giving rise to additional stresses due to volume changes in the concrete (temperature, shrinkage and plastic flow). Optimum thickness depends on radius of curvature of the shell. For reinforced concrete the ratio should lie between 1/100 and 1/250; the shell, if too thin, can, however, be strengthened by ribs or corrugations.

Natural shell structures similarly derive their strength from shape rather than from thickness. All shells—whether smooth eggshells, corrugated scallop shells or latticed radiolaria surfaces—distribute stresses through the material continuously in all directions. The walnut shell is perhaps the strongest example, for it is egg shaped, corrugated, has stiffening ribs on the shell and stiffening diaphragms inside it. These pages show some of man's latest attempts to learn from his natural environment.

* Special conference on Thin Concrete Shells, jointly sponsored by MIT's Departments of Civil Engineering and Architecture.
Ribbed arches vs. barrel vaults

While US shell concrete consists mainly of wide-span ribbed arches, British experience favors barrel vault roofs. Typical of the general trend:

- **Standardized formwork** mounted on wheels speeds transfer of scaffolding from one bay to the next in US arch construction. By this method a 286’-span, 340’-long ribbed arch structure for the Alabama Livestock Coliseum came out cheaper than an alternative non-reinforced roofed steel design, $557,500 vs. $579,000, on competitive bids (taken in Feb. '49, see p. 160).

- **Overhead tie bars** permitted similar traveling formwork to be used on 720’ long arches spanning 66’ and having 20’ canti-levers each side, in a Mexican Custom House structure (p. 161). Although the above-roof tie bars required higher columns and extra waterproofing, the solution proved economical.

- **Precast barrel shells**, 16’-8” x 17’ and only 1½” thick, are cast atop one another at a rate of eight a day using a rapid-curing vacuum process (right).

- **Prestressed barrel shells**, 33’ wide and 2½” to 5½” thick, span 148’ over a garage in Bournemouth, England. There are ten barrels with cables set in 5½’-deep edge beams.

- **Barrels and arches are combined** in two 333’-span hangar bays at Marseilles, France. In each bay six barrel vaults, 333’ long, 32’ wide and 2½” thick, are arched upward in the direction of span to form a corrugated tied arch having a rise of 40’. To reduce formwork each shell vault is cast on the ground and jacked 62’-4” into position. This bold design was engineered and built by the Société des Enterprises Boussiron.

**Economical barrel vaults**

As we have already seen, shell concrete barrels may be either long (vaults) or short (arches). As a result of their experience (over 500 barrel roofs completed since World War II) British engineers have come up with certain general recommendations:

1. That a square barrel is cheapest when only one standard bay is to be roofed.
2. That the most economical ratio of barrel length to width is 2:1 (4:1 with edge beams between vaults). For the more expensive hipped or north-light roofs this ratio becomes 3:2.
3. That the ratio of length to rise of a barrel vault should be no more than 10:1 or deflection becomes excessive in spans greater than 100’. By prestressing the vault lengthwise (the cables being placed either in the shell or in the edge beam) a length/rise ratio of 20:1 is permissible since the cables help withstand shear forces. In general, however, prestressing...
Shell concrete test barrel is 1½" thick, 31' x 20'. Displacements due to 40 psf loading: ½" in inward and 2½" downward at edges; ½" upward at crown. Engr.: Vacuum Concrete, Inc.

Precast barrel shells, 16'-8" wide, 17' long and 1½" thick are cast atop one another using the rapid-curing vacuum process. Each barrel acts as formwork for the next.

Vacuum-hoisting speeds erection of precast barrels atop precast walls of low-cost housing project at Bogota, Colombia. A six-man crew erects walls at a rate of six houses a day; barrels, 12 a day to produce a 540 sq. ft. house selling for $650 including plumbing, electric light and a stove. Alvaro Ortega, architect; Vacuum Concrete de Colombia, engineers.

only proves economical in large barrels spanning over 110'.

4. That the angle of springing should be about 30° where edge beams are employed, 45° without edge beams.

While long-barrel shells have an average ratio between thickness and radius-of-curvature of the order 1:150 (e. g. 2" for a 25' radius), in most US short-barreled arches this ratio is nearer 1:1,000 (3½" for a 200' radius) and the shell must be protected against buckling by stiffening ribs (or corrugations as in the Marseilles hangar).

Generally, short-barrel shells are considered as a series of thin arch shells spanning between heavier stiffening ribs, which in turn carry the thrust down to the foundations. Thus the lower portion of each arch shell becomes a bridging zone and is in tension. In his conference paper, Engineer Eric Molke showed how this bridging zone could be made lighter and stronger by running prestressing cables close to the base of each arch, at right angles to the stiffening ribs.

Although the derivation of formulae for the design of barrel shells is complex, the application of these formulae is relatively simple, so time-saving tables and charts can be used. These are now available to US designers in the ASCE Manual No. 31, "Design of Cylindrical Shell Concrete Roofs."

Skylit ribbed arches for this 105' x 232' skating rink at Ardmore, Pa., are provided by opening expansion joints. Architect: E. Nelson Edwards; engineers: Roberts & Schaefer Co.

Light and lightness is achieved in this Hamburg market hall, Germany, by a combination of glass shells and arched edge slabs. Engineers: Dyckerhoff & Widmann.

Skylit barrel vaults are obtained by setting glass blocks along the crown of each of five 90'-long, 45'-wide and 3"-thick shells for this Royal Marines Drill Hall at Deal, England.
Ribbed arches span 253'-8" at the newly completed Denver Coliseum. The 400' long shell roof is 4" thick, built with traveling formwork in six 56' long units, each supported by three 20" x 4'/.2 deep ribs. Architects: Lorimer & Rose; engineers: Roberts & Schaefer Co.

Circular coliseum is spanned with 286' span ribbed arches springing from footings 375' apart at the Alabama Livestock Coliseum. A 3½"-thick shell is carried by 2' x 3½' ribs 28'-4" o.c. Architects: Sherlock, Smith & Adams; structural engineers: Ammann & Whitney.

Precast lower panels, 22' high and 16' long, facilitated construction of this 85'-wide 200'-long and 41'-high St. Louis Waste Material warehouse in Fort Worth, Tex. Upper part of shell and the ribs between them were cast in place using traveling formwork. Consulting engineer: Eric C. Molke.

Traveling formwork speeds arch construction

Two-level vaults at Mexican sporting goods factory are 27' wide; the thrust is taken by oblique compression members at the ends of each row of vaults. Raised vaults in rear provide clerestory lighting for workshop. Designers: Raul Fernandez R. and Felix Candela.
Short barrel shells of 66' span and with 20' cantilevers on each side compose a 720'-long Custom House warehouse in Mexico, D.F. In the background (above) can be seen the traveling formwork, which could be used by placing the tie bars above the roof (right). These tie bars are of high-tensile steel and are tensioned by jacking (below).

Expansion joints provide roof lights in the Custom House structure. They divide the 1½" shell roof into 53' lengths. Shell thickness increases to 4" at the springing to form a V-shaped edge beam. Arch.: Felix Candela and C. Recamier.
Folded plate shells, arranged in a discontinuous Z-shaped pattern, provide north-light clerestories for this H. W. Moore Equipment building in Denver, Col.

Z-shaped slabs are cantilevered 22' at each end from their supporting columns. Each slab is carried on two columns spaced 75' apart. Shells are 4" thick and are laterally braced by concrete end walls and beams along the column lines. Estimated cost, $4½ per sq. ft. Architect: Tom Moore; structural engineer: Milo S. Ketchum; contractors: N. G. Petry Construction Co.

Shell concrete simplifies clerestory lighting

The tremendous variety of structural shapes now available in thin shell concrete makes possible good natural lighting for almost any type of building. Interior space can be lit from any or all of four sides, or even from above by punching holes through a greater part of the enclosing slab itself. For instance:

1. **North-light clerestories** provide the even, glare-free light that is required for a textile factory or a machine shop. Clerestories can be built either by hipped slabs (above) or by tilted barrel shells (below), or by conoidal shapes (p. 164), which are formed with straight timbers and have the advantage of negligible bending moments under uniform loading.

2. **“Square domes”** provide maximum light where there is no objection to direct sunlight. In the structures (shown opposite) clerestories on four sides extend from the level of the tie bars up to the edge of the shell itself. In order of economy of construction, these structures include: first, the 43' square, 1½" thick, hyperbolic-parabolic roofs of Architect Candela's Mexican tool factory, which are economical in formwork since surfaces are generated entirely by straight timbers; next, the 82' x 63', 3"-thick, doubly curved shallow domes at the Brynmawr Rubber Factory, Britain, which are formed by steel deck plates atop tubular scaffolding; and last, the more complicated, deeper, cruciform barrels of the 120' square St. Louis Airport roofs.

3. **Glass lenses or skylights** punched in the shell itself avoid glaring contrasts between bright clerestories and a dark enclosing shell. This is practical since maximum stresses in a properly designed shell structure are so small that glass can be employed as an “aggregate” material.

North-light traveling formwork for Z-slabs devised by Felix Candela to reduce costs. Jacks are provided to raise or lower formwork.

North-light shell framing applied to a Zeiss-Opton optical plant at Oberkochen, Germany. Engineers: Dyckerhoff & Widmann.

North-light shells under construction at the Voith industrial plant at Heidenheim, Germany. Engineers: Dyckerhoff & Widmann.
Glass is generally strong in compression but cannot withstand tension stresses, therefore it should not be employed near the edges of shell structures where tension stresses might occur. Since the coefficient of expansion of glass is only slightly below that of good concrete, a permanently watertight bond can be made, which is further tightened by compression as the concrete shrinks with curing. The glass lenses must be strong enough to withstand any shear forces involved. In Europe, translucent slabs have been built with more glass than concrete, and this composite is known as “glasscrete.”

Each dome of the Rubber Factory (bottom, left) is perforated with eight 6'-dia. glass domes and eight 5'-dia. portholes for electric lighting designed to approximate daylighting conditions. Each porthole contains a cruciform arrangement of six 5'-long 80-w. fluorescent tubes. Maintenance can be carried out from the roof by removing spun aluminum lids to the portholes; these lids are painted white on the underside for maximum reflection.

Precast skylights set in the 25' x 20' barrel shell roofs of a dock structure in Southampton, England, are 9'' dia., spaced 15'' o.c. each way. During casting of the shell, the precast skylight molds are held in position atop steel sheet formwork by a pair of magnets bolted to each mold and provide firm attachment to the forms.

Other precast skylights include channels to carry off condensation. In general, British practice favors glass lenses rather than sheet glazing for shell concrete skylights; the lenses are more economical, require little maintenance and provide better insulation, better distribution of light.

For electric lighting of shell structures, it is best to use the shell itself as a reflector for cove lighting. Any direct lighting required can be obtained by spotlights set in the shell itself (or as close to it as possible), and screened from the viewer beneath by a 45° cut-off angle. Suspended fittings should be avoided for they have a depressing effect on vault structures at night.
Umbrella roof of 1½" concrete, 39½' square, carries 25 men along two adjacent edges. This is a hyperbolic-paraboloid structure, with a rise of 39", that is generated by straight formwork and has negligible bending moments under uniform loading. Architect: Felix Candela.

Deformation measured after six months was found to be a drop of ½" at corners, probably due to shrinkage. There were no cracks.

Warped shells eliminate bending

Can bending moments be neglected in hyperbolic-paraboloid surfaces? Sparked by Architect Felix Candela's warped shell structures, this question produced keen discussion and voluminous differential equations at the MIT conference, a long discussion which ended only by Candela falling back on his numerous structures and saying, in effect: "There they are and they seem to work!"

Like all three-dimensional space frames, these warped surfaces are difficult to draw on a two-dimensional board and almost impossible to analyze, particularly if maximum fiber stresses due to bending are sought as in conventional design analysis.

In practice, Candela uses ultimate load design applied to membrane stresses. Thus he shifts the emphasis from permissible safe stresses to permissible safe deformations, and takes into account the redistribution of stresses that occurs at loads approaching failure for any particular element in the structure. In short, Candela's structures are designed by an intuitive grasp of the distribution of forces due to bending.
to applied loading, and are checked by mathematical analysis and scale models.

Membrane analysis

The hyperbolic-paraboloid warped surfaces shown on these pages have four outstanding advantages: 1) under uniform vertical loading they develop a pure shear state of constant stresses acting in the plane of the surfaces; 2) with properly designed tie bars, they result in purely vertical loads on the supports; 3) their double curvature gives excellent resistance to buckling; and 4) they are generated by two systems of straight lines, so formwork is simple to design and to erect.

