

April 1952

house+home

edition

CHAS. W. CONNELLY
ARCHITECT & ENGINEER
CHARLOTTE, N. C.

How to build on a hillside

Nine architects in five states demonstrate how to exploit difficult, sloping land (below and p. 82)

A new steel skeleton for the White House

Modern construction saves a landmark—at a cost of \$5,761,000 to U.S. taxpayers (p. 108)

Building bargain houses

Phoenix points the way with lower prices, higher quality (p. 114)

Builder-house design

A cure for the epidemic of banana split facades (p. 122)

The heat pump

Now in production, a new application of an old principle (p. 126)

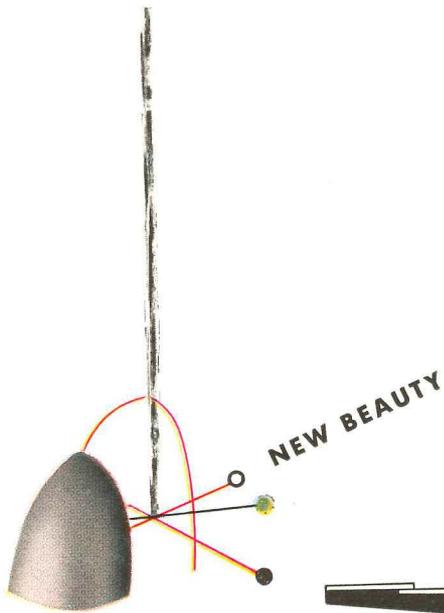
Low cost mass air conditioning

Dallas houses, selling at \$12,500, prove it can be done economically (p. 128)

Why furnish model houses ?

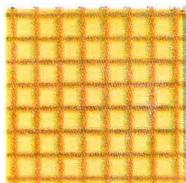
Decoration pays off as a strong selling tool (p. 134)



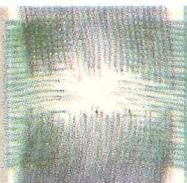


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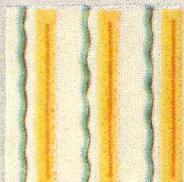
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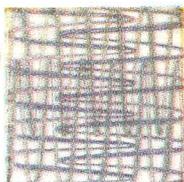
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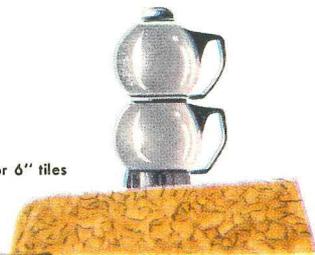
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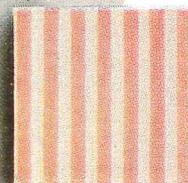
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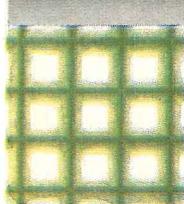
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April, 1952

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ARCHITECT: RICHARD J. NEUTRA, F. A. I. A.
PHOTOGRAPH: JULIUS SHULMAN

Spring Finds Housing Market Spotty; Slump Could Ease Reg. X

As the spring building season arrived, homebuilders seemed to share little of the fear of impending recession felt by many U. S. businessmen. In 143 defense areas, mobilization population shifts would guarantee booming housing demand (see p. 43). For instance, San Diego, Calif. (pop. 321,485), with the nation's biggest defense housing program (9,000 units), looked forward to construction of as many as 16,000 homes, which would mean its biggest homebuilding year in its history. While builders in a few cities gloomily predicted their housing production would drop 10 to 20% from the 1951 level, in a lot more communities builders were planning to build just about as many homes this year as last. With Regulation X, it would take more effort to sell them, but for many a homebuilder, that only meant that business had slipped from "terrific" to "good." In Baltimore, Ex-NAHB President Joseph H. Meyerhoff declared: "Homebuilding is . . . getting on an even keel. There is a lot of hesitancy on the part of builders to undertake big scale projects. They are not as sanguine about starting big numbers of houses as in 1950. Instead, they are proceeding with a few blocks of houses at one time, finishing and selling them—provided they can get financing—before putting others under way. It's a healthy condition."

Latent strength. Meyerhoff started 1,200 homes last year, hoped to start 1,100 this year. (This pointed up another curious but well known fact of the speculative homebuilding industry: a builder's estimate of the general situation could be gloomy, but his personal plans fairly optimistic.) In Indianapolis, John Bauer of ABC Construction Co. complained: "Demand is as big as ever but the ability to buy (under Regulation X) is very sad." All the same, ABC planned to repeat its 1951 production of 100 homes in the \$10,000 and under bracket.

There were contrary opinions. Said St. Louis Real Estate Economist Roy Wenzlick: "The business boom and the real estate boom are getting tired." In city after city, glutted by apartments built under the no-risk features of FHA Sec. 608, vacancies were rising in high-priced units

—always first to feel weaker demand.

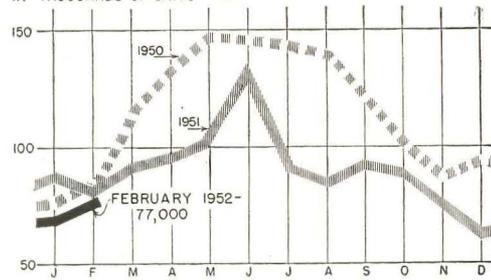
Ground-rent sales. While many a homebuilder complained that Regulation X was preventing use of building materials that were plentiful, there was evidence that available mortgage money would cover only about as many homes as they could sell under credit restrictions (see p. 46). Observed Mortgage Broker W. A. Clarke of Philadelphia, a top expert in the field: "Good mortgages, ready for immediate delivery are selling (e.g. FHA 203's), but other loans are still having difficulty."

The year-old mortgage pinch led a few homebuilders around Washington, D.C. to revive an old practice—selling homes on a ground-rent basis. By retaining title to the land, a lender can fix rent to yield him a higher rate of interest than under a VA or FHA loan. VA Loan Guaranty Chief T. B. King said he would try to stop the deal, however. His objection: buyers never get out of debt.

Modernization boost. Recognizing signs of what many economists regarded as an impending mild recession (something like 1947 or 1949), the Federal Reserve moved gingerly at month's end to ease the credit brakes: it revoked the Regulation W requirement for a 10% down payment on home modernization loans. FHA adjusted its rules for Title I modernization loans to match. Both agencies retained a 36 month ceiling on repayments, however. This

HOUSING STARTS

IN THOUSANDS OF UNITS



Source: Bureau of Labor Statistics

FEBRUARY'S RISE in starts of permanent non-farm housing (13% from January) was attributed by BLS to greater availability of materials rather than a rush to beat threatened stiffer housing controls. On the basis of permits issued late in February, BLS expected a further gain in starts for March. If it materializes, home-builders will be well on their way to another million house year.

seemed to imply that if housing sales sag in the next few months, the Fed will relax Regulation X, as NAHB and NAREB have been repeatedly demanding. Suggested the monthly review of the National Association of Credit Men: "You will hardly see your synthetic prosperity liquidated in an election year even though you have to print money or inflate credit to keep it alive."

How much housing? To the \$64 spring question—how much housing will be built in 1952—there was much unanimity.

HOUSE & HOME's sister publication, FORTUNE, whose forecast a year ago (1,125,000 housing units for 1951) proved spectacularly accurate (actual: 1,097,000), surveyed 39 cities and offered a prediction for this year: 1,125,000, a 5% gain from '51. Hedged FORTUNE: "The survey could easily be off 5% either way." *Engineering News-Record's* latest guess was a million units, in line with most other predictions, including one by a BLS construction official who is seldom far wrong.

In any case, the "official" government goal of 800,000—spawned by January's DPA cries of shortage—looked as far down the drain as the shortages themselves.

Wage Board Policy of 15c Hour Raise for Labor Threatens Boost in Home Prices

The Wage Stabilization Board's 1952 wage formula for construction workers, announced last month, foreshadowed new price hikes on houses. In Chicago, Martin C. Huggett, executive vice president of the Metropolitan Home Builders Assn., estimated it would bring a 1.2 to 1.75% increase in construction costs, that a \$20,000 home would be boosted \$300 to \$350.

Welfare policy. The WSB announced two policy changes in its new formula: by

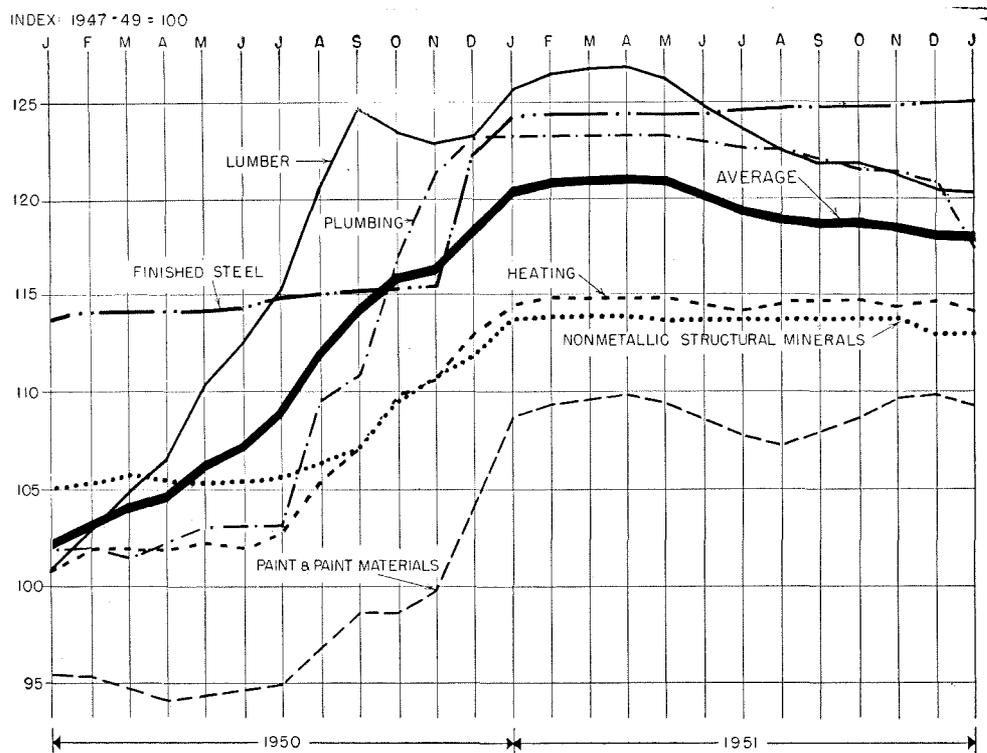
stating it would approve new pay increases up to 15¢ an hour, the board switched from percentage increases "because it disturbs customary differentials"; in deciding (with employer board members dissenting) to approve employer welfare fund contributions up to 7½¢ an hour, the board was now concerning itself with contributions to a plan, rather than benefits yielded.

Higher building costs should be reflected

IN THE NEWS

Among the next 23 pages are reports on these important developments:

- New BLS building materials index . . . p. 34
- Homebuilder warranties soothe Congress . . . p. 35
- Modern design urged for prefabricators . . . p. 37
- House cuts public housing to 5,000 starts p. 39
- Defense housing program picks up . . . p. 43
- Contracts let for demountable houses . . . p. 45
- Mortgage market stays in the doldrums . . . p. 46



NEW BLS INDEX of wholesale building materials prices, revealed at the end of March, shows year-long plateau of most items. Price developments of the month: softwood plywood, after its 6% general price boost in February, held firm. U. S. Plywood guaranteed present prices for 6 months. OPS clamped dollars and cents ceiling prices on fir and hemlock.

shortly because an estimated 70% of construction labor contracts are negotiated in the spring, particularly in May. Although permissive and not mandatory, the increase would bring the average straight-time scale in the construction industry to \$2.61 an hour. Other industries have been granted 4.7% second-round cost-of-living increases (a 10% one was granted in mid-1951). This formula would have given construction workers only a 12¢ boost. WSB justified the extra 3¢ by declaring holiday and vacation increases would be chargeable against it. The Construction Industry Stabilization Commission (at which the NAHB is miffed for not being included) must now approve all increases in employer contributions to welfare plans. Both sides can select the type of benefits, however, including total medical insurance.

Both sides unhappy. The new wage formula pleased neither labor nor industry. To labor, the new formula will mean scaling down over-15¢ increases some of the locals had tentatively gained (which helps explain why the AFL's Richard Gray has lately been declaiming against collective bargaining with the government). Snapped Stephen M. Bailey, business manager of AFL Plumbers Local 130 in Chicago (which had negotiated a 25¢ an hour raise): "Fifteen cents isn't satisfactory and our members won't accept it." To industry, CISC's area-wide wage ceilings are taking away an employer's option to attract key workers with bonuses. NAHB President Alan Brockbank promised a court fight, if necessary, on *that* issue.

Labor piracy suits. Already, WSB had accused Burns Construction Co., one of Denver's largest homebuilders, of labor piracy by that very method. WSB contended Burns paid 37 bricklayers \$4 hourly, \$1 over the WSB rate, and 19 hod carriers up to \$2.50, 65¢ over the WSB rate. A hearing was set for late this month. The Young-Loftus Construction Co. and E. J. Strecker, of Los Angeles, were found guilty of overpaying carpenters on a La Mesa, Calif. housing project by \$1,340 and ¾ of this was disallowed as a cost factor in income-tax computation. WSB's Cleveland office was mulling over the cases of some 150 employers in Cleveland, Dayton and Paducah involved in overpaying bricklayers and roofers. Signs pointed to a major battle between WSB and U. S. homebuilders.

HOUSING INQUIRY urged on Truman by Housing Conference

Late in February, a delegation from the National Housing Conference called on President Truman, urged him to appoint a special housing inquiry commission. Charged NHC: lack of housing in critical areas seriously impedes the defense effort; U. S. housing generally fails to meet the needs of the aged, low-income, minority and migratory groups, large families; is substandard six times as often for non-whites as for whites; is being built in unintegrated neighborhoods. A month later, there was no sign from the White House that the commission would be formed.

NEW INDEX of building materials prices unveiled by BLS

Two years in the making, a new index of wholesale building materials prices was unveiled last month by the Bureau of Labor Statistics. A far more accurate tool than the 20-year-old series just discarded, the new index has a postwar base selected by the Bureau of the Budget (average 1947-1949 equals 100, in place of 1926), 45 more components and far fewer non-building elements than its predecessor. Instead of feeding all lumber and wood product prices into the over-all index, for instance, the new series selects only lumber actually used in construction, eliminates wood appearing as furniture and crating. Moreover, the relative importance of each element has been shifted to mirror the vast technological changes of the last two decades. Light metals, for example, win a far more important weight than they merited in the mid-twenties.