The roof type shown in the diagram (left, opp.) is mounted on four columns C,D,E,F. Horizontal main beams AOA' and BOB' intersect in a plane pitched a distance OP above the column heads, to which they are attached (as shown).

Under uniform loading, the fibers parallel to the curve CO are in compression and those parallel to the curve AB are in tension. The resultants produce: 1) compression forces along the ridges AO and BO, zero at the edges of the roof and maximum at the center, where they are equalized by the ridge forces developed in the other quadrants; and 2) compression forces along the edges AC and BC, zero at the crown and maximum at the columns, where their horizontal components are taken by equal and opposite components transmitted from the other quadrants by the tie bars, resulting in a vertical force down each column. The pitch OP should be about one sixth of the span CD.
New techniques of dome construction

Shell concrete domes, doubly curved slabs that transmit predominantly compressive loads in all directions simultaneously, have progressed considerably since the 140' dome of the Pantheon, Rome, went up in the first century A.D. Outstanding current developments include:

MIT's three-point auditorium: a 3½"-thick roof slab covered with 2" rigid glass-fiber insulation, another 2" of concrete (added solely to exclude outside noise) and lead-coated copper roofing. In form the slab is an equilateral, spherical concrete (added solely to exclude outside loads in all directions simultaneously, have Shell concrete domes, doubly curved slabs extremities. Some problems have been encountered with the tremendous lateral pressures concentrated at these three point foundations.

Three ways to reduce formwork: 1) by precast radial ribs as used in a 100' dome at Karlsruhe, Germany (above) ; 2) by pie-shaped movable scaffolding mounted on a circular track, used to cast a dome in 30° segments at a time at West Kenton, England; and 3) by spraying gunite directly onto balloon surfaces, subsequently adding mesh reinforcing and a further thickness of gunite. In spite of difficulties of maintaining constant shape of the balloon and of "flat" spots, spans of 32' have been achieved for under $5 per sq. ft.

Prestressed reverse dome: a 2½" thick, 160' x 240' elliptical concrete shell is stretched as a catenary surface (no bending forces) between an outer compression ring mounted on perimeter columns at Karlsruhe, Germany (right). Prestressing bars are tensioned between each pair of diametrically opposed columns to hold the compression ring to its proper shape.

Properly designed, most of the load in a dome is carried by direct membrane action with relatively limited bending forces. Direct tensile stresses are avoided if the rise is between one sixth and one eighth of the diameter. Domes can be made even shallower by prestressing the outer ring (below).

Shell thickness is usually set by construction problems rather than design, so smaller domes are not appreciably thinner factually. The minimum thickness required for three layers of reinforcing is about 2½", a thickness at which the radius of curvature should be no greater than 100' to avoid buckling; for a larger radius it is necessary to increase shell thickness or employ either stiffening ribs or corrugations.

Thin shell concrete—bibliography

Samuely, Felix J. "Is this Tomorrow's Structure?" Architectural Forum (Feb. '53, p. 150).

Prestressed dome, a 100' tank structure at Flint, Mich., being prestressed by the winding process. Cost: $3.30 per sq. ft. Preload Corp., consulting engineers.
Reversed dome under tension is suspended from a peripheral compression ring to roof a 160' x 240' assembly hall at Karlsruhe, Germany. Held by prestressing cables between outer columns, this catenary surface has a slight countercurve at midspan to aid drainage. Engineers: Dyckerhoff & Widmann.

Double shell dome on three supports nearing completion at MIT. This 160'-span auditorium is enclosed with two shells, a 3½" inner structural shell and a 2" outer shell added to help exclude outside noise. Eero Saarinen Assoc., architects; Ammann & Whitney, consulting engineers; George A. Fuller Co., general contractors.
Thugg in California

My friend Professor Thrugg left his notes in some confusion when he went on vacation but I would hesitate to edit them too much—you might like to see anyway how the crusty, corny Professor looks unedited:

"Law! Law! Law!" begins one of his scribbles, "the idea of law: to protect society. The idea of law enforcers: to protect the law. They get zealous. End by turning law from useful fortress into free men's jail. Example: architect registration laws mean to protect society vs. frauds, bad work. But acting as law enforcers, state registration boards like California's sometimes proceed vs. nice good men too, just to keep law going. John Lloyd Wright, 61, humorous, amiable. Spent all life, from boyhood on, in arch. & bldg. supervised fr father, Frank LLW, including Tokyo Imperial Palace Hotel, which emphatically did not fall dwn. Bit nice bases, schls in Indiana, as noted in Forum. Member AIA. Registered in Indiana, Tex. Nev. Has engs license in one State. Could you suppose him not trustworthy fr 25' x 100' store in Calif. Just bcs once flunked registran exam there? Ha! ha! ha! ha! & haw! haw! HAW! [Thrugg loves these exclamations!!!]—How do you like that, Hoosiers?

"Did John really endanger society or did he only endanger law—by 'entering wedge' principle? Definition 'enter wedge,' people: you can't afford as law enforcer to know & ignore, officially, a guy doing no harm, fr fear of raising expectation you wouldn't know officially when some other guy was really doing harm.

"Tough spot really for Calif. Board. I have remedy. Device known in law as 'fiction.' Legal 'fiction' is just like any other fiction: an imaginary statement of truth that can be more true to life—and more useful by far—than literal truth. Example: supposing some brilliant but 'unstable' guy applies in 1924 for license then forgets about it. Supposing by 1948 he's world famous & sassy. In 1948 he submits as 'evidence' for a license a whole issue of Forum devoted to his work. You can now use fiction No. 1: give him a 'temporary' license for Calif. But then suppose he later goes still further, & collects every gold medal in US & Europe plus place on sacrosanct Academy of Arts & Letters. You now use fiction No. 2. Declare you gave him license, really, back in 1924, which, you now remind him, he neglected to 'pick up.'

"This shows how useful fiction can be. Serves every substantial interest of society. Lets a good architect de facto be one de jure. Saves everybody's face—provided you keep face straight while telling kind, useful, constructive fiction. Face being deadpan is essential. This explains why wise men call face being deadpan is essential. This explains why wise men call govt an art, not a science. "Dare anybody say the case just described was not real?

"So: Proposal from Thrugg to Calif. Registration Bd: find a nice useful fiction to get license for John Lloyd Wright too. Hand it out deadpan. Now don't be shocked. What cd be more ridic­ulously a fiction than the one you are now caught with, the pretense that John as an architect wd do Calif. harm?"

Thugg in Boston

Thugg last June seems to have been a man of several moods. He must have attended the AIA convention in Boston, for he says:

"Best architecture in Boston last June was unlisted. It was Art Festival on part of Boston Common. If we say architecture is art of civilizing man-made surroundings—all of them—what example cd be better? 'Lanternlight' (from spots & floods of course) at night on gay stage, wonderful dancing, folk dancing. Lights on little booths with fine modern art seen by thousands. Sculpture on grass. Light in Bucky Fuller's little stick-string-canvas dome with photos of official modern architecture (dome itself better than most of it). Less light on grass. Next to no light on lakes (better boating fr lovers). This part Boston gay, lovely, musical, popular, adored & a Better yet, solve it straight.—

used by all people. This Boston a city where can be in love, like Paris painted by Renoir.

"The secret: all this managed by real artists. No condescension, no polls of 'popular demand,' no hokey-tonk. People loved it because artists loved them. Lesson for architects. As Chuck Good­man says: people want artists to meet what they aspire to, not what they are. Prototype for broader, more popular architecture."

* * *

"But can't understand my old friend Ralph Walker at Boston convention. Monotonous speeches about modern monotony. "Ralph himself, say I, acts far more wisely than he speaches. Latest reports of FBO Review Board picture him understanding, appreciative of constructive ideas, tolerant.

"Yet speech plagued frustrates. Men-trained deus-ex-machina, unable to cope with new industrial world, ready to transfer their frustration to the age, to scold those men of genius or just conscience who are coping. Poor Ralph admires Morgan library by McM, but mentions nothing later. If he can't get magic in today's little Walker house (I mean by Wright) sorry for him. God hasn't died.

"All other panel speakers pledged architecture to renewed search beauty. Each had his own vivid idea of humanism too: Rudolph, Saarinen, Wurster, Sert. Didn't Ralph bear? Incidentally, will Ralph pls measure his rear elevation? If 'molded' by either Saarinen's modern chair or Mies's Roman chair as Ralph contends, it's wide enough to qualify him fr fat man in circus."

Thugg in Texas

Finally, Thrugg gets lyrical (for him): "Youth always right, says Geo. Howe. Can also be generous, loyal. Touching example. 3rd yr design class at Houston U sending fine display panels of Harwell Harris' work to Harris, who is dean at Austin, a wholly different college. Thank God our young men left to selves know a good man when they see one, and that will be forever."—DH.
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NEW PRODUCTS continued from p. 153

Man-Lift is two-way vertical conveyor belt which carries people up (left) and down (above).

Akron plant which is used by more than 10,000 people per day. This outdoor unit is 70' long and climbs a 10% grade. The 4-ply belt is 150' long, 42" wide, and has a capacity of 7,200 persons per hour. The 15-hp motor is reversible. Since maintenance on these units is low and power consumption is small, and no attendants are required, Goodyear claims that it is the most economical form of passenger transportation known. They foresee its use in rail and bus stations, airports, stadiums, race tracks, auditoriums, on the central malls of shopping centers and between parking fields or garages and retail areas.

An entirely different use of the conveyor-belt principle is the Man-Lift, an elevator that never stops. Installed in the new parking garage in the Airlines building in New York, the device is for the use of the parking attendants on the four levels of the underground garage. The 5-ply rubber and fabric belt is 14" wide and 105' long. It has a step-platform every 16' with a handgrip 4½' above each step. The belt moves at a rate of 75' per minute and can be stopped readily by pulling on a parallel rope. The Man-Lift can carry eight persons a minute in both directions. Power is supplied by a 3-hp motor.


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ARCHITECTURAL FORUM • AUGUST 1954
NEW PRODUCTS continued

exactly how much a wasted step cost until Westinghouse, in an effort to sell more water coolers, worked out a formula for calculating the annual dollar savings resulting from steps saved by the installation of additional water coolers. The formula is based on four trips to the water cooler per day, 240 working days per year, and a walking speed of 320' per minute. Based on this formula, a handy dial computer was developed on which it is only necessary to set the number of employees opposite the average hourly wage, and then, opposite the distance saved in feet, can be read the annual saving in dollars. With proper modification the device could be used to give the value of steps saved by other means. The architect who boasts of the efficient circulation of his plan might use the computer to establish the dollar value of his planning ingenuity.


You Can Tell Them With Complete Confidence These Things About

PERMANENT CAST IRON SOIL PIPE

When young couples, building their first home, come to you to draw their plans, you can't expect them to be more interested in buried pipe than the things that will show.

That's when they need your sound and experienced counsel. You will do them and yourself, too, a lasting service if you emphasize the vital importance of permanent cast iron pipe and fittings.

You can tell them with complete confidence that cast iron pipe will not need replacement or repairs . . . resists corrosion and ground settlement . . . will not let in tree roots . . . absorbs moisture and is the only material with a proved record for permanence, permitted by all plumbing codes.

Our Company does not manufacture cast iron pipe, but supplies leading cast iron pipe foundries with high grade foundry pig iron from which soil and pressure pipe is made.

WOODWARD IRON COMPANY
WOODWARD, ALABAMA

Conventional roof after fire shows how vapor barrier has disappeared, revealing deck joints.

Protected roof after fire has vapor barrier still in place.

ASBESTOS-PLASTIC VAPOR BARRIER contributes fire resistance to factory roofs

It is by now well-known that the conventional 2-ply hot-mopped vapor barrier, formerly used on steel roof decks before the famous Livonia fire, is a fire hazard. In the event of a fire the asphalt in the vapor barrier melts and runs through the cracks in the decking, and adds fuel to the fire. To make a fire-resistant vapor barrier, Philip Carey has adapted the asbestos-plastic coating used successfully for some years on their Fire-Chex shingles. This plastic coating is thermoplastic as originally made, but under the high temperatures created by fire, it becomes thermosetting. Tests have shown that Fire-Chex vapor barrier does not melt or flow but stays in place throughout the fire and prevents any dripping of bitumen through the deck. Tests have also shown that it is an excellent vapor barrier, with a vapor permeance of only 0.12 grains as compared to the FHA requirement of 1.0. One roll of Fire-Chex vapor barrier, 36'' x 38', covers 1 square, with 3'' side lap and 6'' end lap. It weighs 60 lb. per square. One gallon of Fire-Chex adhesive, applied by brush or spray, covers one square. Materials cost: $3.47 per square F.O.B.

To satisfy the school board all 6 ways

1. **ACOUSTICAL VALUE.** High noise reduction coefficient—up to .90—equal or superior to any material.
2. **FIRE-SAFETY.** Easily meet all safety codes. Carry the Underwriters’ Laboratories label service.
3. **BEAUTY.** The most complete fire-safe line of decorative textures, patterns and colors. Light reflection in many cases over 80%.
4. **PERMANENCE.** Will not warp, buckle, expand or contract under varying temperatures and humidity. Odor-proof, rot-proof, sanitary.
5. **MAINTENANCE.** Easily cleaned by standard maintenance methods. May be sprayed or brush-painted.
6. **LOW COST.** Actually the lowest cost fire-safe ceilings available. Lightweight, easy to install and maintain. Provide added thermal insulation.

**RECOMMEND FIBERGLAS® ACOUSTICAL CEILINGS!**

OWENS-CORNING FIBERGLAS CORPORATION
DEPT. 171-H, TOLEDO 1, OHIO

**RECOMMEND FIBERGLAS® ACOUSTICAL CEILINGS!**

OWENS-CORNING FIBERGLAS CORPORATION
DEPT. 171-H, TOLEDO 1, OHIO

BLONDE HARDBOARD. Suitable for sundry construction and cabinet jobs, smooth-faced fir-fiber and resin Forall is a workable, low-cost hardboard. The 4' x 8' honey-colored panel is easy to saw, rabbet or rout. Grainless, it cannot splinter or split. The edges hold screws and nails as well as its faces. Prices for the dent- and warp-resistant material per M sq. ft. range from $2.12 for ½" thick to $3.32 for ¾" in the West; $2.26 to $3.56 in the East. Forest Fiber Products Co., Forest Grove, Ore. (Nov. '53, p. 216).

REINFORCED GYPSUM. Added to the gypsum core of ½" Bestwall is a glass-fiber network which improves the panel's availability, shock-resistance and clean response to scored cutouts. By increasing the core’s resilience, the retrofit incombustible fibers make the wallboard a better match for the strains of shipping and handling. It costs the same as regular gypsum board: about 64 psf.

REVERSIBLE. Completely reversible, the Adlake 1500 aluminum window makes an inside job out of window washing. The large sash cannot be pivoted unless unlocked by key and so the weather-tight unit should be well received in air-conditioned buildings where a few outdoor-air enthusiasts might impair the system's efficiency. Windows are made to turn either on a horizontal or a vertical axis. Price for 4' x 6' unit is about $150. The Adams & Westlake Co., Elkhart, Ind. (Nov. '53, p. 208).
Stainless and heat resistant steel can usually be classed as a critical material, since it not only contains strategic alloys but is indispensable in many vital industrial and armament applications. It is always important, therefore, to make every pound go as far as possible.

The latest edition of our comprehensive 124-page, case-bound Stainless Steel Handbook is ready for distribution now. It will help you to select the right stainless steel and to use it properly. Comprehensive listings of analysis, properties and characteristics of each type will guide you in specifying grades that will do your job most efficiently. Clear, concise fabrication data will help you speed production and cut waste.

Your copy of the Stainless Steel Handbook will be sent—without charge—upon request. Our only stipulation: please make your request upon your company letterhead. Write Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.

ADDRESS DEPT. B-56

You can make it BETTER with Allegheny Metal

Warehouse stocks carried by all Ryerson Steel plants
Sun control and daylighting

OUTSIDE BLINDS. Permanently fixed Riemco aluminum louvers can serve a building all year around. In summer, they deflect solar heat. On overcast days, fins may be tilted to bounce daylight indoors by the simple hand crank mounted inside the window. For about $5.50 psf, the heavy-gauge blinds may be mounted either as awnings, flush jalousies or both. (Hardware can be provided to regulate the slant of the complete blind as well as the angle of the fins.) Rhode Island Engineering Manufacturing Corp., 570 S. Water St., Providence, R. I. (March '54, p. 169).

MARQUEE. At $5 per sq. ft. in place, Kawneer's prefab low-maintenance aluminum marquee is competitive with its least expensive to-order wood cousin. The 3"-deep "W" louvers come in 6', 8' and 10' lengths preassembled in panels 4', 5' or 6' wide. Self-leveling fittings, gutter and trim come in the package. Three men can put up a complete unit for a 30' store front in six hours. Supports are available for cantilevering marquees on new construction or for hanger-suspension on remodeling jobs. The Kawneer Co., Niles, Mich. (Aug. '53, p. 184).

ALUMINUM LOUVERS. Ogee-curved to bounce solar rays effectively, the etched aluminum K-louvers are engineered for high strength at minimum bulk. Outstanding feature is their adaptability to sundry climate conditions: fins can be mounted vertically, horizontally or on a pitch, with curve frontward or backward, to fulfill interior and exterior building-area needs for glare reductions, heat deflection, light direction or natural ventilation. Snap-on fittings are made for projected or recessed applications. Complete costs average $2.75 psf. The Kawneer Co., Niles, Mich. (Aug. '53, p. 150).

GLASS-CLOTH PANELS. Simple white shades of woven glass yarn soften intense sunlight and distribute it throughout a room. Easily constructed for old and new classrooms with large windows, the durable cloth diffusers are fireproof and rot-resistant. The fabric comes in light and heavy weaves (for different orientations) at 17c and 23c psf. Owens-Corning Fiberglas Corp., 16 E. 56th St., New York, N.Y. (Oct. '53, p. 248).
WHY YOU SHOULD SPECIFY CRANE

In Crane bathroom and kitchen fixtures, you have design that is as fresh as today's architectural thinking... styles and sizes as varied as the needs of your clients... a line so complete you never need look beyond the pages of the Crane Architect's Catalog. And in the minds of your clients, as you probably know, no other name in plumbing so strongly signifies quality.

The Crane Diana lavatory is of lustrous vitreous china with semi-oval basin and paneled front. Supported by chrome-plated metal legs. Available with or without chrome-plated towel bars. Three sizes: 24 x 20", 27 x 21" and 33 x 22".

Crane matched and colored fixtures

When you plan a bathroom around Crane fixtures, you find it easy to achieve harmony of both design and color.

That's because the Crane line is so extensive that, regardless of the size or type of bathroom, there are Crane fixtures to fit it exactly—in size, shape, design. And in color, too.

With a choice of white or eight beautiful decorator colors available, Crane offers the widest selection of colors on the market.

CRANE CO.
GENERAL OFFICES: 836 SOUTH MICHIGAN AVE., CHICAGO 5
VALVES... FITTINGS... PIPE... PLUMBING AND HEATING
NEW PRODUCTS REVIEW  continued

SHATTERPROOF SKYLIGHT. Ready to attach over a roof curb, the Marco top light consists of a domed rectangular sheet of corrugated plastic in an extruded aluminum frame. Any inside condensation collects in an integral gutter and is channeled outside. Twelve sizes in light green or off-white range from 24" x 41" ($60) to 73" x 41½" ($123). Slightly higher priced models, with curb and flange as part of their frames, can be set directly over roof openings. The Marco Co., 45 Greenwood Ave., East Orange, N.J. (June '54, p. 198).

PLASTIC PANES. For buildings requiring diffused light, translucent panes of resin and glass fiber provide it for about 75¢ psf. Geometric planes formed in the glazing break up light in intriguing patterns and add rigidity to the material. Square units come up to 3' x 3' and a paneled rectangle is made to fit industrial casements. A 3' x 6' domed skylight is also available. Colors are green, blue and white. Molded Insulating Co., 335 E. Price St., Philadelphia, Pa. (April '54, p. 196).

GLASS-PLASTIC SANDWICH. Two layers of window glass laminated around a gray vinyl sheet, Dusklite is an effective sun-glare reducer. Made for the ribbon windows and ventilators used in conjunction with glass block, the tinted glazing obviates mechanical louvers or shades. It sells for about $1.50 psf in sizes up to 15 sq. ft. Pittsburgh Plate Glass Co., 632 Dusquesne Way, Pittsburgh, Pa. (Oct. '53, p. 252).

PREFAB SKYLIGHT. The Ventdome packaged skylight furnishes light and air for inside rooms at moderate cost. The unit consists of a clear or translucent molded plastic bubble on a leakproof aluminum frame and insulated 14½" collar. Set in its collar is an 8" exhaust fan shielded by a motor-operated weather door. A carpenter merely sets the Ventdome over a prepared opening and applies mastic and felt over the flange. Prices range from $70 for 20" square Ventdome to $400 for a 64" x 96". Each extra fan is $34. Wasco Flashing Co., 87 Faucett St., Cambridge 38, Mass. (Dec. '53, p. 166).

Lighting

LIGHT FIXTURES. The Budgetlite has no shield or casing. Ballasts and lamp holders comprise the end pieces, and aluminum tubes above the lamps act as spacers and wireways. Hung on slim steel spokes, the fixture offers little surface for dust collection. It takes two 5', 40-w. low-brightness lamps, and is at its best in long runs for classrooms, offices and stores. Budgetlites are $23 each, without lamps. Ainsworth Lighting, Inc., 38-10 29th St., Long Island City, N.Y. (June '54, p. 202).

Picked by a New York AIA committee as "best-designed industrial fixture," the 5'-long IC lighting continued on p. 182
New Protection
Against Roof Damage

NEW CELOTEX
Channel-Seal
TRADE MARK
ROOF INSULATION

guards against blistering
and separation of
felt and insulation

As you can see in the diagram, high-pressure air pockets do not build up with Celotex Channel-Seal Roof Insulation. Pressures due to temperature differences are constantly being equalized by movement of air through the channels. This channeling principle of roof protection has been proved effective by many years of actual use on jobs of every type and size.

Low in Cost
Light and easy to handle, yet remarkably rigid and tough, Channel-Seal is low in both initial and applied cost. Resists damage from job handling. Quick, easy to apply. Smooth surface assures positive bond to both roof deck and roofing felt.

Moreover, it is the only roof insulation made of tougher, stronger, long Louisiana cane fibres — and protected by the patented Ferox® Process from dry rot and termite attack. Write now for full data on Channel-Seal and other types of job-proved Celotex Roof Insulation. The Celotex Corporation, Dept. AF-84, 120 S. LaSalle St., Chicago 3, Ill.

For a Better Roof... Specify Genuine CELOTEX
REG. U. S. PAT. OFF.
ROOF INSULATION

THE CELOTEX CORPORATION, 120 S. LA SALLE STREET • CHICAGO 3, ILLINOIS

For a Better Roof... Specify Genuine

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ROOF INSULATION

THE CELOTEX CORPORATION, 120 S. LA SALLE STREET • CHICAGO 3, ILLINOIS
NEW PRODUCTS REVIEW continued

ing unit is engineered for high illumination levels. Easy relamping of the open, side-shielded fixture suits it particularly for high bay use. It lists at $46.90 with metal side panels; $49.50 with plastic. Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y. (March '54, p. 244).

Dispersing even light through its fine-ribbed polystyrene diffuser, the four-lamp Sightron ceiling fixture should fit in many modern offices, stores and institutions. It lists at $49.55. The companion 48" wall bracket is tagged at $24.90. Either model may be mounted singly or in runs. Ceiling unit catalogue No. is 7194; and bracket 7214. Lighting, Claremont St., Jersey City 5, N.J. (Jan. '54, p. 196).

For seeing comfort, brightness must be controlled even on lighting jobs which demand intense illumination. To combat glare for its two 40-w. lamp Para-Louver troffers, Day-Brite devised ribbed aluminum louvers that are actually segmented parabolas. Light hitting the fins is directed up and down; a minimum is thrown at the viewer. The fixture is $34 to the trade. Day-Brite Lighting Inc., 5411 Bulwer Ave., St. Louis 7, Mo. (March '54, p. 238).

WALL LAMPS. Providing high levels of diffuse illumination, these wall brackets should serve handsomely over bulletin boards, mirrors, hospital beds or phone-book stands. Model 224 ($14) has an 11"-long cast-aluminum case and prismatic glass diffuser. The 19-%" Model 211 ($21.60) comes with sockets for two 75-w. bulbs, or with provisions for two 15-w. fluorescents ($22.60 with low power ballast; $28.40 for high). Gotham Lighting Corp., 37-01 31st St., Long Island City 1, N.Y. (Aug. '53, p. 198).

This two-in-one fixture directs 80% of its light either up or down, depending upon which way it is mounted. Gratelite louvers with 9/" cells shield lamps from direct view. Fixture is made in three sizes: two 20 w. ($18), two 40 w. ($24), two 75 w. Edwin F. Guth Co., 2615 Washington Blvd., St. Louis, Mo. (July '54, p. 214).