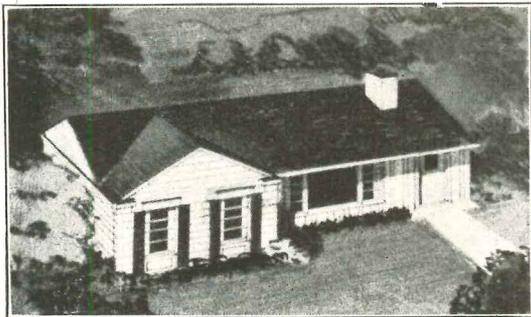
The new index is a product of study and cooperation on the part of government and industry. Frequently consulted were building industry members of BLS business research advisory group: Miles Colean, Washington economist; H. C. Foreman, AGC managing director; H. C. (Cotton) Northup, executive vice president of the National Retail Lumber Dealers Assn; and Wilson Wright, former economist for Armstrong Cork Co.

HHFA, BLS FUNDS sliced in half by House economy bloc

The House of Representatives took a wild swing with its economy meat cleaver at the bill appropriating funds for the HHFA and others in the government's family of housing bureaus. Arguing that HHFA is not doing an effective coordinating job, lacks the power to make FHA and other constituent agencies fall in line, a Republican-Southern Democrat coalition whacked the Administrative budget for Ray Foley's HHFA from a requested \$6,250,000 nearly in half to \$3,606,000, FHA's field operations fund was pared from \$28,870,000 to \$25,175,000.

As it did last year, the House Appropriations Committee sliced the Bureau of Labor Statistics construction division funds from a requested \$636,000 to \$324,000. Last year, this cut forced BLS to abandon its reports on characteristics of metropolitan area housing, reduced the number of cities where it reported housing starts and building materials prices. If the same reduction stands this year, BLS will have to retrench still further, probably have to abandon regional housing volume reports entirely. Government salaries have gone up 10% in the meantime.

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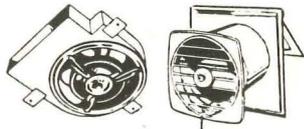
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A small living room can look twice its size



HIGH costs are shrinking a lot of house plans these days. Here's a way to cut down floor area without making an interior look skimpy.

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The illusion is partly the result of furnishing the alcove to blend with the living room, but equally important in creating a spacious effect is the use of one smooth sweep of Armstrong's Linoleum in both areas. The floor ties the whole decorating scheme together. The effect is furthered by the brick wall that serves as both outside wall and inside partition.

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strong's Linoleum makes a strong appeal to the home buyer for other important reasons. Women know how easy it is to clean, what long wear it gives, and how comfortable it is underfoot. Armstrong's Linoleum creates a luxurious, decorative wall-to-wall effect—yet the cost is moderate. Its decorative advantages alone can play a big part in selling a home. Whether you are building one house or a multiple unit development, you can profit by adding the extra appeal of Armstrong's Linoleum.

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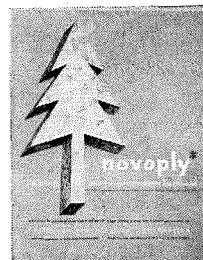
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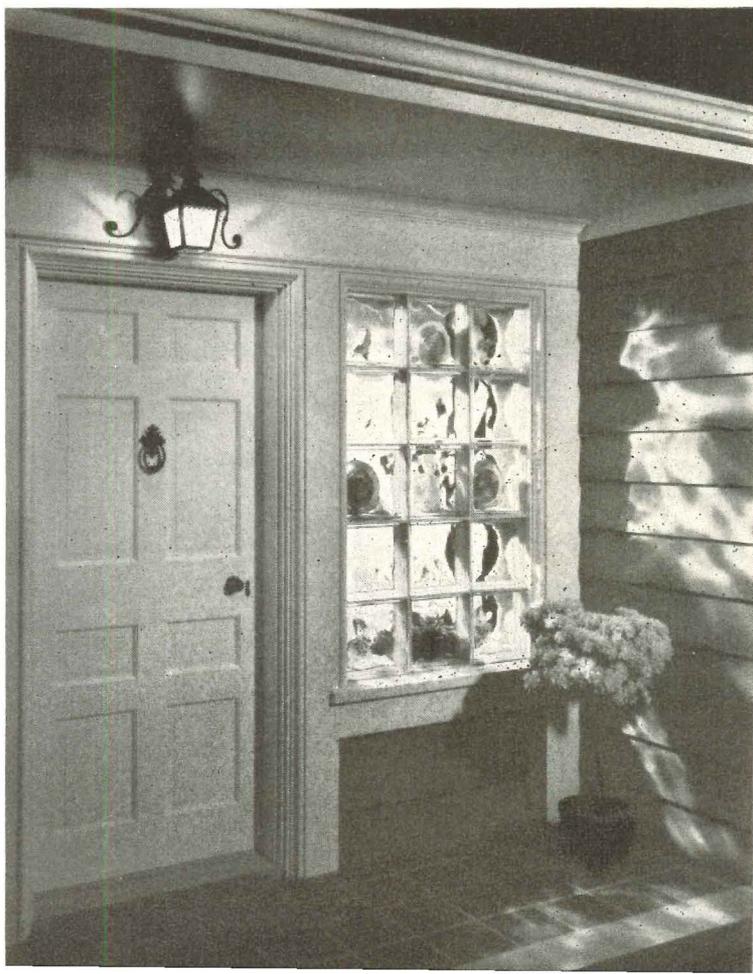


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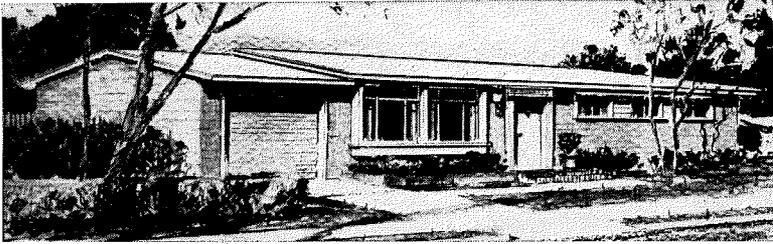
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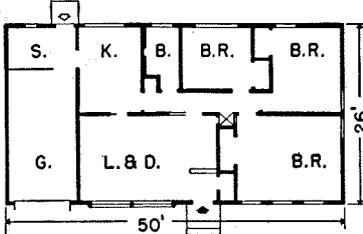


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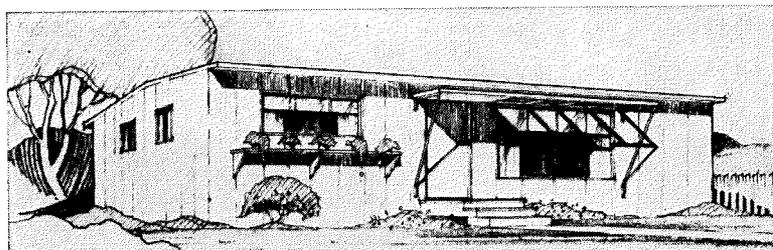
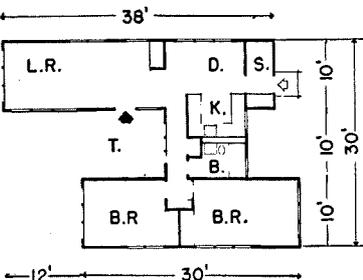
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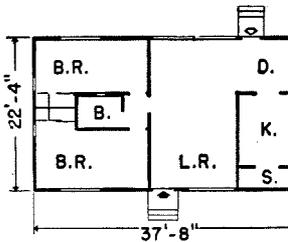
MOBILHOME CORP., Bakersfield, Calif., moves its 3-bedroom, 1,045 sq. ft. house as a complete unit, a stunt that requires bomber dollies and special highway permits. Cost: \$8,250. Redeployment estimate: \$1.12 per sq. ft., 300 man-hours for 100 mile move. Mobilhomes has 18 licensee plants in eight states, mostly in the West.



PRESSED STEEL CAR CO., Chicago, Ill., a railroad car maker invading the housing field for the first time, will prefabricate two stressed-skin plywood units, each 40' x 9½', which can be joined several ways at the site to form a two-bedroom house. Estimated quantity cost: under \$8,000. Redeployment cost estimate: \$1.21 per sq. ft., under 200 man-hours.



TRANSA-HOUSING, INC., Long Beach, Calif., designed a larger version of its portable, folding Transa-House for HHFA's project. Stressed-skin plywood panels hinged to a central mechanical core fold out at the site to form an 800 sq. ft., two bedroom house. Cost: under \$8,000. Redeployment cost estimate: \$1.23 per sq. ft., under 200 man-hours (because folded house size is 8'4" x 37'8", permitting cheap highway transport).



MORTGAGE MARKET eases a little; lenders still seek bargains

It was just a year since the Federal Reserve unpegged government bonds, sent the insured-guaranteed segment of the mortgage market into a tailspin. So far, the recovery that some experts had foreseen as long ago as last fall had not materialized.

Last month produced a surge of activity in FHA and VA mortgage sales* in the all-

* FHA loans were bringing 99 to par, nationally and some 203s were commanding 101 in the monied East. VA paper was reported at 95 to 97 nationally, and as high as 98 around Manhattan.

important secondary market, but close inspection showed it was mostly window shopping. Explained Vice President John J. Scully of New York's Chase National Bank: "There are signs the FHA-VA market is easing. But banks are still looking for bargains, meaning yields over 3.75%."

Pressure of savings. Most compelling reason for renewed interest in VA mortgages was the phenomenal rise in savings. Between January and February, deposits zoomed \$110 million to a new all-time peak of \$21.1 billion. Moreover, the rate of rise was the steepest in the five years the National Association of Mutual Savings

Banks has gathered the statistics.

Lenders were finding conventional loans scarce. Homebuilders and homebuyers alike were conditioned to the easier down payments and lower interest of government-backed loans. Another pressure tending to push savings bank investors toward mortgages was New York State's new ruling raising the interest ceiling on deposits from 2 to 2½%.

Plateau ahead? But rising savings bank interest rates reflected past earnings, not future expectations. And there were these hints of continued money-scarcity:

▶ Both New York Life and Prudential Insurance Co., two of the nation's biggest private buyers of government-supported mortgages, pulled in their horns on buying VAs. Said New York Life: "No more for a while." Said a Prudential official: "We're not buying portfolios, but if a veteran walks in and wants a loan, that's different . . ."

▶ At its current rate of buying (about \$60 million a month), Federal National Mortgage Association will run out of funds for buying nondefense mortgages by the end of April unless Congress comes to the rescue with a new grant of lending authority. If that happens, said President George West of Atlanta's First Federal Savings and Loan Association, "I don't think there will be any more GI loans around here."

▶ New offerings of corporate bonds in the next few months will equal the impressive volume of the last six months. And bond yields, down in January and February, recovered in March, may surge still higher. American Cyanamid and National Cash Register paid 3.75%, and Southern California Gas Co. (a Grade A) found sales soft even at 3.42%.

The net effect, predicted Vice President George T. Conklin of Guardian Life Insurance Co., is that "the mortgage market will go bumping along at the same pace it has."

NEW TECHNIQUES for roof truss spacing found by researchers

Two new techniques for spacing roof trusses 48" apart instead of the usual 24"—thus reducing the number of trusses needed by 50%—were announced by Southwest Research Institute.

▶ An incombustible acoustical tile, connected by invisible T-splines, has been developed to eliminate half the roof trusses and facilitate open planning.

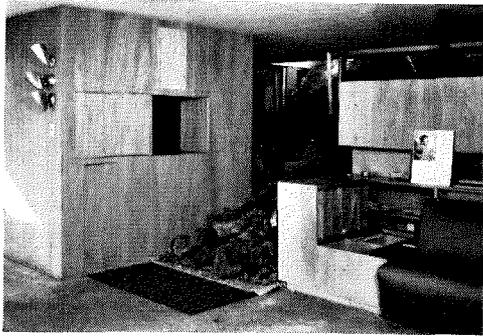
▶ A galvanized sheet metal H-clip has been found to strengthen the tile ceiling when inserted in the horizontal joints midway between the trusses. The H-clip is ¾" deep and each of its lugs is ¾" square.

The combination of tile and H-clip eliminates "weaving." Up to now, if trusses were further than 24" apart the weight of workmen on the roof would depress sheathing as much as 7/16" and rupture roofing materials. The two new developments limit this depression to 5/16". Moreover, the new ceiling eliminates noise, reduces construction cost and the pattern of the square-tiled ceiling adds to the home's looks.

PEOPLE: landslide into house injures Julius Shulman; Chicago AIA

to study lifting contracting ban; builder Doelger sued for \$60,000

Architectural photographer **Julius Shulman** found to his regret that his house was his best subject last month. The house, designed by architect **Raphael Soriano** and engineer **William Porush**, lies in the Holly-



INDOOR-OUTDOOR LIVING

wood Hills at the base of a 40' graded basalt rock cut. Came a 2" Los Angeles rain and down poured 800-1,000 tons of rock, pinning Shulman as he tried to back his delivery truck out of the garage, fracturing his right leg, flattening the truck, service porch and rear bedroom. One of the garage's 8" beams was bent like a bobby pin. The house itself is built on an 8' module of 6" steel beams. Engineer Porush expected it to spring back from a slight displacement once the rock mass was removed. Said Porush: "Had the house had a wood frame, the entire structure would have been flattened into kindling." As it is, twisted aluminum window frames, broken windows, ceiling cracks, ruined rubber and cork-tile flooring, plus general damage to frame and furnishings will cost Shulman \$10,000 to repair. Regrading will mean another \$5,000. In addition to his leg, Shulman had another pain to nurse: the insurance doesn't cover natural damage.

After a facts-of-life talk by **Walter Gropius**, knowledgeable chairman of Harvard's School of Architecture, members of the Chicago chapter last month became the first AIA group to study lifting the traditional ban against an architect engaging in building contracting. Said Gropius: "Architects must regain the medieval role of 'master builder' if they are to survive in the industrial age. When the great cathedrals were built the architect headed the construction team as co-ordinator. Now the young architect must learn to: work with the scientist and producer in developing new building materials; incorporate finished materials into his design; work with the contractor on the site." What's more, said Gropius, an architect would no longer be "penalized" with a small fee.