PEACH FLUORESCENT LAMP. Cafes, shops and salons take on a friendly intimacy under Glo-tone continued on p. 184

Designed to serve many generations...

EDGEOED SCHOOL, HIGHLAND PARK, ILLINOIS ARCITECT: CHILDS & SMITH, CHICAGO PLUMBING CONTRACTOR: J. G. WEBER, CHICAGO and Clow "IPS" (threaded) Cast Iron Pipe will last the life of the building!

Highland Park is one of Chicago's better North Shore suburbs. Gracious design and functional superiority are prerequisites of its buildings. Thus, even its most time-hallowed structures are pleasantly distinctive today.

And its new Edgewood School, low in line and embodying all that's truly modern in equipment as well as design, will remain a credit to the community a century from now. Moreover, its Clow "IPS" (threaded) Cast Iron Pipe downspouts, drains and waste lines will still be serving faithfully...because Clow "IPS" Pipe is corrosion-proof, requires no replacement, no upkeep. Installation is fast, economical...permanent.

JAMES B. CLOW & SONS
201-299 North Talman Avenue • Chicago 80, Illinois

PUBLISHERS OF THE MAGAZINE OF BUILDING
**New building trend set by air-conditioned skyscraper**

This 26-story structure at 99 Park Avenue is distinctly different from anything ever built in Manhattan.

It’s completely sheathed in self-cleaning aluminum, with reversible windows set with heat-resistant glass.

99 Park is also going to set a new standard in comfort for its tenants. Dependable air conditioning is provided by a Worthington system made up of two 665-ton centrifugal refrigerating units, which supply chilled water to 38 Worthington-equipped interior fan rooms. These distribute cooled, dehumidified air to the interior offices on each floor. The centrifugal units also furnish chilled water for individually controllable room conditioners enabling tenants in the outer offices to select their own climate.

For more than fifty years, Worthington-engineered air conditioning installations have been serving business and industry. Whether large or small, Worthington systems are all Worthington-made, not just Worthington-assembled. For the full story, contact your nearest Worthington district office, or write to Worthington Corporation, Air Conditioning and Refrigeration Division, Harrison, N.J.

Tishman Realty & Construction Co., Inc., Owners and Builders; Emery Roth & Sons, Architects; W. R. Cassenti & Associates, Consulting Engineers; Roister Corporation, Mechanical Contractor; Cushman & Wakefield, Inc., Agent.

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME

ARCHITECTURAL FORUM • AUGUST 1954
NEW PRODUCTS REVIEW

continued

COLORED LAMPS. The nuisance of collaring filters over white lamps for decorative lighting is eliminated by GE's color-reflector bulbs. Available in red, green, yellow, blue, blue-white, and pink, the 150-w. lamps may be used singly or combined for any warm or cool tone in the spectrum. Prices, depending on color, range from $1.85 to $2.10.

WHITE FLUORESCENT LAMP. Emitting 35% more light than any previous fluorescent source, GE's new 8' tube makes it possible to bring up lighting levels for plants, schools or stores without added cost or upkeep. The cool white lamp has a 110-w. rating and its 6,800-lumen output is triple that of other 40-w. tubes. Maintaining its brightness even in cold, the new tube is eligible for outdoor lighting jobs. It sells for $3.85. General Electric Co., Nela Plk., Cleveland 12, Ohio (Aug. '53, p. 198).

GLASS-FIBER GASKET. Die-cut to fit Marco recessed fixtures, this glass-fiber gasket effectively stops light leakage. Fireproof and resilient, the gasket also keeps dust and insects from getting into the fixture. Marvin Mfg. Co., S. Beverly Dr., Los Angeles 5, Calif. (March '54, p. 232).

HONEYCOMB CEILING. Expanded sheets of 3/32" thick aluminum honeycomb on standard suspension supports comprise Honeylite fireproof dropped ceilings. Masking overhead pipes and ducts, the light (1 oz. psf) cellular panels also diffuse harsh glare from bare-bulb fixtures above into flattering illumination, and break up—thereby softening—noise from below. Honeylite Co., 576 W. Grand Ave., Oakland, Calif. (May '54, p. 204).

Wiring

MINERAL-INSULATED WIRE. Impervious to moisture and intense heat, Safety m.i. cable consists of a seamless copper tube around a mass of magnesium oxide in which are copper conductors.

BX CONNECTORS. After the armored cable is in place, Harbot connectors are put on the wiring outside the box. Taking up no precious space inside the box, the simple cast-aluminum devices grip the edges of knockout openings. Two machine screws pulled up on the cable fix it rigidly in any position. The connectors are available in... continued on p. 186
NOW! UNISTRUT® CHANNEL AND FITTINGS
APPROVED BY
UNDERWRITERS’ LABORATORIES
as a Surface Metal Raceway!

Long popular as a quick-erected, low-cost method of lighting support, UNISTRUT channel and fittings have now been approved for use as a surface metal raceway...for wiring lighting installations and for supplementary power wiring (up to 600 v.) of machines, motors, other lighting rows, etc.

Faster, Lower Cost Installation—The UNISTRUT system is quick and easy to erect from stock parts. No wire pulling necessary as wires are laid in the channel and closer strip snapped in place. Continuous channel support permits wider spacing of hanger stems, reducing installation time and costs. Lines tapped from the channel for supplementary wiring eliminate special lines and extra cost.

Neat Appearance, Complete Flexibility—Straight, strong and rigid, UNISTRUT channel gives lasting true alignment that's undisturbed by changes or servicing. Concealed wiring eliminates unsightly external power lines. Fixtures may be attached anywhere along channel length...ideal for continuous run or spaced fixtures. Attachment of hanger stems at any point on channel permits quick, simple installations in spite of ceiling irregularities.

In this building, UNISTRUT channel was used to support and wire a lighting installation on a concrete ceiling. Savings over conventional methods of installation were estimated at 50%! Note the neat, perfect rows of fixtures.

Lighting for a large manufacturing plant was solved fast by using UNISTRUT channel for support and wiring. Even on ceiling arrangements as this, using two types of fixtures, the UNISTRUT System installs quickly and easily.

UNISTRUT System goes up fast from stock channel and fittings!

The World's Most Flexible All-Purpose Metal Framing

Available now at your UNISTRUT Distributor

See your UNISTRUT Distributor for complete information on the UNISTRUT system of light support and wiring, or ask to have a UNISTRUT Demonstrator car brought to your door. Warehouse stocks in all principal cities. In Canada, Northern Electric Company. For export Pressed Steel Car Co., New York, N. Y. See your telephone directories.

Send for folder.
Write today for free copy of bulletin FF-3 and Underwriters' Laboratories Specifications.

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Company
Address
City
Zone
State

U.S. Patent Numbers
237587  2363398
2336855  2345970
2345650  24055631
2419088

Other Patents Pending
NEW PRODUCTS REVIEW continued

many types at 11¢ to 14¢ each. Unimatic Corp., 32 E. Centre St., Nutley, N.J. (June '54, p. 212).

RECESSED FIXTURE ASSEMBLY. Put in place with four nails, the Atlantic UL-approved assembly saves time on installations of the manufacturer's 60- to 300-w. recessed lighting units. Supply leads are brought directly to the factory-wired assembly box. The Atlantic lists at $5. Atlas Electric Products Co., 319 Ten Eyck St., Brooklyn 6, N.Y. (June '54, p. 210).

Communications

INTERCOM SYSTEM. Dial-X makes it unnecessary to redial a busy number. A sensing element keeps testing the called line and signals when that phone is hung up. Other features: executives with urgent calls can pre-empt lines by pressing a button which sounds a warning and then makes the connection; conferences can be called on one line; and announcements may be broadcast through the PA system. A 40-line layout fitted to handle 20 lines initially costs about $2,400 plus installation. Stromberg-Carlson, 109 Carlton Rd., Rochester 3, N.Y. (March '54, p. 250).

Direct-A-Call is a neatly designed push-button system for two to five-station, which can be plugged into any receptacle. It costs $25 per telephone plus $19.50 for power supply. Private Line is a dial system for 10 to 50 stations. Cost of 50-line system is $5,645, plus $600 power supply, plus wiring. Connecticut Telephone & Electric Corp., Meriden, Conn. (July '54, p. 203).

NURSE CALL. With Coach Call flush-mounted in the wall beside his bed a patient can communicate with his nurse at will. From her central station the nurse can monitor patients or initiate calls. Remote nurse's duty stations, patient's emergency priority stations, explosion-proof stations for operating rooms are among special features. Cost of a 36-station system is about $3,500. S. H. Coach Co., Inc., N. Quincy 71, Mass. (July '54, p. 208).

CONVEYOR TUBES. Mix and Genest and Lamson automatic pneumatic conveyor systems handle intrabuilding papers and materials via far simpler tubing than either manual or push-button layouts. Electrical relays—which work like phone dials—direct carriers in both new systems; no dispatchers are needed. Basic difference between the two is that in the Lamson, relays are located before each station and in the Mix and Genest, the actuators can be at a central point or decentralized. Automatic one-line systems with 360-carriers-per-hour capacity run around $2,500 per station, and two-line (600 carriers), $3,000 per station. Mix and Genest-International Standard Trading Corp., 22 Thames St., New York, N.Y. and Lamson System, 253 Madison Ave., New York, N.Y. (Aug. '53, p. 194).

Doors, controls, hardware

ALUMINUM DOORS. Moderately priced, these bolted-frame aluminum doors come in sizes from 3' x 7' up to 6' x 7' in single- and double-acting models. Bolts connecting the corners through top and bottom rails are held securely by vibration-proof locknuts. Each door is furnished with pull handle, push bar, plastic glazing channels, concealed closer, threshold and lock cylinder. A single-acting unit installs for about $215. The Knaeuper Co., Niles, Mich. (Oct. '53, p. 252).

Aircraft production methods are used in making O'Keeffe's sleek aluminum flush panel doors. Channel frames and outer skins of the lightweight (under 3 lb. psf) distortion-free units are aluminum. Cloth adhesive bonds the skins to the rigidizing core, which is either an all-aluminum full honeycomb or alternate strips of honeycomb and sound-deadening glass fiber. Doors are furnished in any size for metal or wood jambs.


Fashioned for contemporary facades, the "B" Series extruded aluminum doors feature butt-joint corners, weather-resistant anodized finish, beveled glazing stops, and custom-look handles, bars and push-pull plates. All 7' high, the entrances are continued on p. 188
"CLAY TILE...AN INSPIRATION TO DESIGNERS
...A BOON TO THE MODERN HOMEMAKER"

Done in subtly blended clay tiles of black, gray and white, Marcel Breuer, architect of UNESCO building, has designed a bathroom-sun garden that may well stimulate salable ideas for your next project.

Roomy, convenient clay tile counter-tops like this will take suds, wear and water for a lifetime. And the tile tub and recessed shelf demonstrates the practical and dramatic effects you can achieve with clay tile.

For durability and beauty, be sure to specify clay tile floors—walls and wainscoting, too. In the picture a scuff-proof, waterproof, no-wax clay tile floor leads invitingly to a sun garden. There, colorful clay tile, crisply accenting the outdoor flagstones, will resist fading and weather extremes for years.

When designing, building, or remodeling consider clay tile's qualities: unlimited design potential, incomparable durability, long range economy and minimum upkeep. Tile is sure to enhance any project—for years to come!

Tile Council of America, Room 3401, 10 East 40th Street, New York 16, N. Y., or Room 433, 727 West Seventh Street, Los Angeles, Calif.
NEW PRODUCTS REVIEW continued

SLIDING DOOR. A frame of natural wood sets off Westerner sliding glass doors. Oak sills and fir frame are treated against rot. The units also boast low price: a 6'-wide x 6'-8" unit is $70 unglazed and a 14' four-light group is $150. Each unit is weather stripped and fitted with hardware. T. F. Walker & Son Inc., 217 N. Lake St., Box 547, Burbank, Calif. (Feb. '54, p. 222).

HONEYCOMB CORE. Rigidly built to resist dimensional change in extremely humid climates, Chem-clad interior and exterior doors have resin-impregnated paper honeycomb cores between their hard plastic laminate faces. Only the frames for these stressed-skin units are wood. Their abrasion-resistant surfaces make them especially suitable for institutional use. Prices range from $30 to $60. Bourne Mfg. Co., 1573 E. Larned, Detroit, Mich. (Oct. '53, p. 356).

PACKAGED REVOLVING DOORS. Plant-assembled, these labor-saving entrances of revolving and swing doors need not inhibit the designer: a wide choice of metals, hardware, trim and door groupings can be made from stock components. A typical packaged unit costs $5,900 installed—about $1,000 less than separate items. All 6'-10" high, the doors fit under existing transoms without tricky alteration. A special control ($1,200 in place) motorizes the revolving section at a constant rate. International Steel Co., 1321 Edgar, Evansville 7, Ind. (June '54, p. 168).

HARDWARE. Instead of using standard door hardware in a Connecticut school, Architects Ketchum, Gina & Sharp summed up separate components in one cost-saving unit. Now produced commercially as Com-Vision No. HSC-3, the 6'-wide x 18'-0" hardware consists of a Y-shaped chromed brass pull, glass viewer and push plate in an aluminum frame with a cylinder lockset. Com-Vision costs about $57 installed, compared to about $70 for individual items. Hardware Sales Co., 383 Post Rd., Darien, Conn. (Oct. '53, p. 256).

WIDE-THROW HINGE. Offsetting a 1-3/8" door at a 90° angle, Stanley's BB 266 hinge allows full clearance of hospital corridor and bedroom doors for easy passage of beds and carts. Its wide-throw eliminates tacking of protective metal strips on doors. The self-lubricating ball-bearing hinge is made of heavy wrought steel in all standard finishes. The Stanley Works, New Britain, Conn. (Sept. '53, p. 236).

DOOR CONTROL. As someone steps on the 80"-long vinyl mat running through an entrance equipped with an Invisible Dor-O-Matic, the door will open—if the opposite side is clear. It stays open until the person walks through and then closes noiselessly. Adaptable to all types of stock doors, the apparatus' floor-concealed control actuates a remote 110-v. hydraulic power unit. If power fails, the door will work manually. Price for a single-door mechanism is $647.50 installed. Dor-O-Matic Div., Republic Industries, Inc., 4446 N. Knox, Chicago 30, Ill. (May '54, p. 231).

DOOR CLOSER. Rixson's heavy-duty closers can be furnished with a hold-open device for theater, school and other entrances subjected to the rush continued on p. 194
KENNARD EVAPORATIVE CONDENSERS AND COOLING TOWERS meet present day demands for efficient water saving. Rugged enough for Outdoor, quiet enough for Indoor, 3 to 75 tons.

KENNARD AIR CONDITIONING BLOWER UNITS are adaptable to all forms of air conditioning installations. 13 sizes, 400 to 21,600 C.F.M. Vertical or Horizontal.

Complete the job with other KENNARD products
Coils—Cooling or Heating. Multi-Zone Air Conditioning Units Heating and Ventilating Units Sprayed Coil Dehumidifiers Cooling Towers

KENNARD SHELL AND TUBE LIQUID CHILLERS
Revolutionary internally finned tubing (exclusive with KENNARD) makes them better than 50% lighter and smaller—positive oil return—no Freon head gasket—smaller Freon charge. Sizes 2 to 200 tons.
15 YEARS and not one penny spent for painting or maintenance on these aluminum windows!

PARK SCHOOL, Ossining, N. Y.
Architect: Frederick Mathesius

HERE'S PROOF YOU CAN STOP NEEDLESS AND WASTEFUL MAINTENANCE EXPENSE

in schools, hospitals, housing, commercial and industrial buildings, by insisting on Quality Approved

ALUMINUM
EXPERIENCE SHOWS... ALUMINUM WINDOWS SAVE MANY DOLLARS ON PAINTING ALONE

YES, Aluminum Windows actually DO SAVE YOU MONEY... They do help keep building maintenance expense at a minimum. Experience in hundreds of schools (like the one shown on opposite page), hospitals, and other types of buildings erected 15 to 25 years ago shows that not one penny was ever required for painting the aluminum windows.

That's why today, more and more architects are specifying "Quality-Approved" aluminum windows for every new building project they design. That, too, is why maintenance-conscious building owners and managers insist on "Quality-Approved" aluminum windows.

Aluminum windows, whether they be double-hung, casement, projected or awning type, are the only practical, reasonably-priced windows that never require painting... that cannot rust or rot, warp or swell... that retain their trim, modern-looking appearance for the life of the building.

A WORD OF CAUTION—Remember, that only aluminum is rustproof through and through. Mere surface protection against rust is not enough. Wear, unintentional scratches in delivery or installation may nullify any protective surface coating and soon require painting.

"Quality-Approved" aluminum windows are available through many manufacturers in sizes and styles that fit any exterior design treatment. For your protection and full satisfaction, insist on the "Quality-Approved" Seal when you specify or OK specifications.

For a copy of our 1954 window specifications book and names of approved manufacturers, consult Sweet's Architectural Catalog (Section 16a/ALU) or write direct to Dept. AF-8.

Aluminum Window Manufacturers Association
74 Trinity Place, New York 6, N.Y.


WINDOWS
Scores of modern hospitals like these have Conduit Weathermaster air conditioning:

- Georgia Baptist, Atlanta
- Detroit Receiving, Detroit
- The Moses H. Cone Memorial, Greensboro, N.C.
- John Sealy, Galveston
- Self Memorial, Greenwood, S.C.
- Hermann, Houston
- St. Vincent’s, Little Rock
- St. Vincent’s, Jacksonville
- Southern Baptist, New Orleans
- Woman's, Detroit
- Sandia Base, Albuquerque
- Baptist Memorial, Memphis
- Baylor University Hospital, Dallas
- U. S. Veteran’s, Houston

Best place to get well is in an air conditioned hospital. The Conduit Weathermaster® System serves many of the finest. This air conditioning, perfected by years of unmatched experience, permits the occupant of each room to dial his own climate. Operation is quiet; there are no moving parts within the room. Cross-contamination is eliminated; there is no recirculation of air. And installation can be readily engineered into an existing building.

Carrier Corporation, Syracuse, New York.

Better Mortar for Blocks

Because of their size and weight, concrete blocks require mortar with "body", plasticity and water-retaining capacity. Brixment meets all these requirements. It has the body necessary to support the weight of the unit and hold it up to the line. It has the plasticity necessary to prevent the mortar from falling off the long head joint, while the block is being placed in the wall. It has high water-retaining capacity, which gives the bricklayer more time to shift and adjust the block to its final position before the mortar stiffens.

It is the combination of these characteristics that makes Brixment the leading masonry cement for concrete block as well as for brick.
of sporadic crowds. Set in "contact" position, the mechanism engages and holds open a door until reset at "noncontact." It then functions as usual, closing the door quietly after each opening. The Oscar C. Rixson Co., 4450 W. Carroll, Chicago 24, Ill. (May '54, p. 231).

GARAGE DOORS. Borrowing bracing and riveting techniques from aircraft, this aluminum door spans openings up to 60' without posts or mullions. Weighing just 1 lb. psf, the big, corrugated unit can be opened and shut by hand. Various operating mechanisms are obtainable. Knocked-down doors up to 20' wide are $1.10 psf; from 20' to 60', $2 F.O.B. Los Angeles. Hardware is extra. Stevens-Thuet Co., Long Beach 13, Calif. (Feb. '54, p. 226).

S-shaped joint seals on steel panel Roly-Door allow it to adjust to an uneven garage floor for weather-tight closure. The sectional overhead units lift up and roll open completely inside the building. Each ribbed panel is welded and braced at key points to prevent sagging. The doors come in seven widths from 8' to 16' and 16 heights from 6'-6" to 14'. Prices: $100 to $600 F.O.B. Buffalo. Morrison Steel Products, Inc., 601 Amherst, Buffalo 7, N.Y. (April '54, p. 218).

GARAGE-DOOR OPENER. As a car or truck passes over either of two magnetic discs set in a driveway, the Electronic Door Keeper inside the garage opens the doors. Sensitive to masses of metal, the discs close a relay, activating the mechanism. The Keeper will not close doors behind a vehicle until clear by 7', and during power failure, keeps them open. When necessary, it can be switched on and off manually. Automatic Electronic Engineering Co., 2207 E. North Ave., Milwaukee 2, Wis. (Nov. '53, p. 214).

PLASTIC DOOR STRIP. Stan-Guards prevent painful finger-pinching accidents at the hinge side of a door by covering the crack with flexible plastic strip. The light gray plastic is held by extruded aluminum moldings, screwed to jamb and door. Price for one side of a wood door is $12.50; for an all-glass door, $21.50. The Stanley Works, 195 Lake St., New Britain, Conn. (July '54, p. 222).

Coal fired with a Will-Burt stoker provides low cost heating with a factor of greater safety

Efficient combustion assured under ever-changing fuel bed conditions with a Will-Burt Air Controlled Stoker makes bituminous coal the most practical fuel for low cost heating in schools, hospitals, institutions, greenhouses, country clubs, churches and so on. Automatic Air Control, an original exclusive feature available with Will-Burt Stokers, prevents starving or an oversupply of air to the fuel bed. Specify coal heating for schools, hospitals, and institutions, and wherever a factor of greater safety is of utmost importance.

Write on your letterhead for the Will-Burt Stoker Data Book, with engineering facts, dimension and installation drawings, suggested specification sheets, etc. Valuable to architects and engineers.

Heating, air conditioning

AIR CONDITIONER. The Flexazone's three major components—coil, blower and damper—can be job-assembled 24 different ways according to air-conditioning needs and space available. Intake air is blown past the heating or cooling coils through one to eight individual dampers in air streams of different temperatures called for by zoned thermostats. Models are made with capacities of 1,300 to 24,000 cfm. Price for a 30 T. unit, uninstalled, is about $1,750. Drayer Hanson, Inc., 3301 Medford St., Los Angeles 63, Calif. (April '54, p. 196).

PANEL GRID. Factory-formed Panel Grids can cut costs on copper-coil radiant ceilings or walls by 4¢ per lin. ft. since the single-size PG can meet all panel design requirements. Fabricated from 50' lengths of 5/8" tube, the 6"-spaced loops have enough give to be squeezed 4¼" apart or stretched to 12" to fit varying space and radiation needs. Opened from its bowknot shipping shape, each 56" x 60" PG (serving 30 sq. ft.) is neatly secured with fewer straps or ties than site-bent coils. The American Brass Co., Waterbury 20, Conn. (Oct. '53, p. 254).
Specify time-saving LATEX PAINTS to complete the job ahead of schedule!

They dry so quickly painters can apply two coats in a day... and there's no long wait for plaster to cure!

You can have buildings ready for occupancy ahead of schedule with latex paints. These durable paints can be applied soon after plastering, even over hot spots. They dry so quickly on any surface that painters can recoat them, if necessary, the same day. And those aren't the only time-saving advantages! They can be put on quickly because they flow on smoothly... leave no brush or lap marks that need going over again. This means painters can do a top-quality job in a minimum of time!

They dry to a tough, impermeable film that's durable, cleanable... can be simply wiped clean with soap and water.

Leading paint manufacturers make latex paints available in a wide range of colors and will supply you with further information on latex paints upon request. For a list of their names, write Dow Plastic Sales, Department PL 515M, THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW PLASTICS
STEAM SYSTEM. Planned for motels, hotels and rambling structures, Selcetemp steam heating system handles unlimited heating zones. A boiler feeds steam to the wall-mounted heaters via ¾” copper tubes. Each room unit has a copper heat exchanger, steam-turbine driven fan, filter and thermostat. The units in unoccupied rooms run at 1/20 capacity; when the thermostat is turned up, the ready steam supply can warm the air almost immediately. Selcetemp's cost is competitive with other wet systems, but less than most requiring zone controls. Iron Fireman Mfg. Co., 3170 W. 106th, Cleveland 11, Ohio (March '54, p. 256).


HEAT LAMP. Delivering triple the radiation of a conventional 375-w. infrared lamp, this new heat bulb can do such jobs as dry paint or solder metal. Its two filaments are operable at three wattages—650, 900 and 1,500—allowing precise control of infrared output. The bulb sells for $25. Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y. (March '54, p. 238).

Air distribution

PANEL DIFFUSER. Attached to the neck of this neat air diffusor is a flexible plastic and rubber hose connection which makes it possible to shift the modular 1' x 4' unit from one spot in a suspended ceiling to another without relocating main ductwork. As for balancing air distribution when room layouts change, a screw-regulated damper built into each diffuser controls air volume but does not alter the air throw. Outlets cost about $26 each, in place. Connor Engineering Corp., Danbury, Conn. (April '54, p. 184).

DIFFUSER. Designed for air-conditioning systems which serve interiors with changeable heat loads, the Kno-Draft ceiling diffuser regulates air flow at the point of discharge. A thermostat-controlled damper in each unit moves the sleeve up or down to vary the air volume without altering the air pattern. Connor Engineering Corp., Danbury, Conn. (Jan. '54, p. 196).
ALL 14 BUILDINGS in Rockefeller Center, New York City, have floors reinforced with American Welded Wire Fabric. This high quality fabric comes in prefabricated rolls, wound on large mandrels in any style you need.