As it is, clients suspect he "rigs" the house price in order to increase his earnings. Were he a definite part of the financial enterprise such suspicion would be removed. Gropius plans to repeat his words before the Philadelphia AIA this month.

San Francisco builder **Henry Doelger** was having legal differences with his former employee, **Emile A. Raffetto**. Doelger started proceedings by seeking to restrain the Prudential Insurance Co. from paying Raffetto a \$50,000 loan commission. In a cross complaint, Raffetto sought \$60,000 damages. He claimed he had helped Doelger obtain a \$4.8 million loan for his Westlake development, for which he had been promised a \$3,000 trip to Hawaii for himself and family and \$3,000 monthly profits in a new corporation. Raffetto said he was still waiting to be paid.

Named: **Joseph H. Orendorff**, as director of the HHFA's housing research division. He has been acting director since last September; **Ray V. Carey**, former city manager of Stockton, Calif., as the Los Angeles Home Builders Institute's executive vice-president, succeeding **Len Haggard**, who will now publicize Mark Taper's Biltmore Homes; **Jean Labatut**, Princeton professor of architecture, as a knight of the French Legion of Honor; **Fred J. Driscoll**, to a second term as president of the Building Trades Employers' Assn. of New York; **J. A. Gilbreath**, of Servel, Inc., and **A. B. Newton**, of Acme Industries, Inc., as chairman and vice chairman of the Air Conditioning and Refrigerating Machinery Assn.'s newly-formed residential air conditioning section; **Angus G. Wynne Jr.**, president of the American Home Realty Co., as Dallas "Realtor of the Year" by the Dallas Realty Board; **Howard R. Olson**, as general manager of the Chicago Regional Planning Assn.

Photos: (top) Julius Shulman; (below) Foto Levi



FIRENZE DEFENDED: citizens resent 'barracks' dwarfing Ponte Vecchio

Florentines took to picketing along the River Arno last month in protest against what they felt was a definite thistle in the "City of Flowers" bouquet—a nine-story apartment house which they dubbed, "Great Big Barracks No. 1." The building was accused of violating Firenze's building code. But far more important to Florentines, its height was dwarfing the nearby Ponte Vecchio, famed and favorite 14th century covered bridge, and its contemporary roof line was about to bring disharmony among the balconies and bay windows of the neighboring skyline. One placard (left) showed a Manhattan skyline branching off from the Ponte Vecchio with the caption, "Do you recognize it? It is Florence." Another (center) declared: "Florence! We were unable to defend you from destruction, but we will save you from reconstruction." The picketers made their point. The apartment house owners agreed to take down the ninth and eighth floors and soften the roofline.

Tasting blood, Aesthetes next went after "Great Big Barracks No. 2," a sprawling lower

building going up next to the apartment, and a court suspended construction on four others pending modification orders. The movement spread throughout Northern Italy, culminating in a demand by the public prosecutor of Turin that ten floors be lopped off a 14-floor building on the Via Santa Teresa. In Florence, at least, the construction consternation was promptly blamed on the city's recent Communist administration which, in its anxiety to promote as many housing units as possible, issued provisional building permits without studying plans.

As Prof. Roberto Papini of the League of Action for the Aesthetic Defense of Florence explained it: "The problem of reconstruction is harmonizing the new with the old. Building interests who want to make maximum use of the downtown ground space threaten to create blocks of buildings which will submerge the old monuments. Florentines do not want modern architecture to renounce its character, but merely ask that it fit in naturally with the buildings around it."



In Philadelphia



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URGENTLY NEEDED: Green light for the building industry

Last year, for the first time ever, dollar volume of the construction industry exceeded the dollar volume of agriculture.

Perhaps that blunt statistic is the simplest way to show the tremendous importance of the building industry to our national prosperity.

In years past construction has always been boom or bust, subject to wilder ups and downs than almost any other part of the economy. Construction booms pushed prosperity to higher and higher peaks. Construction busts dragged depression to lower and lower bottoms.

Ever since the fighting began in Korea ***the government has been trying hard to discourage construction.*** That was no doubt as it should be when all our resources were needed for rearmament.

But now there are increasing signs that before many more months have passed rearmament alone will not be able to keep our economic management running in high gear and that we will run into serious problems of unemployment and deflation unless other elements in the economy can be stepped up.

Perhaps, therefore, it is not too soon to remind the government's economic advisers of one of the most basic facts about our industry:

You cannot revive a depressed building industry overnight.

You cannot start a building boom overnight. And once deflation gets started the problem of stimulating construction becomes many times more difficult. So if America will want the construction industry to play a bigger part in maintaining national prosperity next fall and next year, it would be a very good idea to give construction the green light while there is still time—by relaxing the credit controls which have cut back all types of private construction.

on the next 24 pages

nine HILLSIDE HOUSES

on nine hills in Arkansas, California, Minnesota, New York and Washington

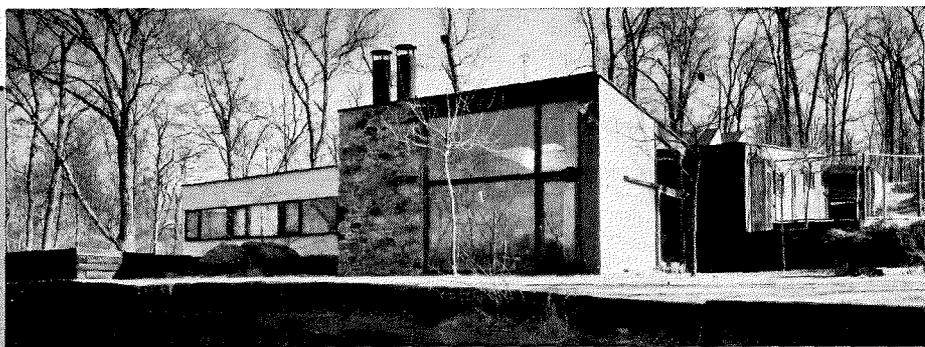
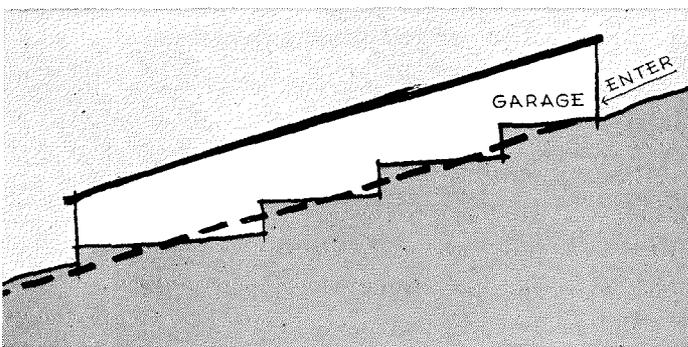
Frank Lloyd Wright has written in his autobiography, "No house should ever be *on* any hill or on anything. It should be *of* the hill, belonging to it, so hill and house could live together each the happier for the other."

Not all the houses in this 24 page collection adhere strictly to this dictum; there are two (*pages 92 and 96*) which seem almost to float free of the slopes they inhabit, rather than remaining part of the land. But all these hill houses do have this much in common: an enthusiasm for their rough, slanting sites, and full realization of their possibilities. There are no grudging design approaches, no attempts to plant conventional houses on the unconventional plots. Instead, each architect used imagination to perch his design on the incline (or dig it in)—and other architects and builders both can learn from all of them. The schematic drawings on this page and the next are a catalogue of ways to put a house on a hillside, and the houses themselves extend the demonstration.

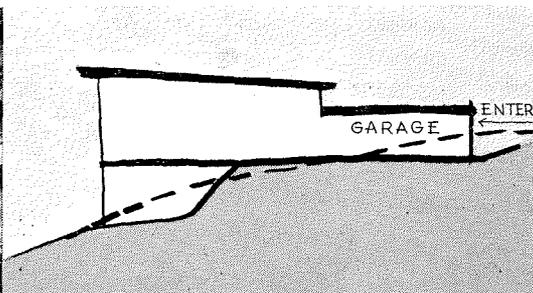
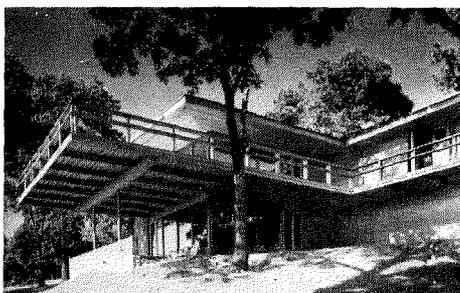
It is an axiom of quantity-builders to steer wisely clear of hilly sites, because in order to build with their usual staccato economical methods they first have to bulldoze the terrain into submissiveness, and that is very expensive in really rough land. But flat sites are increasingly difficult to find; and one of the houses shown here is significantly a builder's house (*page 104*). Another house, an architect's own home, might be of even more interest to developers—on a 45° lot, it cost only \$10 per sq. ft. (*page 92*).

Houses are built on hillsides for a number of good reasons. Primary among them:

The view: The lyrical element in architecture and in living—in house and in home—has no more specific instrumentation than in elevation over (*continued on page 84*)



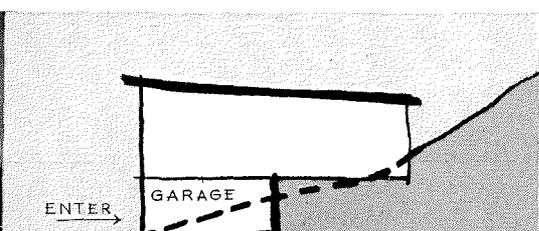
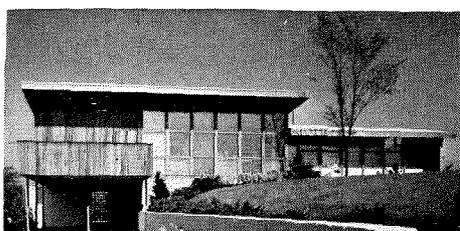
Stepping down the slope is one of the clearest, most natural solutions. See pp. 84 through 89, and p. 106

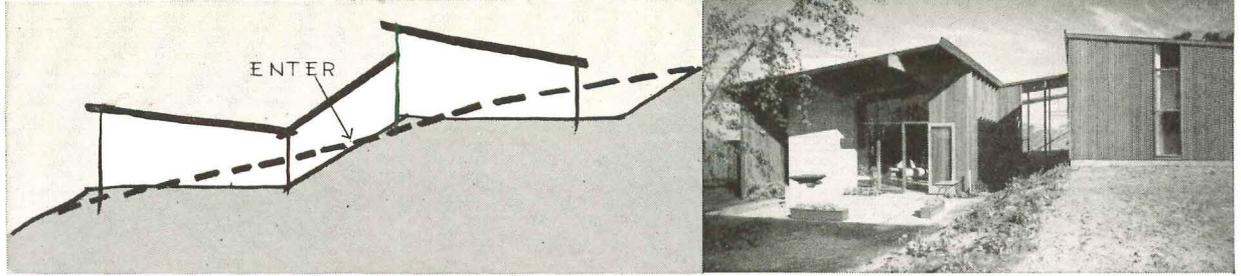


You can enter on top level and expand downward, as left and on p. 98

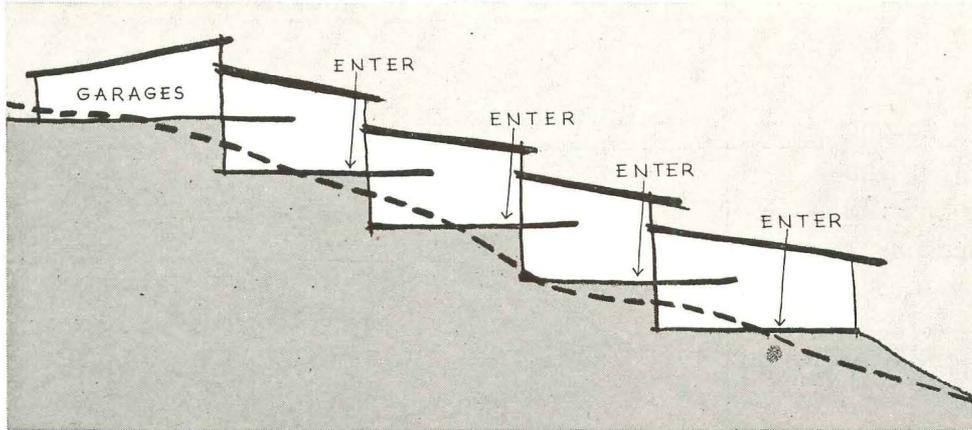
You can enter on bottom level and climb the hill indoors.