FACTORY FLOORS—pounded day after day by heavy traffic and vibration—need the extra protection of American Welded Wire Fabric.

It's American Welded Wire Fabric for the strongest concrete

Don't worry about the strength or durability of your concrete work if you reinforce it with American Welded Wire Fabric. American Fabric doesn't just meet the new ASTM Specifications A185-53T; it often exceeds them. It assures you an extra margin of safety in concrete walls, floor slabs, driveways and roofs, whether they are pre-cast or poured at the job site.

We make sure our fabric is the best quality by rigid inspections that check size and spacing of wires, soundness of welds, and strength of the finished product. This assures you high quality concrete work that is just as strong and crack-resistant as you designed it.

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EVERY TYPE OF REINFORCED CONCRETE CONSTRUCTION NEEDS

USS AMERICAN WELDED WIRE FABRIC

UNITED STATES STEEL
DUCT FITTINGS. Interlocking seams on Duc Pac galvanized metal duct fittings make bends, folds and hammering unnecessary. A sheet-metal worker can assemble any prescribed air-conditioning ductwork with the stock components. Prices for a few of the many items: $2.71 for a 14" x 8" offset collar, $2.50 for a flat 90° elbow 4" x 8", and $5.52 for a 24" x 8" trunk duct. Sweet Bros., Duc Pac Div., 78 Island Pond Rd., Springfield, Mass. (April '54, p. 190).

SLOTTED DUCT VANES. These packaged vane runners with slotted knobs reduce the sheet-metal handicraft necessary for air-conditioning ducts. Blades are cut from scrap, the vanes locked in place with shears or hammer, and the assembly screw-fastened into an elbow for a rattleproof job. Runners are 24-ga. galvanized steel, and come in bundles of 20 8' lengths at $32 F.O.B. plant. Elgen Mfg. Corp., 31-34 39th St., Long Island City 4, N.Y. (April '54, p. 196).

Insulation

GLASS FIBER. Fire-safe and rotproof, Aerocor Fiberglas products fit any conceivable insulation job. Aerowrap, a soft padding, wraps around cold and hot pipes. Covering a 4" line with 1"-thick material and aluminum jacket costs about 50¢ per lin. ft. Flexible Duct Insulation, a lightweight thermal and acoustical mat, is used on warm-air or air-conditioning ducts. It is 5¢ to 35¢ per sq. ft., depending on thickness, density and type of facing. Applied inside ductwork, Flexible Duct Liner makes the metal walls act as their own vapor barrier. According to thickness, prices are 16¢ to 26¢ per sq. ft. Metal Building Insulation is a resilient blanket bonded with resin for use between metal siding or roofing and structural members. It is 5¢ to 15¢ per sq. ft. Fluffy, porous Sanocor rolls and precut pads for acoustical ceilings have high sound absorption. Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo, Ohio (Jan. '54, p. 208).

A glass-fiber core in a .016" aluminum jacket, Met-L-Glass pipe insulation is virtually impervious to weather. Applied to outdoor lines at a density of 6 lb. per cu. ft., the jacketed blanket costs 45¢ to $6.60 per lin. ft. depending on size. The aluminum sheath is available separately at 22¢ to $1.85 per lin. ft. for recovering existing insulation. Met-L-Glass Corp., 2220 25th St. S., Seattle 44, Wash. (Dec. '53, p. 166).

PETROLEUM GRANULES. Gilsulate solidified petroleum insulation protects underground pipes from corrosion and root attacks. Similar to asphalt, the granules are poured into shallow trenches around the pipes, tamped down and back-filled. Hot fluid or steam, run through the line, fuses the inner layer in a dense semiplastic. Around this form two other thermal layers. No sheath is needed; multiple runs and bends are insulated as easily as single straight pipes. Overall cost is said to be $5 to $30 less per lin. ft. than comparable materials. American Gilsonite Co., 248 S. Main St., Salt Lake City, Utah (Nov. '53, p. 204).

INCOMBUSTIBLE VAPOR BARRIER. Plastic vapor barrier which chars at 350° F. but does not support combustion reduces the hazard of factory fires. Tough, flexible film, .004" thick, is made of special Koroseal, costs 21¢¢ to 3¢ per sq. ft. Special adhesive for sealing joints costs about $1.75 per gal., may also be used for securing film to deck. Lexaco, Inc., 4815 Lexington Ave., Cleveland 5, Ohio (July '54, p. 206).
Efficient recessed downlights... now with a fresh decorative appeal that makes them doubly-effective for showrooms, restaurants, reception areas, residences. Gleaming brass and sparkling, champagne-tinted glass add a feeling of warmth and elegance. Colouvered® lens and alumilite reflectors assure maximum light output without side glare. Torsiontite® hinges, pre-wired adjustable construction permit quick installation, easy maintenance. Fiberglass gaskets reduce convection currents, eliminate ceiling dust streaks. These designs help solve the often perplexing problem of specifying efficient lighting that is also a decorative accent.

Write today for a complete portfolio of Architectural Lighting by Lightolier.

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Preferred by Architects, Interior Designers and Illuminating Engineers for Fifty Years.
NEW PRODUCTS REVIEW continued

Sound control

ACOUSTIC TILE. Each recessed perforation on Tene-coustic metal tile acts as a tiny funnel, channeling noises to insulation pads above. These round-edged orifices do not scrape water during cleaning, instead prevent dirty water from backing up. Tile pad and suspension system cost about 30¢ psf plus 25¢ to 35¢ for labor. Tene-coustic ceilings have a .50 noise-reduction coefficient.

The usual boxy appearance of acoustical tile wall and ceilings are camouflaged by Minatone's scatter perforation. Highly absorptive and incombustible, the tile is usable wherever codes stipulate fire-resistant material. Costed with light-reflecting white paint, it comes in 1'x1' and 1'x2' sizes. Armstrong Cork Co., Lancaster, Pa. (March '54, p. 256).

Random-grooved Stria sound-control tile works into many decorative patterns. Its highly porous surface of compressed glass fiber gives it a noise-reduction coefficient of .80. Firesafe, dimensionally stable and rotproof, the striated tile comes in 1' squares and 1'x2' size, and installs for 50¢ to 65¢ psf. Owens-Corning Fiberglas Corp., Nicholas Blvd., Toledo 1, Ohio (March '54, p. 244).

Fire control

ROOF FIRE VENT. Fire Valse is a packaged metal unit holding 9 5/8 x 5 5/8 roof opening. When fire melts the 160° fusible links, dampers drop by their own weight, providing a clear opening of 46 sq. ft. for escape of heat and gases. Unit can also be used as roof ventilator. Prices: $190 in galvanized steel, $285 in aluminum. Swartzport Co., 18511 Euclid Ave., Cleveland 12, Ohio (July '54, p. 214).

Flooring

CONDUCTIVE TILE. Conductive flooring is regarded generally as one essential safety material for hospital operating rooms where volatile anesthetic gases are used. Three conductive tile products recently marketed are made for just such locations. One type is vitreous ceramic. Pigmented warm brown, the 9/16" squares are installed for 50 psf. Mosaic Tile Co., Zanesville, Ohio. (Sept. '53, p. 232).

A terrazzo-patterned 1/4" vinyl which is laid dry over any kind of subfloor, Lifetile floor conducts static electricity through its butted edges and via a layer of aluminum foil beneath the wall-to-back units. It is made in three pastel tones in 9" and 12" squares, and costs $2.50 psf in place. Robbins Floor Products, Tuscaloosa, Ala. (Sept. '53, p. 232).

continued on p. 202

NEW PRODUCTS REVIEW

School Architects Specify COOKSON

EXTRUDED ALUMINUM

COUNTER DOORS

- Lifetime beauty
- Smooth, easy rolling
- Rugged protection

Proved for schools, offices, cafeterias and stores

Durable slots of "Alumilited" extruded aluminum, resistant to denting, scratching or other damage. Corrosion and rust proof. Nothing to chip or wear off. Requires no painting or maintenance. Easy to clean. Counterbalanced for effortless operation, push-up or with removable crank.

Opens clear, without obstruction. Custom built to specified openings up to 20 ft. wide. Lifetime lubricated ball bearing mounted. Ideal as counter doors, or floor to lintel division between kitchen and multipurpose rooms, etc.

WRITE FOR COMPLETE CATALOG with specifications, description and illustrations of extruded aluminum counter doors, steel rolling grilles, steel rolling service doors and Service fire doors, and specialty doors. Available on request without obligation.
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FROM EVERY ANGLE

Use this guide to plan present and future boiler installations

Here are basic reasons why Cleaver-Brooks self-contained boilers SAVE money wherever installed. Remember these advantages when expanding your present plant or replacing obsolete boilers. For complete details, write for catalog AD-100, Cleaver-Brooks Co., Dept. J, 336 E. Keefe Avenue, Milwaukee 12, Wisconsin, U.S.A. — Cable address: CLEBRO — Milwaukee — all codes.

• SAVES FUEL — greatest efficiency and fuel economy through high-heat transfer of four-pass, forced draft boiler design.
• SAVES SPACE — boilers are compactly self-contained. Use less boiler room area. Fit into low headroom locations.
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• SAVES MAINTENANCE — oil, gas or combination oil/gas firing eliminates bulky fuel handling. Designed for easy cleaning and inspection.
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• SAVES INSTALLATION COSTS — no special foundation needed. Set boiler on existing concrete floor. Simple, roof-high vent eliminates costly smoke stack. Service connections conveniently located.
• SAVES THRU FUEL FLEXIBILITY — uses most economical and available fuel in your area. Exclusive burner permits 10-second gas/oil interchange.
• SAVES BY QUICK STEAMING — meets fluctuating steam loads automatically. Electronic controls start and stop burner. Safety controls assure 100% protection.
• SAVES MANPOWER — fully automatic operation. All controls easily accessible and all normal maintenance can be done by men without special training.
• SAVES PLANNING TIME — standard design in 15 to 500 hp; 15 to 250 psig gives you custom planning for single or multiple units.

IT PAYS TO PLAN FROM ALL ANGLES TO GET GREATEST BOILER ECONOMY — PLAN WITH CLEAVER-BROOKS — WRITE FOR DATA TODAY

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ORIGINATORS OF THE SELF-CONTAINED BOILER
Aluminum sheet gave us best value

"ALUMINUM SHEET was an obvious choice for our Lynnville plant," says Mr. Kelce, "because it was lower in cost than any other building material offering so many advantages.

"The corrosion resistance of Kaiser Aluminum sheet was a big plus, because the plant is subject to corrosive fumes and gases. And of course, aluminum sheet is so strong and durable it will last many years without maintenance of any kind."

Not only does Kaiser Aluminum Industrial Roofing and Siding give extra value at low cost, it provides immediate savings. Its light weight means reduced transportation, handling and erection. In addition, it often requires a lighter, less-expensive under-structure.


NEW PRODUCTS REVIEW continued

Another resilient tile is the 9" marble-patterned Conductile. This ½"-thick thermoplastic flooring is said to resist indentation from heavy equipment. Its conductivity is guaranteed for five years, and it installs for $2.25 to $2.50 psf. Vinyl Products, Inc., Sheboygan, Wis. (Sept. '53, p. 232).

RADIANT FLOOR FORMS. Interlocking metal forms shaped like groined vaults assembled on top of a 2" slab and covered with 2" of concrete result in a 7½" floor with a continuous plenum for heating or cooling. Continuous baseboard registers or standard floor or wall registers may be used. Forms of 26-ga. steel are 1' square by 3½" high, weigh 1 lb. and cost 34¢ each F.O.B. Airfloor Company of California, Inc., 8620 Otis St., South Gate, Calif. (July '54, p. 210).

INDUSTRIAL FLOOR. Heavy steel mesh and resilient topping are combined in Steel-Rock packaged flooring to withstand impact and loads for the life of the building. The cushioning filler compacts to the level of the armor grid so truck wheels can ride over the surface without noise or slipping. The material may be applied on wood or concrete surfaces, new or old, indoors or out. Steel-Rock costs 80¢ to $1.20 psf depending on depth of reinforcing, plus 30¢ to 50¢ for labor. United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio (March '54, p. 262).

SLIPPROOF SURFACING. Treating treacherous floors, steps and ramps with Safety-Walk can ward off many foot-traffic accidents. This durable gritty material is a tough waterproof fabric coated with synthetic grains. It comes in various shapes and sizes in two types: Type B, with pressure-sensitive adhesive, goes on like tape; Type A, prepared for rough concrete, is applied with liquid adhesive. Safety Walk strips for a 12-strip stairway cost $6.60. Minnesota Mining & Mfg. Co., 900 Fanquier Ave., St. Paul, Minn. (Jan. '54, p. 200).