(House by Architect E. P. Elliott, p. 104, H & H, Mar. '52)

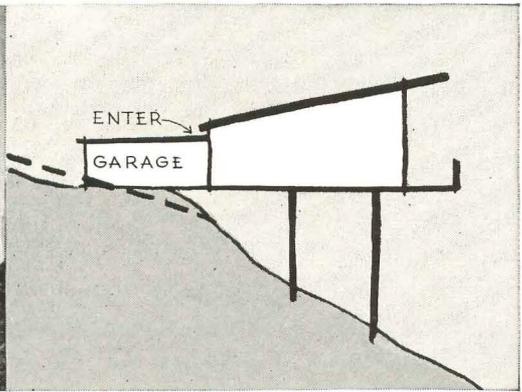
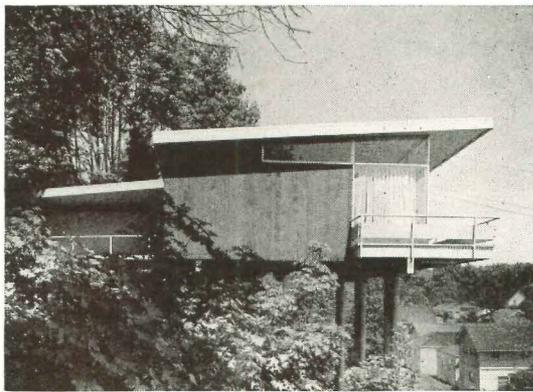




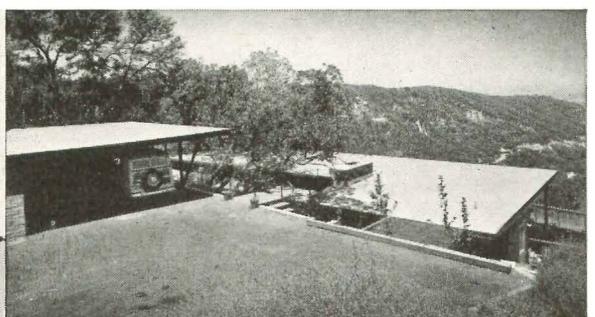
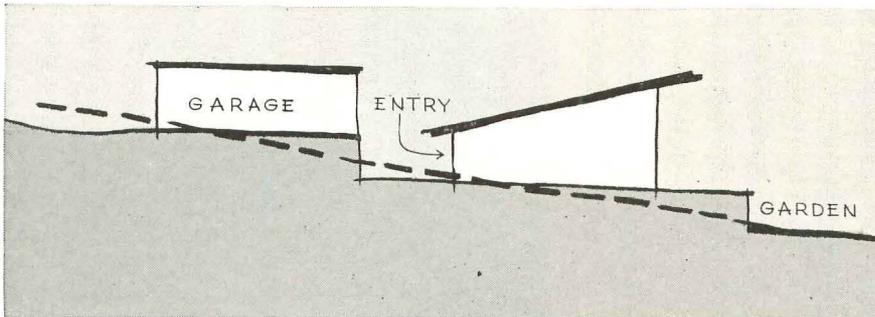
Another solution is building the **house in two units**, then tying them together. See p. 104



Hillsides are highly adaptable for **multiple, intersecting units** as in diagram and on p. 101

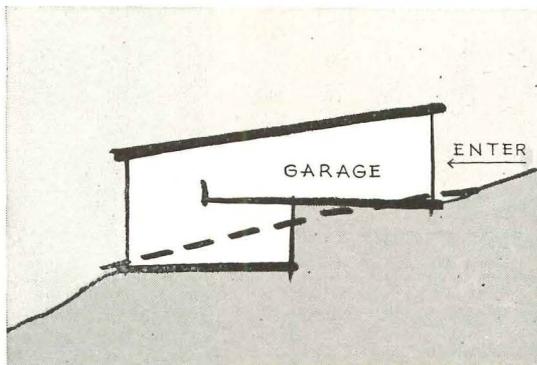


Putting the **house on stilts** is often least expensive way of building on a steep slope. See also pp. 92 and 96



House on shelves cut into slope, with garage on higher shelf. See also p. 90

Mezzanine house uses slope to get dramatic down-hill room. See also p. 94



HILLSIDE HOUSES (continued from page 82)

a vast prospect. Ruskin said: “. . . skillful architects . . . build high.” And skillful housebuilders will always build *on* high when they can.

Privacy: Building on a hillside adds the vertical dimension to the space separating each house from its neighbor. Not only is this vertical space more effective than horizontal division in such mechanical insulating functions as noise dissipation, but almost any house on a hillside also gives its inhabitants a strong psychological feeling of aloneness. Hill dwellers have more sky and fewer human beings for neighbors than most of us.

The microclimate: If you live on a hillside in summer, you may actually be twenty degrees cooler than the people below in the valley, so radically does intimate climate vary within broad geographic zones (see “Microclimatology,” March issue '47). It is conversely true that in winter the hillside may be colder than the valley—but it is still easier to heat than cool a house.

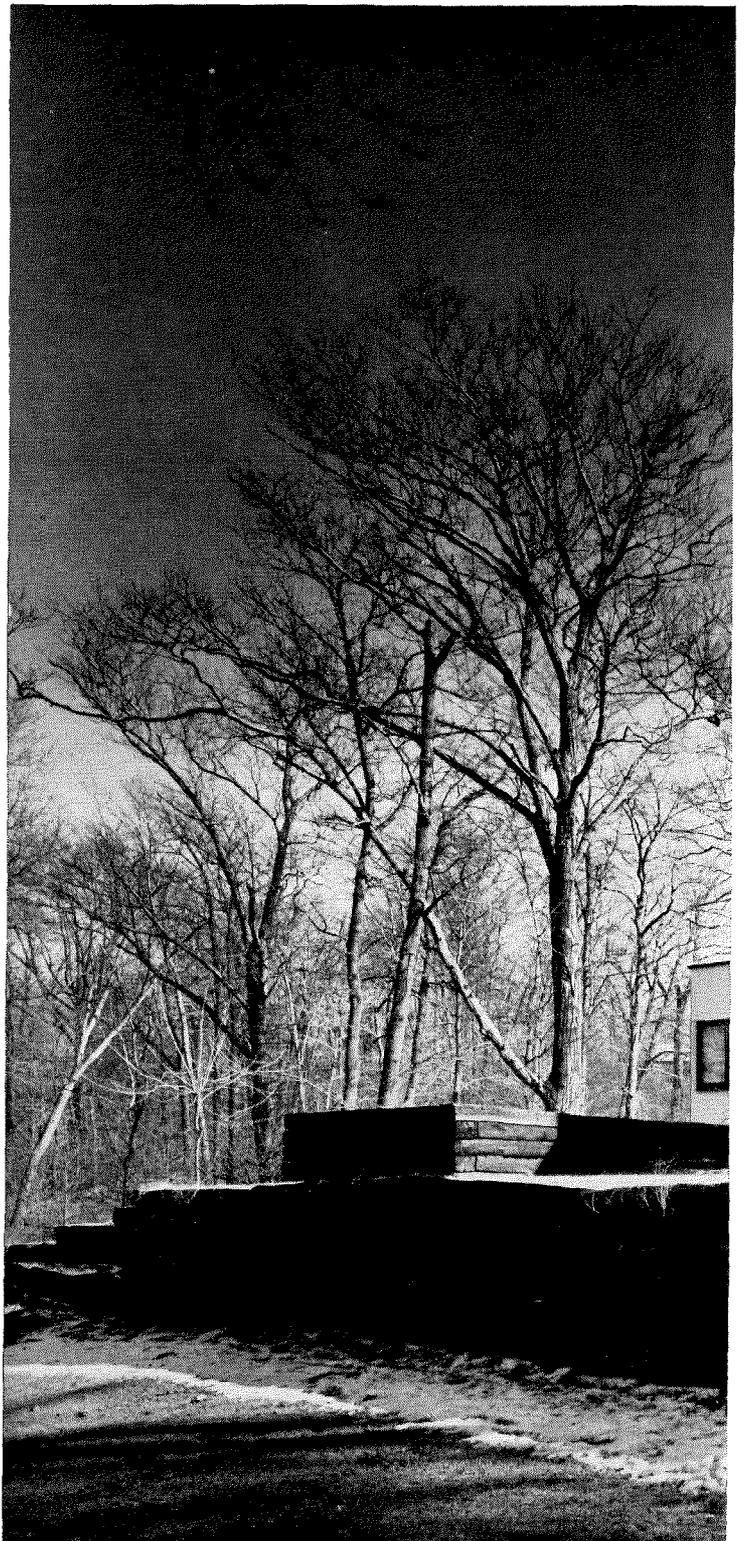
Location: Many of our cities are in valleys, rimmed with hills, and the only good residential sites which remain on which to build houses convenient to the city are on the hillsides. The hilltops are mostly well occupied by now . . . and even if they are not, the cost of land on top the hill is usually twice that on the hillside.

But building on a hillside generally is expensive. An analysis of the houses in our collection indicates that foundations and grading for a hillside house will cost between 15% and 200% more than foundations for a similar house built on the flat. The only way to economize on a steep site is to ignore contours and put the house on stilts, which may either be left exposed (*p. 96*) or covered with a skirt (*p. 92*).

The platform style also saves money in other departments besides the foundation, although it generates a few extra expenses of its own. It saves because putting the house up on a raft in the sky cuts down on the usual hillside house's expensive stairways, avoids the many problems of waterproofing the uphill side of a house dug into the earth, and also diminishes the expense of building retaining walls to prevent avalanches or provide protection from rolling boulders. In such a platform house, gardening expenses are also lowered; the house is so obviously an island that the site is usually left wild.

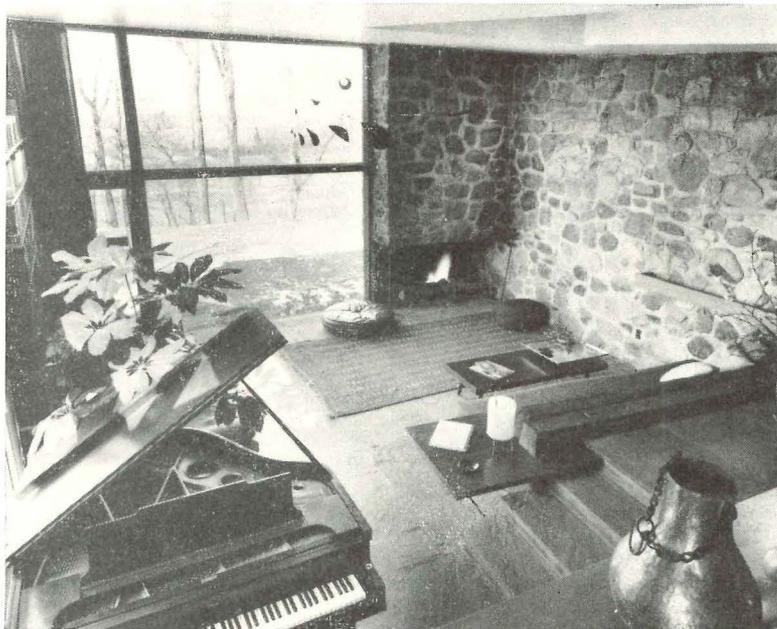
When you build on stilts, however, it is generally necessary to build expensive porches for outdoor living, in order to compensate for losing touch with the ground. Architects have found that labor is also more expensive. Workmen are slower because they prefer not to work on scaffolding, despite the fact that many people do like to live up there in the air.

LOCATION: Sands Point, N. Y.
HENRY HEBBELN, Architect
JAMES ROSE, Landscape Architect
WILLIAM OESTREICHER, General Contractor
CHARLES LANGLEY, Furniture
MARIANNE STRENGELL, Fabrics



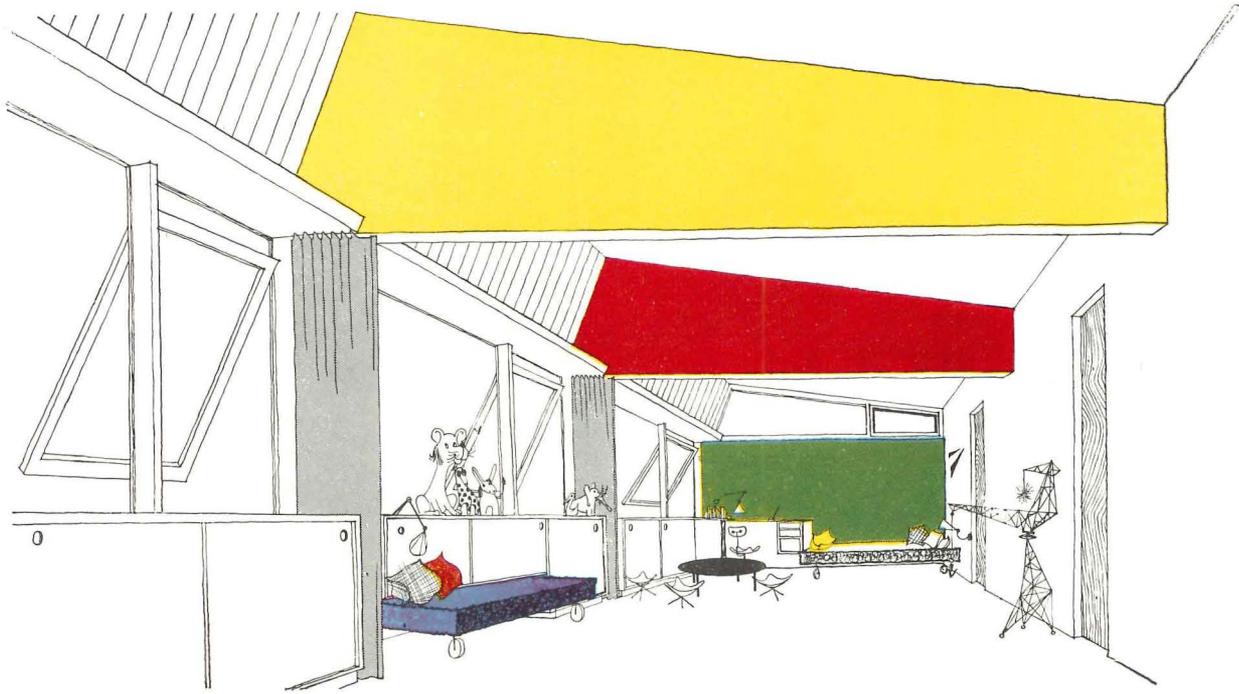


Above and below are opposite views of the living room: above, from near glass north wall; below, from dining balcony. Most of the furniture and lighting is built in. Mobile is by Alexander Calder.



Indoors and out this house preserves an extraordinary affinity for its land, trees and boulders. The masonry walls are local sand-bank boulders, indigenous and multihued; the cypress siding is naturally weathered to harmonize with the native oaks; even the gravel on the built-up roof is reminiscent of the sand of the beach—especially when you see both from uphill. Numerous skylights and plastic domes admit natural light on the native materials, and complete the identity of inside and outside.

LONG ISLAND HILLSIDE HOUSE



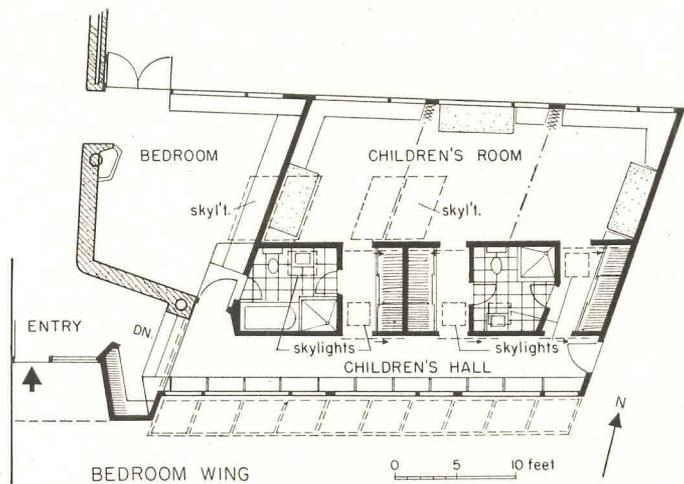
Photos: Lionel Freedman



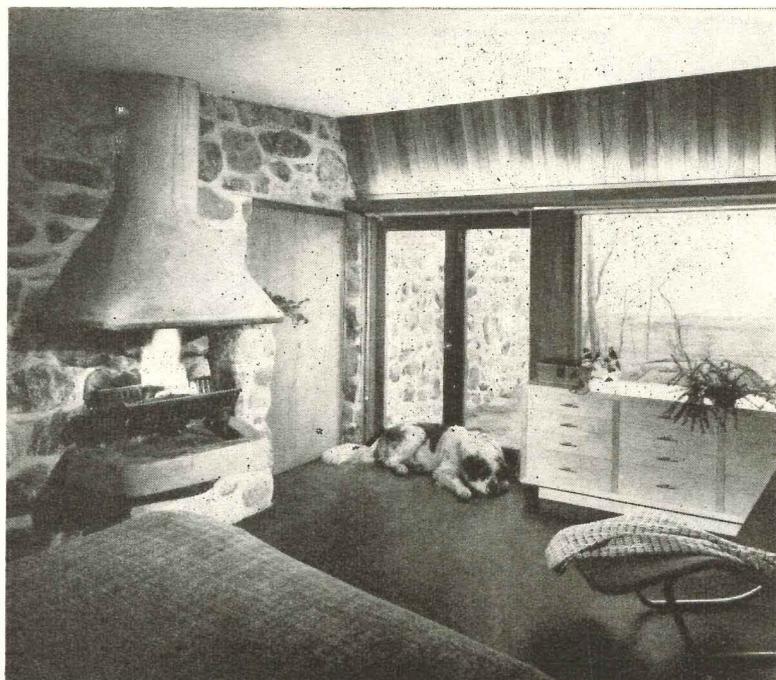
Kitchen, below, looking toward dining room. Note pass-through counter. Maid's room is behind camera in this photograph.

Dining room has companion terrace outdoors, and also overlooks living room. Reversal of roof pitch saves the living room's vista of Long Island Sound for diners to share.



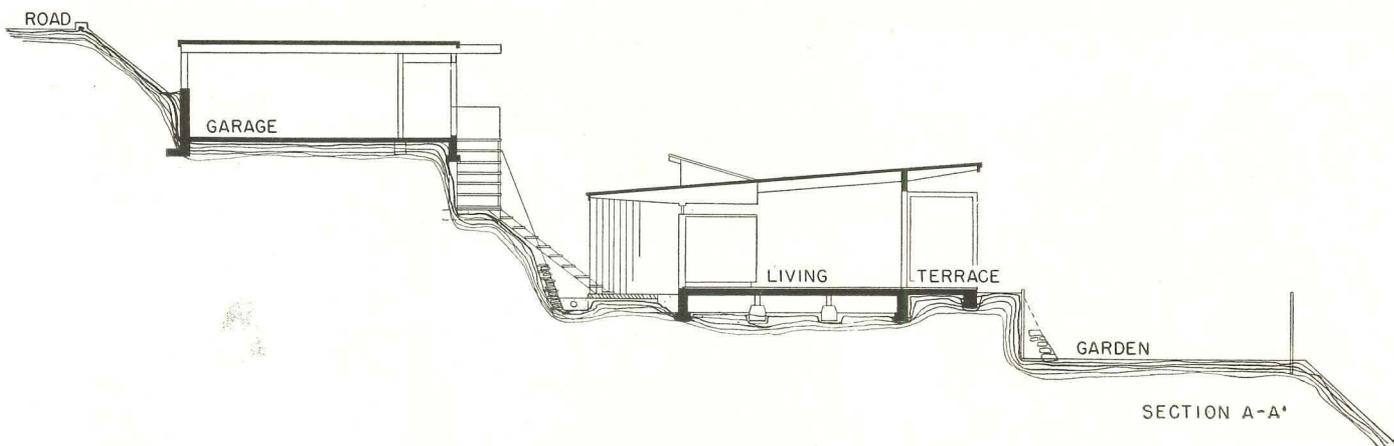


Children's bedroom wing (plan, above, and drawing, left) is partitioned within by accordion walls, and can become single big playroom. Each child has own dressing room, skylit. Cabinet-lined hall to south is also used as greenhouse, and will lead to a wing to be added in the future.



Master bedroom is temporary, will eventually be used as study when new wing is added to house. Its terrace is screened from children's play area by an 8-ft. retaining wall. Interior door leads to living room.





2. On a Los Angeles hillside: three-level house

Photos: Julius Shulman



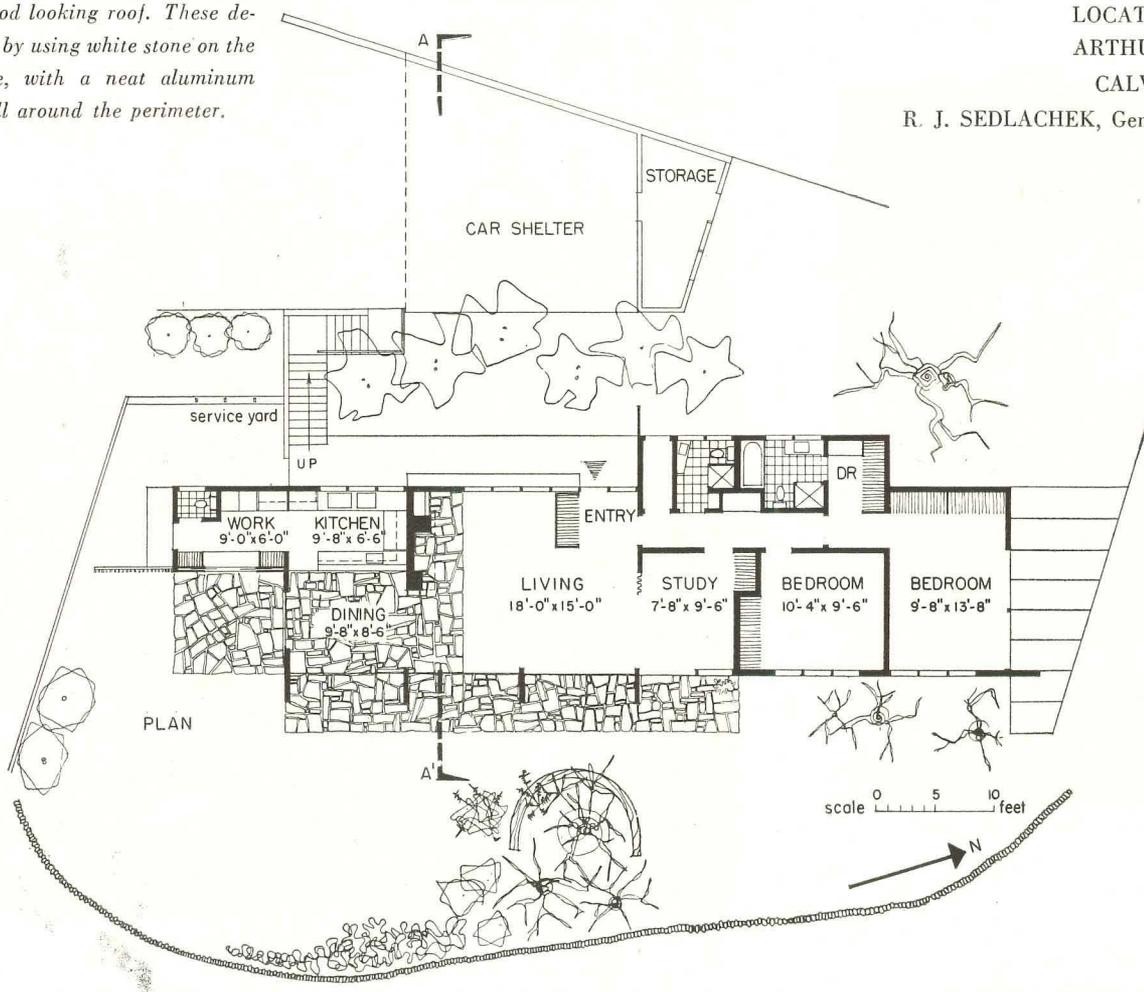
Approach on upper terrace, above. One of the problems in this kind of house is building a good looking roof. These designers did it by using white stone on the built-up base, with a neat aluminum gravel stop all around the perimeter.

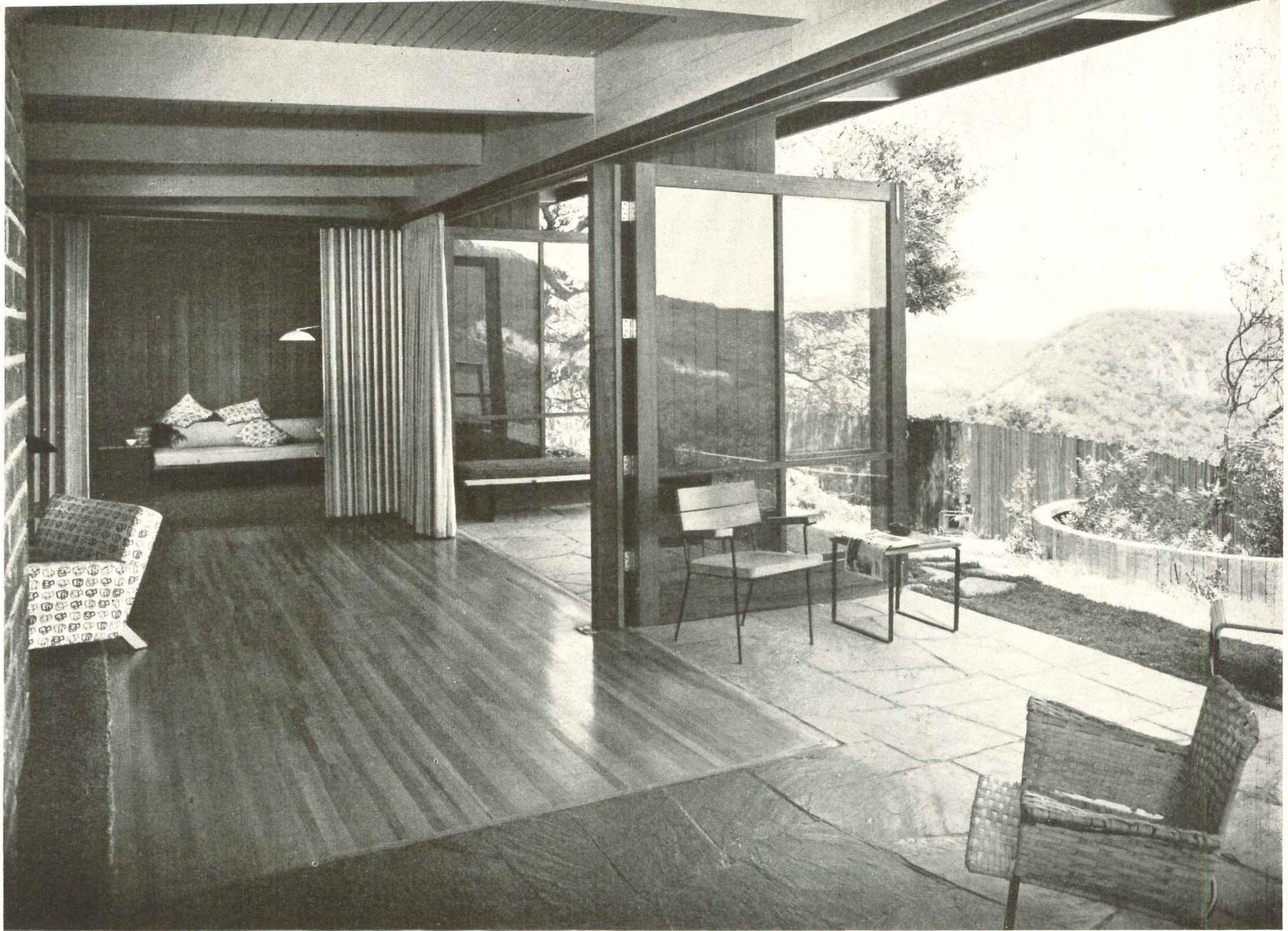
Here the top level is a garage. You get out of your car, walk down a flight of outdoor stairs to the house itself, which is built on a shallow in-line plan, and then you walk down one more level to the garden.

There are distinct advantages to terracing a slope this way in repeated, slim shelves: 1) the cut earth can be used for fill; 2) complete privacy on the level of the house can be had from both above and below by manipulating the depth of the three shelves, as these designers did. From above, all that is seen is the roof of the house. From below, only the garden wall is in sight . . . and because this garden wall is lower than the house itself, it does not block the far view.

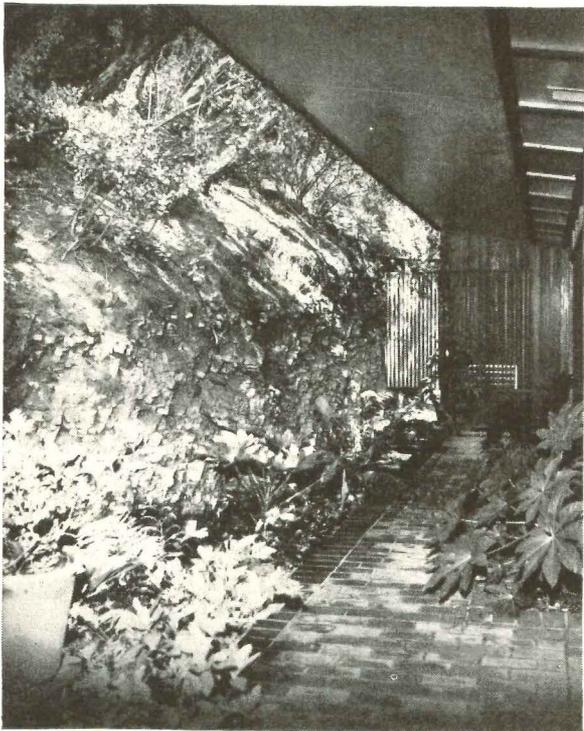
Total cost of the house was about \$22,500, including terraces, carport, and exterior roofed areas (house proper is 1,469 sq. ft.; porch area totals 254 sq. ft.; garage and storeroom are 624 sq. ft.). If the house had been set on flat ground, architects estimate the saving would have been only about \$650. Construction is conventional slab and wood frame anyway.