ALUMINUM SAFETY TREADS. Stairmaster extruded aluminum treads brighten all types of worn stairs and add life and safety to new ones. Firmly embedded in the metal ribs of the 9"-deep units is a black abrasive antislip compound. Treads are precut to any length. Wooster Products, Inc., Wooster, Ohio (April '54, p. 202).

CORK-NEOPRENE SANDWICH. Eliminating costly bolting of machinery, and engines to floors, VPS Elasto Rib Dampers add flexibility to heavy industrial equipment. The cork and synthetic rubber sandwich impedes noise and vibration, and its deep grooves keep heavy machinery from creeping. VPS runs $1.20 for 2" squares (for 200-lb. on p. 204 continued in p. 204

Kaiser Aluminum

INDUSTRIAL ROOFING AND SIDING

Get all these advantages with Kaiser Aluminum Corrugated Sheet

Light Weight—Reduces transportation costs. So easy to handle that construction is faster, lower in cost. Often permits the use of lighter, less expensive framing.

Strong—The increased depth (½") of the corrugations of Kaiser Aluminum Roofing provides greater load carrying capacities over the longer spans required in modern industrial construction.

Corrosion Resistance—High resistance to most industrial fumes. Can't streak with red rust stains. Maintains its attractive appearance indefinitely.

Low Maintenance—Never needs painting. Resists heavy winds and hail.

Cooler, Brighter Interiors—By reflecting hot sun rays, aluminum keeps interiors as much as 15° cooler. Aluminum's high reflectivity insures extra interior light.

Low Cost—Provides a combination of advantages not available in other materials at any price.
Offer clients these benefits by specifying

**ART METAL advanced ELIPTISQUARE**

with clear, prismatic **AMCOLENS**

- Lighted objects reflect their true color value
- Highest light transmission efficiency
- Precise light direction control
- Edge light to ceiling for visual comfort
- Shallow recessed lens lighting

Eliptisquare reflector redirects all box-enclosed light downward through AMCOLENS to multiply lamp light utilization.

May we send Bulletin 254 which gives complete details? Please write:

**THE ART METAL COMPANY**

Manufacturers of Engineered Incandescent Lighting
WHAT'S YOUR I.Q.
ON NATURAL, RED OR WHITE Birch?

HARDWOOD PRODUCTS
Solid Core Door

VEENEER DATA helps you maintain uniformity on all specifications

Do you know that most Birch veneer used in quality doors comes from one specie? Confusing as it may seem, Natural, Red and White Birch actually all come from the Yellow Birch tree! Regardless of type, however, HPC Birch Veneer doors are carefully matched for a pleasing decorative effect.

NATURAL BIRCH (sometimes referred to as unselected) is a mixture of heartwood (Red) and sapwood (White). Natural Birch is selected for quality but not for color. It is available on Hardwood Doors in 1/8" Rotary Cut, 3/16" Sliced, 1/4" and 1/2" Sawn veneers.

RED BIRCH is the heartwood of the Yellow Birch tree, and is selected for both color and quality. Selected Red Birch Veneer on Hardwood Doors comes in 1/8" rotary cut and 3/16" sliced.

WHITE BIRCH is the sapwood of the Yellow Birch tree, and is selected for both color and quality. Selected White Birch Veneer on Hardwood Doors is available in 1/8" Rotary Cut and 3/16" Sliced.

Don't take chances with veneer species, color or grain when matching doors or surroundings. Consult us or refer to Sweet's Building Data on Veneers for complete species information. When matching doors or surroundings, consult us or refer to Sweet's file for complete veneer data on Solid Core Hardwood Doors.

HARDWOOD PRODUCTS

Sound Insulating Doors

America's finest doorway closure for reducing noise penetration — insuring room privacy. Send for our FREE brochure describing these doors in "easy-to-understand" non-technical language.

HARDWOOD PRODUCTS CORPORATION

HARDWOOD PRODUCTS CORPORATION • NEENAH • WISCONSIN

NEW PRODUCTS REVIEW continued

loads up to $12 for 1 square (for 8,500 lb.). The Kortland Co., Inc., 48-15 32nd Pl., Long Island City 1, N.Y. (April '54, p. 230).

Wall coverings

WOOD VENEER. A natural material handled naturally, Randomwood flexible hardwood wall covering plays up irregularities in grain shadings and markings. The gaule-backed 1/8" veneer is paste-applied over any smooth surface like wallpaper. It can be purchased in walnut, mahogany, tulip, oak, birch and tigerwood at 50¢ sf. Sheets are 15" wide, 8' and 10' long. US Plywood Corp., Weldwood Bldg., New York 36, N. Y. (June '54, p. 204).

FABRICS. Laminated to the backs of Ruskin textured wall coverings are layers of foam rubber, sponge rubber or felt. These cushioned backings act as sound absorbers and also make it possible to use the woven fabrics for tackboards. Prices run from $2.25 per yd. for 36"-wide jute with felt backing to $3.18 for a 36"-wide basketweave with foam rubber. Color choice is excellent. R. F. Ruskin & Co., 1410 Wood Rd., New York 63, N. Y. (April '54, p. 209).

Finishes and compounds

MASONRY PRIMER. A good finish for hard-to-paint porous masonry is said to be assured with Medusa's Red-Seal cement paint. Developed particularly for lightweight aggregate masonry, the white primer is worked into the surface with a scrub brush and cured like regular cement paint with a fine water spray. A 25-lb. package sells for $5.75. Medusa Portland Cement Co., 1000 Midland Bldg., Cleveland, Ohio (Oct. '53, p. 250).

LATEX ENAMEL. Drying quickly to a durable, washable finish, Spred Gloss latex base enamel has no odor and so can be applied in closed rooms without disagreeable effect. The tough coating is ideal for woodwork exposed to constant finger smudging. It sells for $6.95 per gal. which covers about 450 sq. ft. The Glidden Co., Union Commercial Bldg., New York City 1, N.Y. (April '54, p. 206).

CANNED SILICONE. After 24 hours at room temperature, RTV Silastic canned calking develops all the favorable properties of silicone rubber: temperature stability, water repellency and chemical resistance. The compound is shipped as two parts which, when mixed, create a heatless vulcanizing action, setting the material in four hours, curing it in 24. RTV costs about half as much as molded or extruded silicones. Dow Corning Corp., Medusa Portland Cement Co., 1000 Midland Bldg., Cleveland, Ohio (Oct. '53, p. 246).

SPRAYED PLASTIC. Delru Transparent, sprayed on fresh concrete, forms a hard, smooth, waterproof seal which reinforces a long slow cure without further attention. Material can also be sprayed on...
For the Answers to Your Wiring Problems...

ASK THE MEN WHO KNOW

At General Cable our engineers devote themselves as much to customers' wire and cable problems as they do to the design and manufacture of the products you buy.

We would like you to think about this engineering service next time you face a wire or cable problem.

You see, our engineering staff is recognized as one of the industry's most authoritative groups of its kind. Ready at any time...to go anywhere, General Cable engineers can assist you in the solution of any electrical wire or cable problem...can quickly recommend and provide the most practical product for the job at the least possible cost.

So—on any problem—transmission, distribution, power, control, lighting, or electrical equipment, check General Cable first. You'll be dealing with the men who know.

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Here is the carpet that produces the maximum in comfortable working hours—because it is fatigue proof. The built-in sponge rubber cushion stays fully resilient for the life of the carpet...no matter how many hundreds or thousands of people walk on it per day.

LOMA LOOM is not only economical to install but it lasts longest and stays colorfully fresh—because it is a blend of tough nylon and sturdy wools.

LOMA LOOM preserves floors and can be laid on wood, tile or cement. Specify LOMA LOOM.

Selling Agents: WEIL BROS. TEXTILES, INC., 31 East 32nd Street, New York 16, N. Y.
Industrial noise costs $4,000,000 every day!

You know all the losses industrial noise can bring—worker fatigue, absenteeism, labor turnover, accidents—$4,000,000-a-day worth! But you can avoid them if you keep one basic idea in mind when you plan your building.

It's a wonderful new building idea called Fenestra® Acoustical Holorib. It's a combination acoustical-structural roof.

And it costs as little as 75 cents per sq. ft....installed!

In one compact unit you get: (1) perforated, heavy, 18-gauge Holorib Steel Deck, which provides a smooth-finished, metal-faced interior ceiling (2) sound-absorbing element which also provides efficient heat insulation (3) strong steel surface for support of 1" wood fiber insulation and finished roofing.

Holorib is lightweight. It saves you building time, labor, materials and money. It's almost maintenance-free but, if you want to, you can wash or paint it time after time without cutting its acoustical efficiency a bit. And it is noncombustible!

There is no comparable building material. That's why you'll find Acoustical Holorib Roof Deck in the General Motors Technical Center, Warren, Michigan; Standard Pressed Steel Company, Jenkintown, Pennsylvania; Simmons Saw & File Company, Fitchburg, Massachusetts, and many other modern structures.

Write today for complete information—or have your architect write—and check on Fenestra floor panels and wall panels. Fenestra Metal Building Panels speed building and lessen the need for structural steel. Write E. A. Miller, Manager, Building Panel Division, Detroit Steel Products Company, Dept. AF-8, 2296 East Grand Boulevard, Detroit 11, Michigan.

Fenestra® METAL BUILDING PANELS

Your need for a maintenance-free, noncombustible, built-in acoustical treatment encouraged us to develop Fenestra Acoustical-Structural Building Panels—a great advancement in building products.
NEW PRODUCTS REVIEW continued


LIBRARY CUBICLE. Prefabricated Study Carrel weighs less than 100 lb. and can be erected in ten minutes without tools. Used singly or in groups, the 4' x 8' "office" provides desk, concealed fluorescent light, bookshelf and space to receive visitor. Homasote walls are sound-absorbent. Carrel is finished in neutral gray washable lacquer and sold for $215 F.O.B. Design & Production, Inc., 1912 Duke St., Alexandria, Va. (July '54, p. 223).

Playground equipment

SCULPTURAL GYM. These dynamic, pleasing sculptural forms are actually play places in and on which children can exercise muscle and fantasy. Safely engineered of modern building materials—concrete, plastic, glass fiber, steel—the esthetic constructions by international artists and architects combine athletic values of slides and gyms while adding eye interest to playgrounds. Models are priced from $300 up to $3,500. Creative Playthings, Inc., 5 University Pl., New York, N. Y. (Oct. '53, p. 246).

SPRINGY COATING. An antiskid cushioned surface, Parafall absorbs the shock of a child's spill from jungle gym, swing or see-saw. Applied like black-top, the blanket consists of a bottom pad of long-lived springy rubber particles poured on the existing surface, a resilient membrane, and a spray- or trowel-applied tough rubbery coat. Called Parasurf, this final topping can be used alone on slippery spots indoors and out. Parafall is $74¢ psf for 1" depth, $1.35 for 3"; Parasurf is 8¢ to 15¢. Southern Chemicals, Inc., 5225 Wilshire, Los Angeles 36, Calif. (Dec. '53, p. 176).

Appliances

COMPLETE KITCHENS. Where there is little space for food preparation—in a motel, small apartment or classroom—combination appliances are most welcome. The 42"-wide General Chef features a double sink, 6 cu. ft. refrigerator, broiler and range. Acme National's 36"-wide kitchen unit has a large, stainless-steel sink and two-burner range set over a 5 cu. ft. refrigerator. Both appliances are made in gas and electric models. General Air-Conditioning Corp., E. Dunham St., Los Angeles, Calif. Acme-National Refrigeration, Inc., 90th Ave., Long Island City, N. Y. (Feb. '54, p. 222).

LAVATORY WATER HEATER. Inside the compact cabinet for this porcelain sink is an insulated, 5-gal. water heater. Suitable for motels, stores and other buildings where it is impractical to run lengthy hot water lines, the dual UL-approved appliance retails for only $109.50. Bowen Water Heater Div., Handling Equipment Mfg. Corp., Wieson, Mich. (Feb. '54, p. 222).

FOOD DISPOSERS. To help restaurants achieve assembly-line economics, the In-Sink-Erator is now producing 1/2 hp high-capacity commercial grinders. Two models with stainless-steel hoppers can be placed in countertops. A third, for diet kitchens, attaches to a sink bowl. Prices: $240 to $300 F.O.B. Racine. In-Sink-Erator Mfg. Co., 1225 14th St., Racine, Wis. (April '54, p. 290).

continued on p. 214
It's as true today as it was 100 years ago... there's no limit to the types of buildings where you can specify and use Terne Metal Roofing. Terne can be applied on nearly every kind of building. You'll find this versatile metal on any type residential and commercial building—on churches, schools, apartment buildings, cottages, mansions, and modern ranch type homes.