LOCATION: Sherman Oaks, Calif.
 ARCHITECT: ARTHUR B. GALLION, Architect
 DESIGNER: CALVIN C. STRAUB, Designer
 CONTRACTOR: R. J. SEDLACHEK, General Contractor and Owner



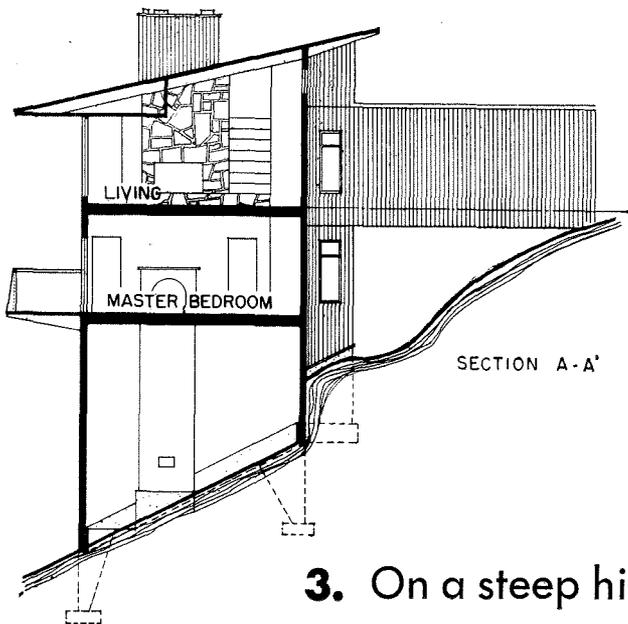


Hinged glass walls open living room, dining room and study almost totally to view, and can be angled as wind-breaks too. The iron-stemmed furniture lives equally well indoors or out. Garden, below, is a close-up version of the verdant panorama beyond.



No retaining wall was necessary to hold uphill side of house shelf. The firm shale surface also makes a cool wall for the outdoor hallway.

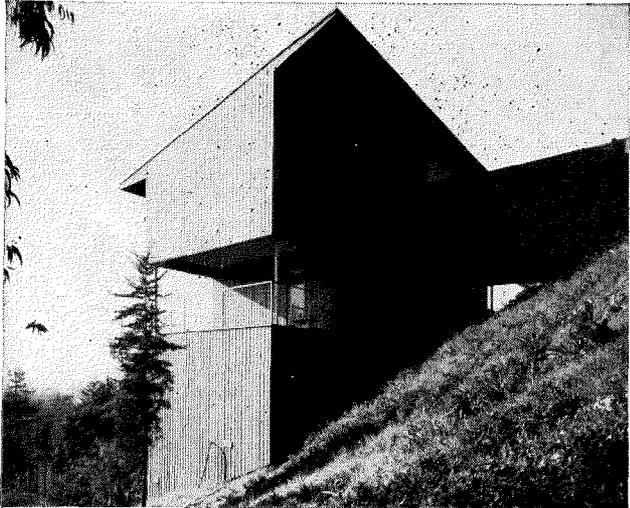




LOCATION: Berkeley, Calif.
 WILLIAM CORLETT, Architect
 ALFRED HIRSHFIELD, General Contractor
 WALTER STEILBERG, Engineering Consultant
 O. M. SIMONSON, Mechanical Engineer

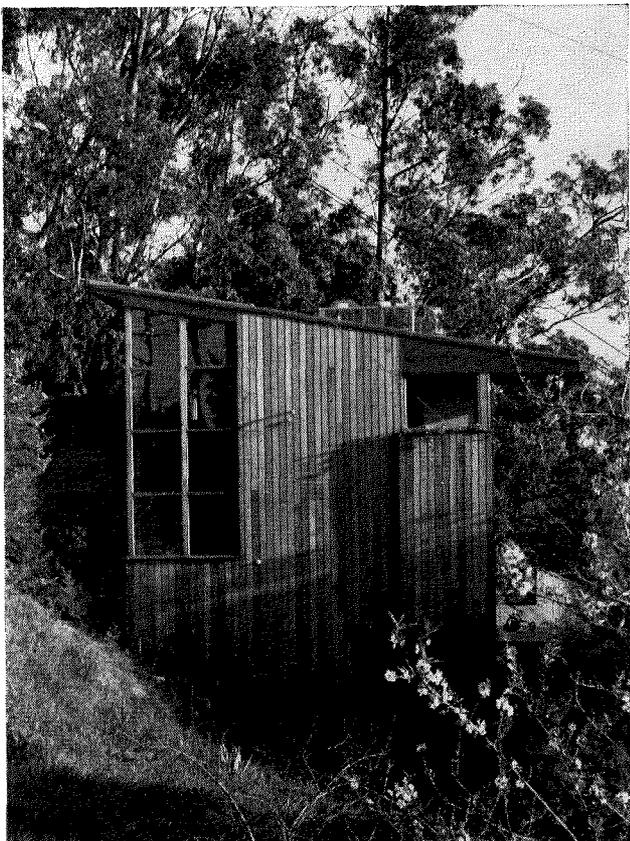
3. On a steep hillside in Berkeley, Calif.: how to use a useless lot

Photography Inc.



East elevation, above; west, below. Exterior finish is redwood T&G. Bridge, above right, to mainland doubles as carport.

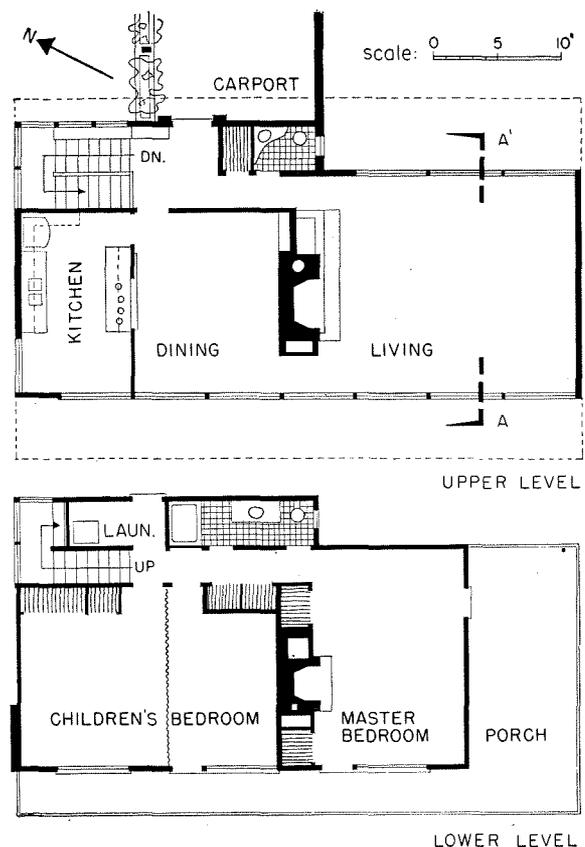
Rondal Partridge



The real estate man sold architect William Corlett this 60' x 200' lot for \$1,000 in 1949, although other lots of the same size in the same neighborhood were going for \$3,000 and higher. Because this one is on a 45° slope, it was considered hopeless.

Corlett knew better; he not only built the neighborhood's (and this collection's) most dramatic hillside house, but he did it for \$10 per sq. ft. (2,014 sq. ft.).

Anything but a platform house was out of the question because whatever was designed would be three full stories from foundation up to street level. Corlett put down nine 1' sq. reinforced concrete piers 7' deep for the foundation, tied the piers together with grade beams (attempting no restraint on shifty surface soil in rainy seasons) and set a wood frame house on the lean legs. Foundation costs came to about 11% of total construction. Other economies: 1/2" foundation grade plywood in 4' x 8' sheets for walls and rough flooring (instead of 1" x 8" diagonal sheathing) and crystal sheet glass (instead of plate). The only extravagance: imagination, and the view it earned.

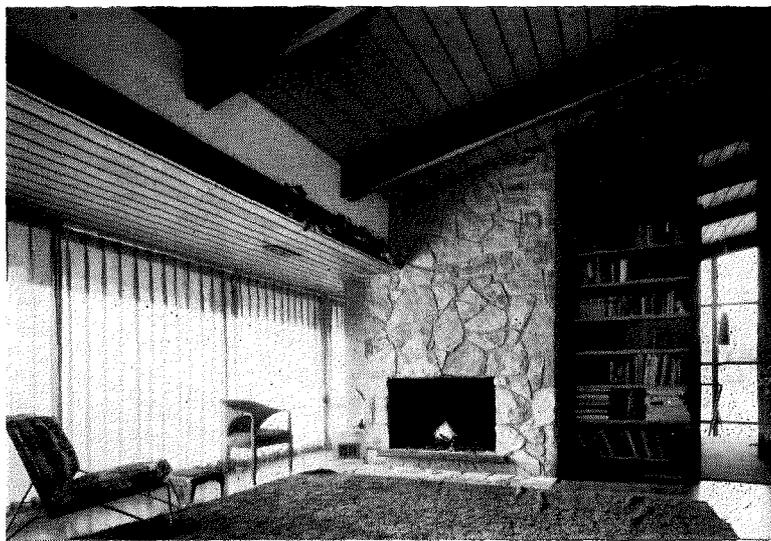




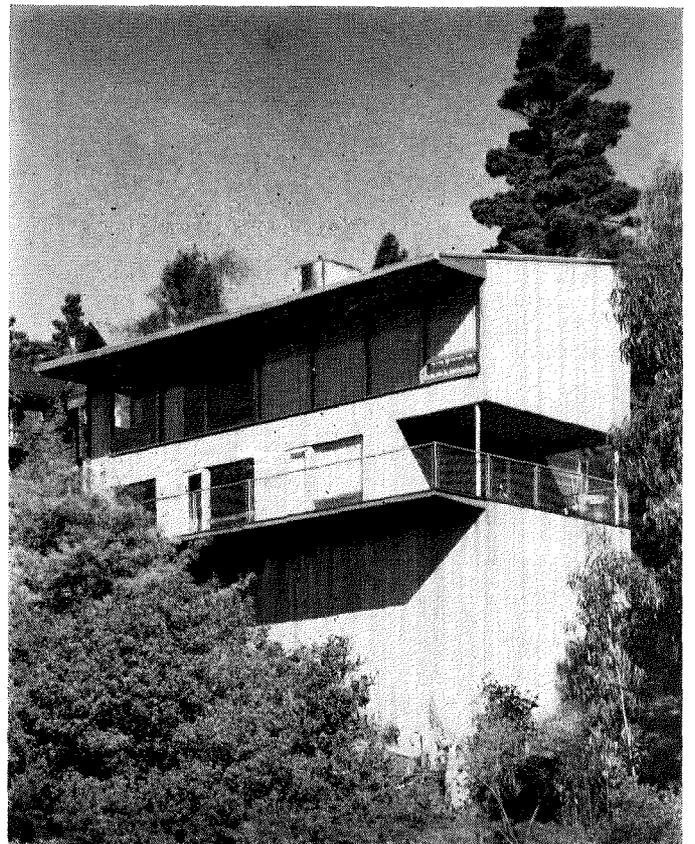
Spectacular view from spacious porch and balcony is over city to bay, including Golden Gate Bridge and Marin Hills.

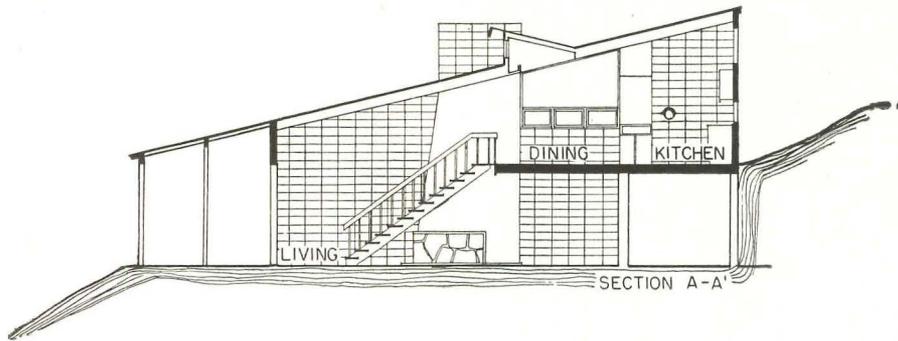
Photos: Rondal Partridge

Shed roof bows toward the sun in order to cut sky glare and cast shade on the glass wall of the living room. Photo above left is from the road; below, from south.



Living room ceiling is 2" T&G white fir sheathing left exposed. Stair down to bedrooms is visible at right in photo.





4. On a Minnesota hillside: a mezzanine house

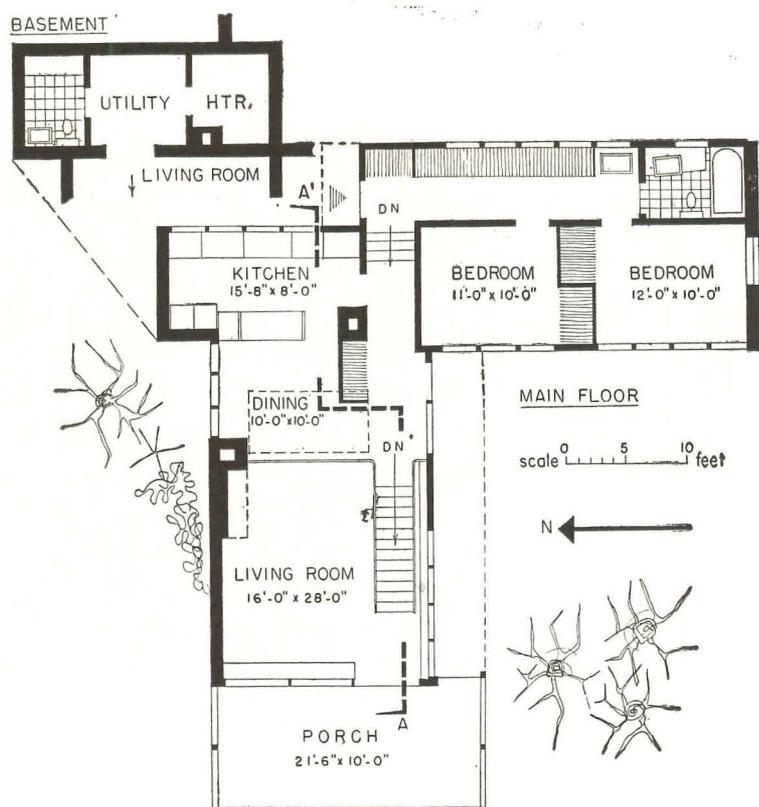
LOCATION: St. Paul, Minn.
 NORMAN C. NAGLE, Architect
 JAMES STEELE, General Contractor

Living room extension under dining platform is used as television alcove, or as extra bedroom for occasional guest. Curtain run on track along edge of mezzanine keeps it private.