Follansbee Terne Metal is available in 50 ft. seamless rolls in various widths to 28 inches. This eliminates numerous unwanted, unsightly cross seams. Consequently, your clients get a better job that is more economical to install, as less seams mean less cost. It's a better looking job, too.

Terne isn't limited to one style, either. There's the batten and standing seam for roofs having 2 1/2" pitch or more. For roofs with pitch less than 2 1/2" there's the flat lock soldered seam.

What's more, Terne can be painted immediately upon installation. Thirty-seven major paint manufacturers offer a wide variety of colors of paints for Terne Metal Roofs.

Follansbee Terne Metal is backed up by more than 100 years' experience. Investigate this trouble-free, lifetime roofing and weathersealing material for your clients today.

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Write for file A.I.A. 12-C-1 for full particulars

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Fresh air is supplied to individual air conditioning units through intake louvers on the exterior face of the new Texaco building, between the vertical fins which decrease the sun heat load. (See circle above.)

17 STORIES—NO BASEMENT!

If you were in New Orleans and stopped to admire the 17 stories of architectural beauty bearing the well-known name Texaco you would have no reason to suspect that under this modern building there is no basement. Because the site was soggy soil it was necessary to drive clusters of concrete piling to a depth of 85 feet and set the welded steel building frame on top of the groups of piling. To reduce the building load the frame was enclosed within curtain walls of aluminum and glass, and the broad vertical section which carries the Texaco sign was faced with porcelain enamel panels. On exposures subject to direct sunlight aluminum fins decrease the heat load and reduce air conditioning costs. Individual air conditioning units, automatically controlled, are located beneath window sills. Two 200-ton refrigerating machines and two gas-fired steam boilers deliver cooling and heating to these units. As in a high majority of notable buildings of all kinds throughout the nation, Sloan Flush Valves, famous for efficiency, durability and economy were installed throughout the new Texaco building—more evidence of preference that explains why . . .

more Sloan Flush Valves are bought than all other makes combined

Sloan Valve Company • Chicago • Illinois

Another achievement in efficiency, endurance and economy is the Sloan Act-O-Matic Shower Head, which is automatically self-cleaning each time it is used! No clogging. No dripping. Architects specify, and Wholesalers and Master Plumbers recommend the Act-O-Matic—the better shower head for better bathing.

Write for completely descriptive folder
all interior room doors too!

...should close automatically

with **RIXSON** closers

concealed in the rigid floor

installed, they really cost no more

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  Office Room and Suite Doors • Toilet Room Doors • Cafeteria Doors

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  Hospital Supply Room Doors • Hospital Utility Room Doors
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CONCEAL THE CLOSER AND EXPOSE THE BEAUTY OF THE DOOR
No unsightly arms or mechanism exposed to tampering—or dust and dirt.

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<td>Hancock Lumber Limited, Edmonton, Alberta</td>
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**these selected acoustical specialists are trained for efficient installation**

The Simpson Certified Acoustical Contractors listed at the left are outstanding experts in the field of noise control. They have been selected by Simpson's acoustical staff as the foremost firms in each territory. Through constant inter-communication, periodic group meetings with Simpson experts, and on-the-job training of their mechanics, these acoustical contractors are amply qualified to make the best use of Simpson's fine acoustical materials .... including the new Forestone fissured fiber tile.

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amazing NEW development!

Forestone
FISSURED FIBER ACOUSTICAL TILE
(PATENT PENDING)

FISSURED FOR BEAUTY...FIBER FOR ECONOMY

For the first time in history you can have an acoustical ceiling combining the rich, travertine-like charm of fissured tile with the economy of fiber tile. Forestone, an exclusive Simpson research development, has three basic advantages:

BEAUTY
Forestone has a natural look, creating a ceiling of architectural distinction. Its flame resistant finish has a warm, cream tone that blends with every type of wall and all decorative schemes. Available square edge as well as beveled, Forestone is the first fiber tile that permits an “overall” pattern without accentuated joints. Either beveled or square edge, the irregular, random-spaced fissures create a distinctive pattern of light-and-shade.

ECONOMY
Forestone has the basic economy of wood-fiber, with its low cost and ease of installation... the attractiveness and distinction of fissured mineral tile, but at much lower cost. Never before has the beauty of fissured tile been available in this price range.

EFFICIENCY
Forestone has high sound absorption, equivalent to fissured mineral tile or perforated fiber tile of equal thickness. Forestone is an efficient acoustical material that is beautiful and economical.

GUARANTEED
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and Simpson Acoustical Contractors
Materials handling

AUTOMATIC LIFT. A small hydraulic lift for factory and warehouse loading platforms, the Load-o-matic starts to rise automatically when the wheels of a hand or motor truck touch a switchbar in the front of its 8'-6" x 4' platform. When the hinged ramp is level with the truck floor the lift stops, the plant truck is unloaded and backed onto the lift for the automatic descent. It has a 3-ton capacity and runs on a 3-hp motor. Price is about $1,800 F.O.B. plant. Field Engineering Co., 66 Foote Ave., Jamestown, N. Y. (Aug. '53, p. 190).

HALF-CAB TRUCK. Long pipe, lumber, structural steel and other construction materials usually toted by tractor or trailer can be accommodated on the Murty flat-top truck. Its cab is offset to make deck room for long, clumsy and heavy cargoes. The single-axle truck ($8,450) with 25' deck can carry 10 tons. The dual-drive ($12,200) with 30' deck will take 15 tons. Said to handle easily in traffic and parking, each model has a 150-hp engine. Murty Bros., 906 E. Third Ave., Portland, Ore. (Aug. '53, p. 190).

Maintenance

POWER BROOM. Whisking debris from floor to hopper, the heavy-duty 2-hp Turbo-Sweep can clean 40,000 sq. ft. an hour. The turbine-principle maintenance machine raises no cloud of dust, and all its controls are on a console within easy reach. Price F.O.B. plant is $648. Parker Sweeper Co., 91-99 N. Bechtle Ave., Springfield, Ohio (March '54, p. 262).

MAINTENANCE TOOL. Shooting a slug of compressed air, the Hydraulic Water Ram forces a column of water against solids clogging a drain pipe or sewer, disintegrating the trouble-maker. The Ram sells for $86, and is a useful maintenance item for big buildings where after a few uses it pays for itself in plumbers' calls. Hydraulic Mfg. Co., Kiel, Wis. (May '54, p. 220).

Instruments

PLASTIC RULE. By pushing the middle strip of the Steel Beam Selector slide rule, a designer can quickly determine the most economical laterally supported steel beams for a light construction job. The Selector sells for $4 with a simulated leather case. Everett Rader Co., Box 122, Bowling Green Station, New York 4, N. Y. (Nov. '53, p. 216).
1,000 steel sash by Copco for new CHRYSLER PARTS PLANT

This modern "MOPAR" parts plant at Centerline, Michigan, (W. L. Couse, General Contractor) is one of many large industrial projects using COPCO windows to keep quality up and costs down. COPCO's streamlined production facilities, COPCO's complete engineering service, and COPCO's rigid standards of quality with a realistic pricing structure all add up to the best possible service at lowest cost. Can COPCO fit into any of your plans? You will be pleasantly surprised at the economies we can achieve.

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To get denser, drier floors at lower cost, always specify Sisalkraft. Perfect, too, for protective covering of equipment and materials.

Made in widths from 36" to 96", blankets up to 26½'
The heat transfer rate of Cyclotherm's exclusive, patented Cyclonic Combustion is unequalled by any other method of combustion. Only 3 sq. ft. of heating area per boiler horsepower is needed...a bonus to you of 66% more steam generating power per sq. ft.1

Cyclotherm requires only two passes to reach a minimum heat transfer rate of 80%. Maintenance costs are reduced as much as 50%. The single pass of return tubes is easily accessible for cleaning...the combustion chamber needs no cleaning. The burner nozzle can be replaced in five minutes by any maintenance man.

Cyclotherm reaches its peak capacity faster...from cold start to full power in 15-20 minutes...and holds it steadily under extreme load conditions.

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Cyclotherm is up to ½ smaller than any other packaged unit...60% smaller in floor area than conventional boilers. Yet it delivers the same capacity...faster and more economically.

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KENNATRACK CORPORATION, ELKHART, IND.

ANSWERS

that help you specify and detail the right type of SLIDING DOOR HARDWARE

Q What are the advantages of center mounting and 8 wheels per door?
A Hangers that are center mounted support the weight of a true vertical position, relieving stress or pressure against door guides or frame. Hangers providing eight nylon wheels per door distribute weight more evenly over track, providing extremely quiet, effortless operation. Only custom Kennatrack offers these two highly desirable features.

Q When should adjustable hangers be used?
A Whenever headroom is sufficient. Vertical adjustment permits easy alignment of door to jamb. Readjustments are easy to make if settling and other changes occur. Kennatrack also offers non-adjustable hangers of exclusive design for use where extra strength and neatness are desired, or where headroom is limited to one inch. This type is highly desirable where plywood doors are used.

Q Why should a steel frame be used for all pocket door installations?
A To avoid costly as well as frequent troubles caused by warping of wood frames. An exclusive development of Kennatrack Corporation, "Kennaframe" is the steel frame that completely eliminates this danger. Easy to install, and with center mounted 8-wheel hangers for smoothest performance, "Kennaframe" is widely used for 2 x 4 wall installations. Any type of wall material or trim may be applied. Doors can't possibly bind if this prefabricated steel frame is used.

Q Can millwork be eliminated?
A Using Kennatrack hardware, the need for millwork has been eliminated for practically all installations. Complete packaged sets include versatile molded nylon guides that eliminate need of saw kerfs for doors of all thicknesses.

Q How can I be sure the right track is used?
A Selection of the right track for a specific installation is highly important. Reference to the Kennatrack Buyer's Guide takes all the guesswork out of selecting the right hardware. An easy-to-follow index leads to complete descriptive information, scaled detail drawings and architects specifications for each series. Write today for your free copy.
There is a fine MENGEL FLUSH DOOR FOR EVERY DOOR OPENING—

Palace or Project!

What is the RIGHT door for any particular job? Is it the BEST door you can buy, or the CHEAPEST, or what?

Mengel makes three distinct types of flush doors. Each is exactly RIGHT for its purpose. Each is the best possible value in its field. All are built by the makers of world-famous Mengel Furniture, and to the same standards of quality.

This means something to you, your clients and your customers—this, and the fact that every Mengel Door is guaranteed by all the resources of this company, the world's largest manufacturer of hardwood products. All Mengel Flush Doors are described in Sweet's (Architectural and Light Construction) Catalog, are available everywhere.

Mengel Stabilized Solid-Core Doors—Exterior and Interior
Mengel Hollow-Core Deluxe Doors—Interior or Exterior
Mengel Hollow-Core Doors—Interior or Exterior

DOOR DEPARTMENT, THE MENGEL COMPANY, LOUISVILLE 1, KENTUCKY
NEW - Reznor’s 250,000 BTU
twin-fan gas unit heater

a new solution for many industrial
and commercial heating problems

Now you can specify Reznor gas unit heaters on those big commercial and industrial jobs for which adequate equipment has never before been available. Reznor’s 250,000 BTU gas-fired unit—the first of its size offered by any nationally-recognized unit heater manufacturer—is the heater you’ve been waiting for.

The twin-fan feature is new evidence of the engineering leadership which has made Reznor the world’s largest-selling gas unit heater. The two fans, operating from a single heavy-duty ¾ HP motor, provide more effective air distribution at a much lower noise level than could be obtained with a single larger fan. They move 3200 CFM with an air throw of 90 feet.

Despite its tremendous capacity and power, the new unit is amazingly compact. The cabinet is no higher than on Reznor’s 175,000 BTU heater: 33½". The 250,000 BTU model is 36" wide and 40-3/16" deep overall; cabinet depth is 24½".

For more details on this revolutionary new heater, write today for your copy of specification sheet NPS-5401A. For the whole story on the complete Reznor line, ask for a copy of Catalog GN-52 or see it in Sweet’s Architectural File.

The Reznor Manufacturing Company, 40 Union Street, Mercer, Pennsylvania.

REZNOR
THE WORLD’S LARGEST-SELLING
GAS UNIT HEATERS
A new slant on open merchandising with new TYLER SALES-CASES!

TYLER

- Faster self-service sales with new low 36" height
- Easier display and storage loading
- New low maintenance
- Better refrigeration
- Faster installation and service
- Greater flexibility of use
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