This is the customary way to notch a house into a hillside, but here it is done unusually well. The roof pitch parallels the one-in-four slope of the terrain, but is adroitly kept high enough to accommodate a dining mezzanine with extra living room space tucked in under it, and a luxuriously high ceiling.

The house cost approximately \$17,000 (\$11.20 per sq. ft.). The architect estimates this was 3-5% more than a similar flat slab house on grade. But again, this hillside site paid its way: land was bought for \$1,500, but would have been \$2,500 on top of the hill. Putting this house on stilts would have reduced the cost only about 2.7%, because of the extra insulation and larger heating plant which would have been required in this northern climate.

A lightweight concrete block was used for all masonry work, because of its low cost, high insulating value (especially below grade) and ease of handling. It was laid up in a checkerboard pattern so that the resulting continuous vertical voids could easily be filled with an aggregate to complete the insulating job. Pencil reinforcing rods run horizontally every other course. The wall was painted inside and out with a cement paint to provide a vapor barrier; where the walls reached below grade, a rubber membrane waterproofing was applied.

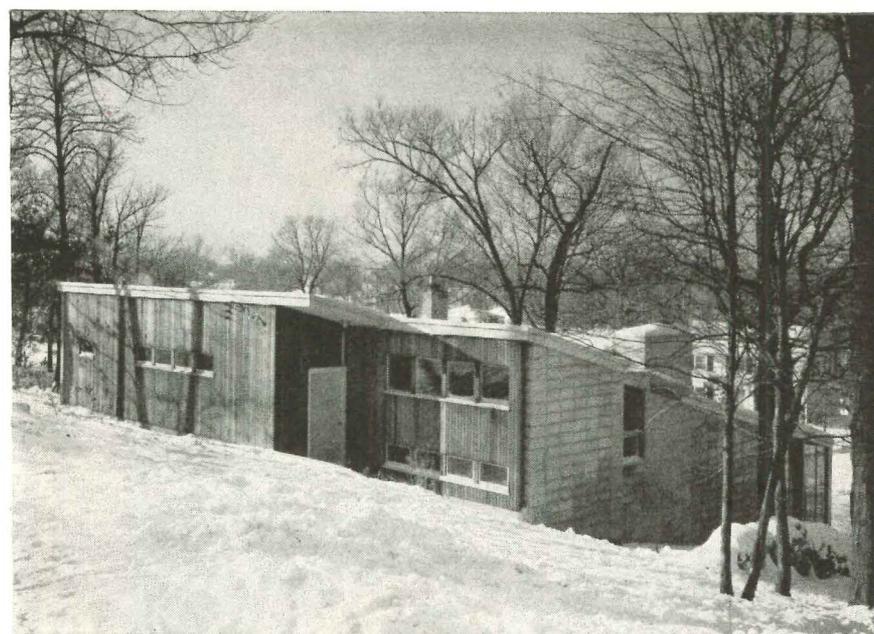




Photos: Photography Inc.

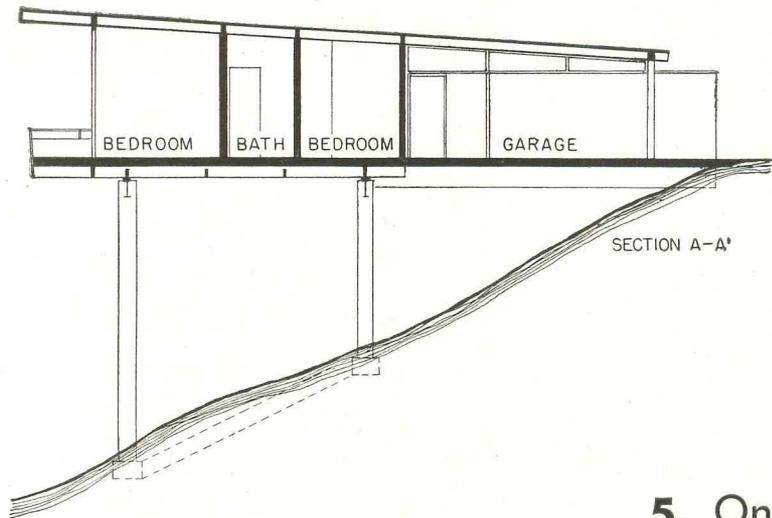
Lot is 69' wide and 150' down hill, and the local building restrictions demanded side yards, so this solution on the slant was virtually the only one possible. Above is a view of the house from northeast.

Dining room, below. Pass-through from kitchen is also used as counter for early meals of the young children. Drawers under this counter for silver storage slide in either direction—into the kitchen or into the dining room.



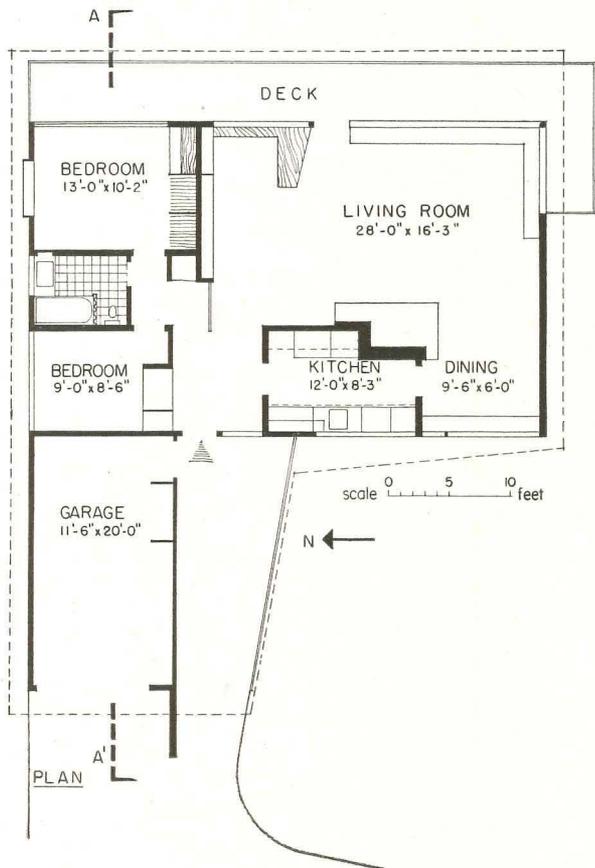
Down hill is also west, so roof slope was continued over porch to shield living room from late afternoon sun glare. The line of low windows near the porch admits earlier south sun to the living room.





LOCATION: Seattle, Wash.
 PAUL HAYDEN KIRK,
 JAMES CHIARELLI, Architects
 PHILIP CEIS, General Contractor

5. On an edge of Seattle: a house in the air



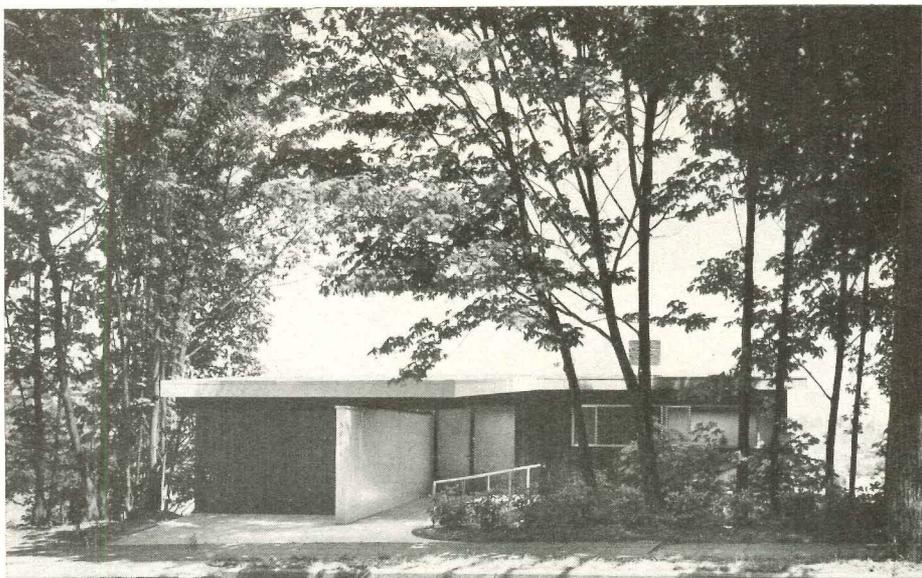
This town house for a secure bachelor (who is the head of the sociology department at the nearby University of Washington) has a sense of floating in the air. Actually six reinforced concrete piers moor it firmly into the hill, and are fitted with brackets to support a rental apartment to be added in the future.

The house is short on space and services because the owner needs little. When he wants to walk around on Mother Earth, he can go to his farm in the country. But when he wants to sit and look out over a long, wide view, his porch here is hard to surpass.

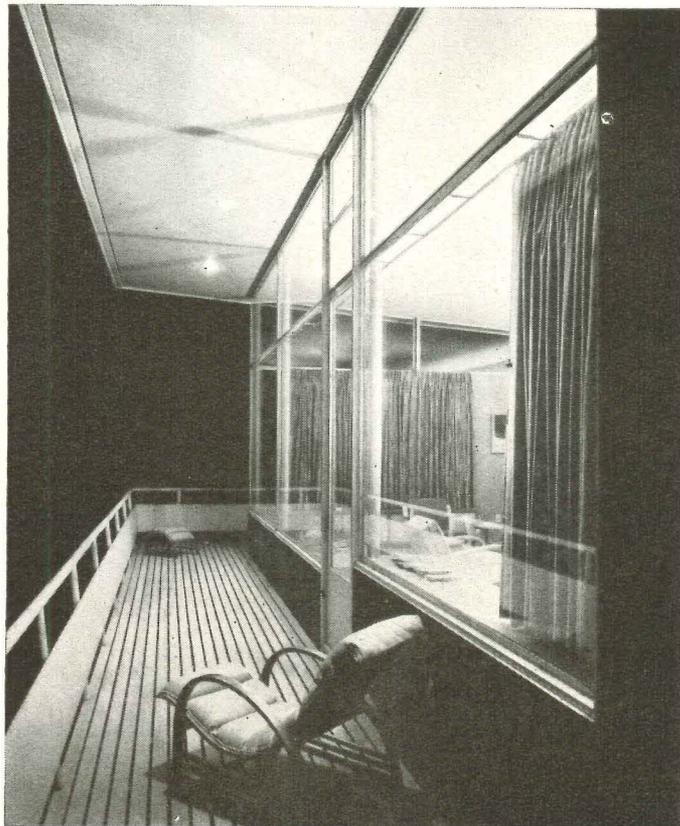
This lot in a \$4,000 neighborhood was acquired for \$1,500 because it was so steep, and was considered to be prohibitively expensive to build on. That was true; the foundation cost \$2,500 more than the normal cost of foundations for a house this size on flat land (total foundation expenditure was \$3,500). But the additional cost for foundations was absorbed in the saving on the purchase of the lot. Construction cost for the entire house was \$20,900, incl. architects' fee, or about \$16 per sq. ft.

Porch at night is a flying bridge into the darkness. Oriented east, it also is a very pleasant porch in the morning sun.

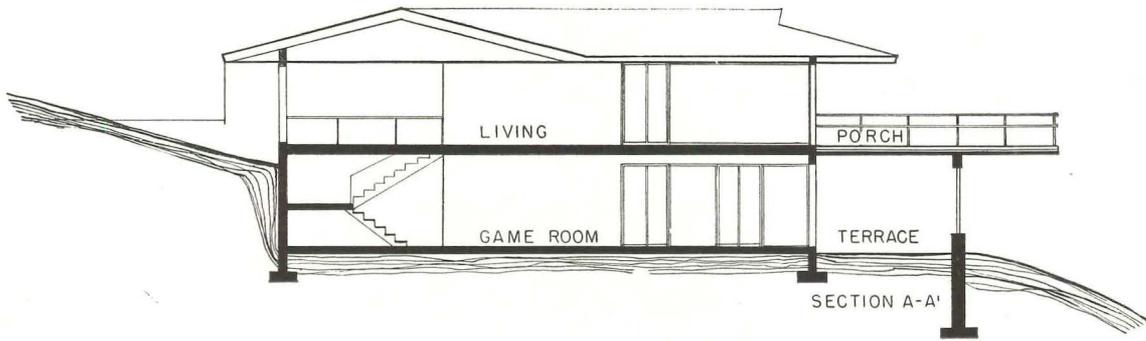
Photos: Dearborn-Massar



Placid facade of house as seen from street, above, gives little clue to its exciting structure. Bridge serves also as garage.







LOCATION: Fayetteville, Ark.

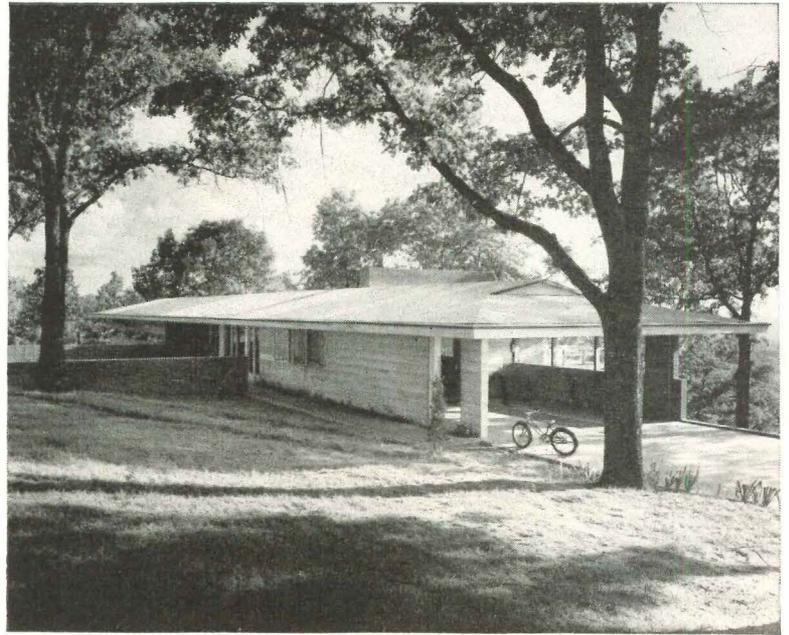
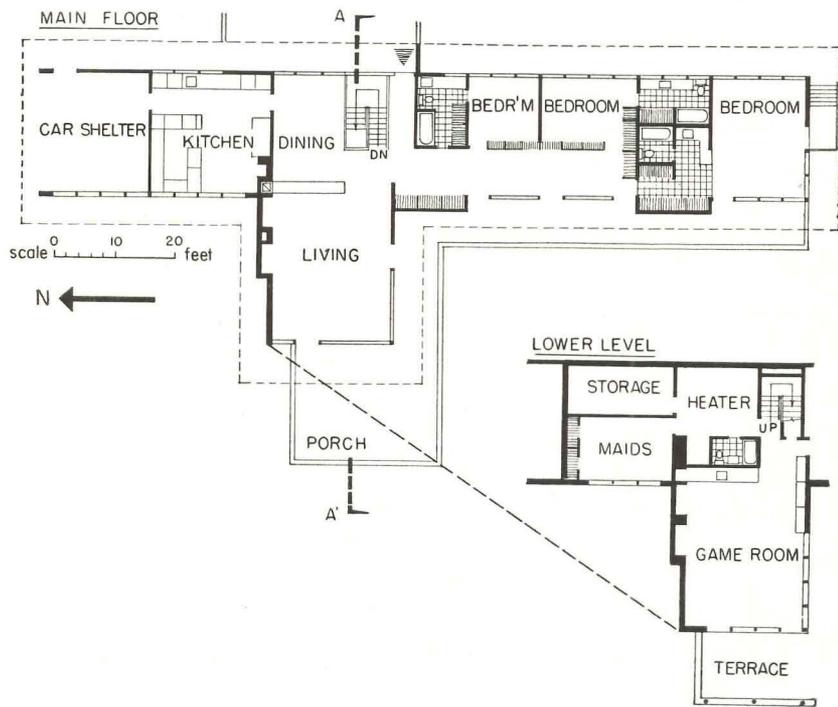
EDWARD D. STONE—KARL J. HOLZINGER JR., Associate

6. On an Arkansas hillside: a spacious timber porch shadows the slope

From southwest, view of informal down hill facade

Photos: Lionel Freedman





Garage, above, is simple public face of this large house. In plans, left, note size of kitchen, which was designed to be sitting room as well, with a fireplace and indoor barbecue. Dumbwaiter connects with play-room on floor below.



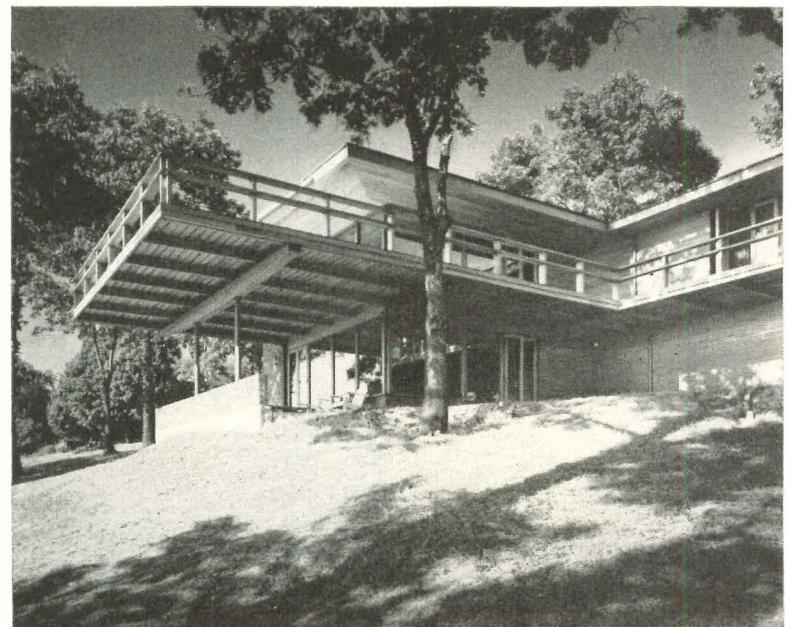
Living room, left, opens on wide porch which is suspended over the hillside below. Wide overhangs over glass walls of the living room intercept summer sun.

This is an opportunistic downhill house, whose designers preserved the contours of its site and used them to build size without formality. Because of the land drop they were able to construct an exceptionally unobtrusive two-story house, which doesn't put up much front, but has a lot of back.

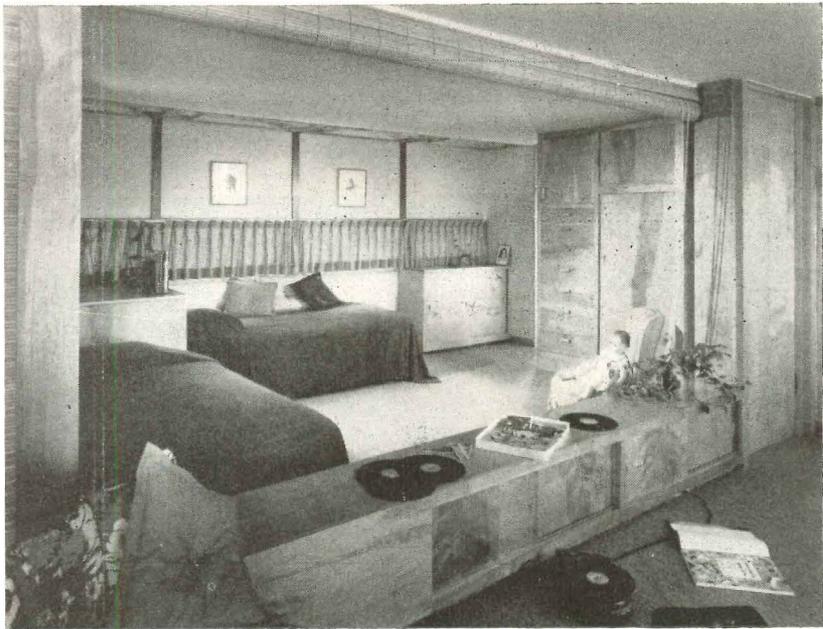
From uphill, the house has a lean low brick facade which belies the actual size of the structure; from below, the true bulk is apparent, where the house opens up and reveals its spacious, comfortable character.

The key to this relaxed informality is the great raft of a porch which is suspended out over the grass and terrace below. Much more than a minimal balcony, this is a real duplication outdoors of the adjacent living room.

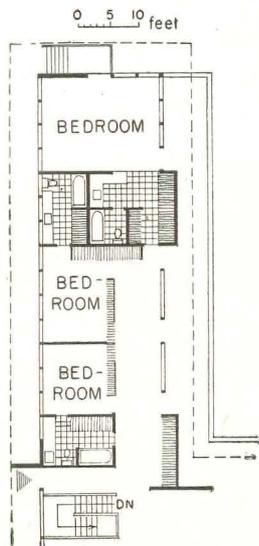
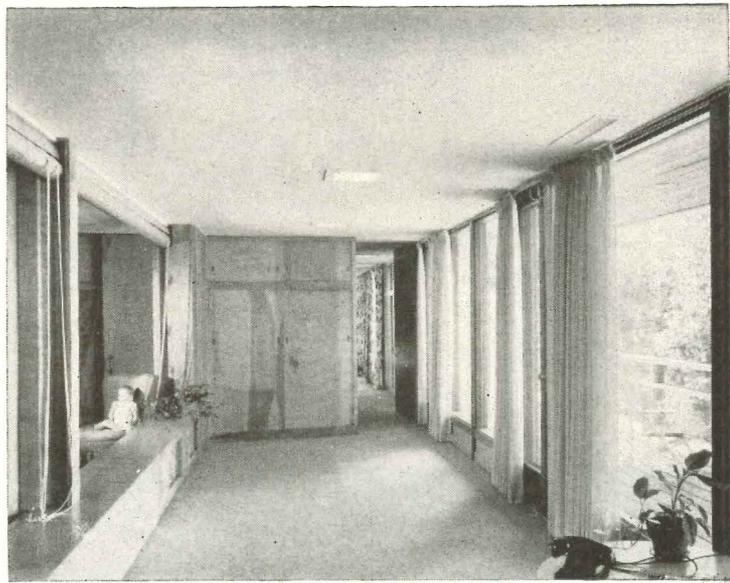
The foundations which hold this rangy structure are concrete block, with brick veneer on stud walls above. There was virtually no site work.



ARKANSAS HILLSIDE HOUSE

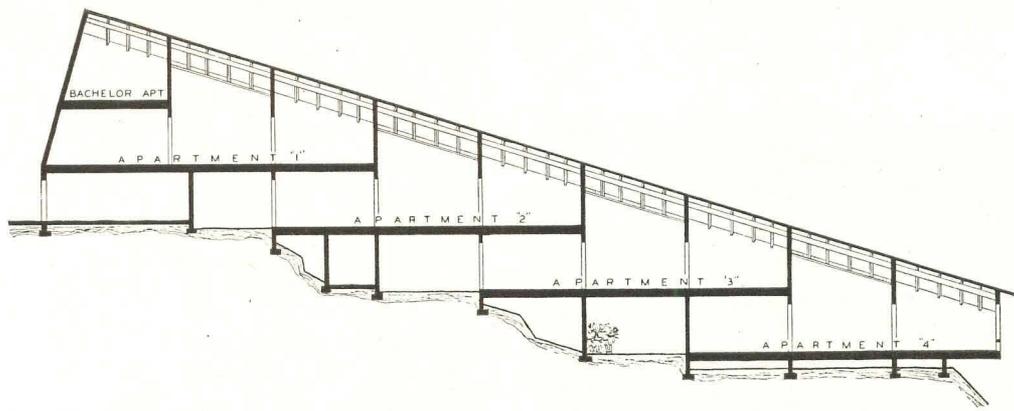


Bedrooms for two children are directly off wide gallery. To obtain through ventilation during hot Arkansas summers, architect designed screen partitions which can be rolled up leaving only low cabinets between gallery and these bedrooms. Left, one of the children's bedrooms. Below, view down gallery.



Left, plan of children's bedrooms and gallery. Below, view out on the great porch from the narrower balcony which extends to the east end of the house.





7. On a Pacific hillside: leapfrog apartments

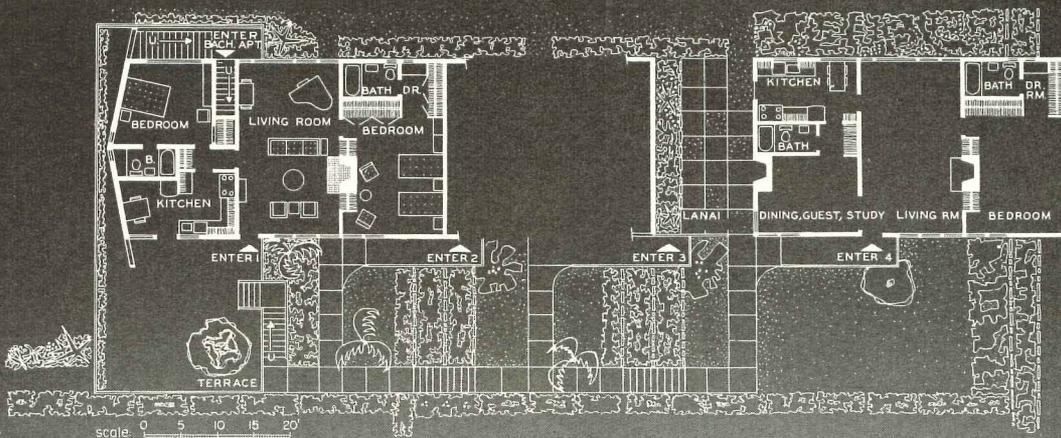
LOCATION: Los Angeles
 KENNETH N. LIND, Architect
 C. HENNING VAGTBORG, Contractor

Architect Kenneth N. Lind's Sunset apartments (see cover) are something of a tour de force in diagonal architecture. He has taken what is essentially a five-story block and eased the floors onto shelves in the slope to form a hillside parallelogram. The results of the maneuver:

Five apartments under one, continuous roof; extra high living rooms; direct, outdoor entrances (except for the top studio apartment); multiple use of plumbing stacks and fireplace chimneys.

The plan capitalizes on the parallel slopes of hill and roof. Each apartment gains three ceiling heights: a medium pitch in the bedroom, lofty in the living room, low and flat in kitchen and study. Such a

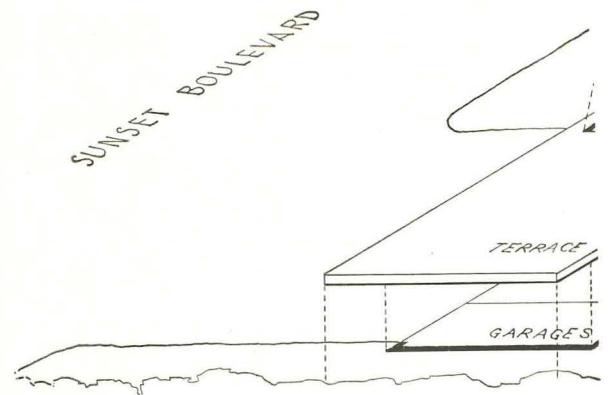
Photos: Julius Shulman



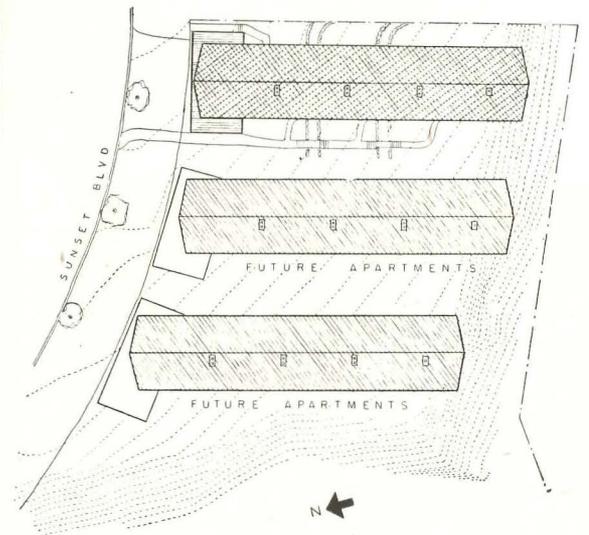
The plan capitalizes on the parallel slopes of hill and roof. Each apartment gains three ceiling heights: a medium pitch for sleeping, lofty for the living room, low and flat for kitchen and study. Such a roof has several advantages (economy among them) but it tends to look as if it were on the verge of a landslide. Lind visually counters this by hooking his building in at the hilltop with a reverse diagonal. Partitions every 15' carry the whopping 135' ridge pole.



LEAPFROG APARTMENTS

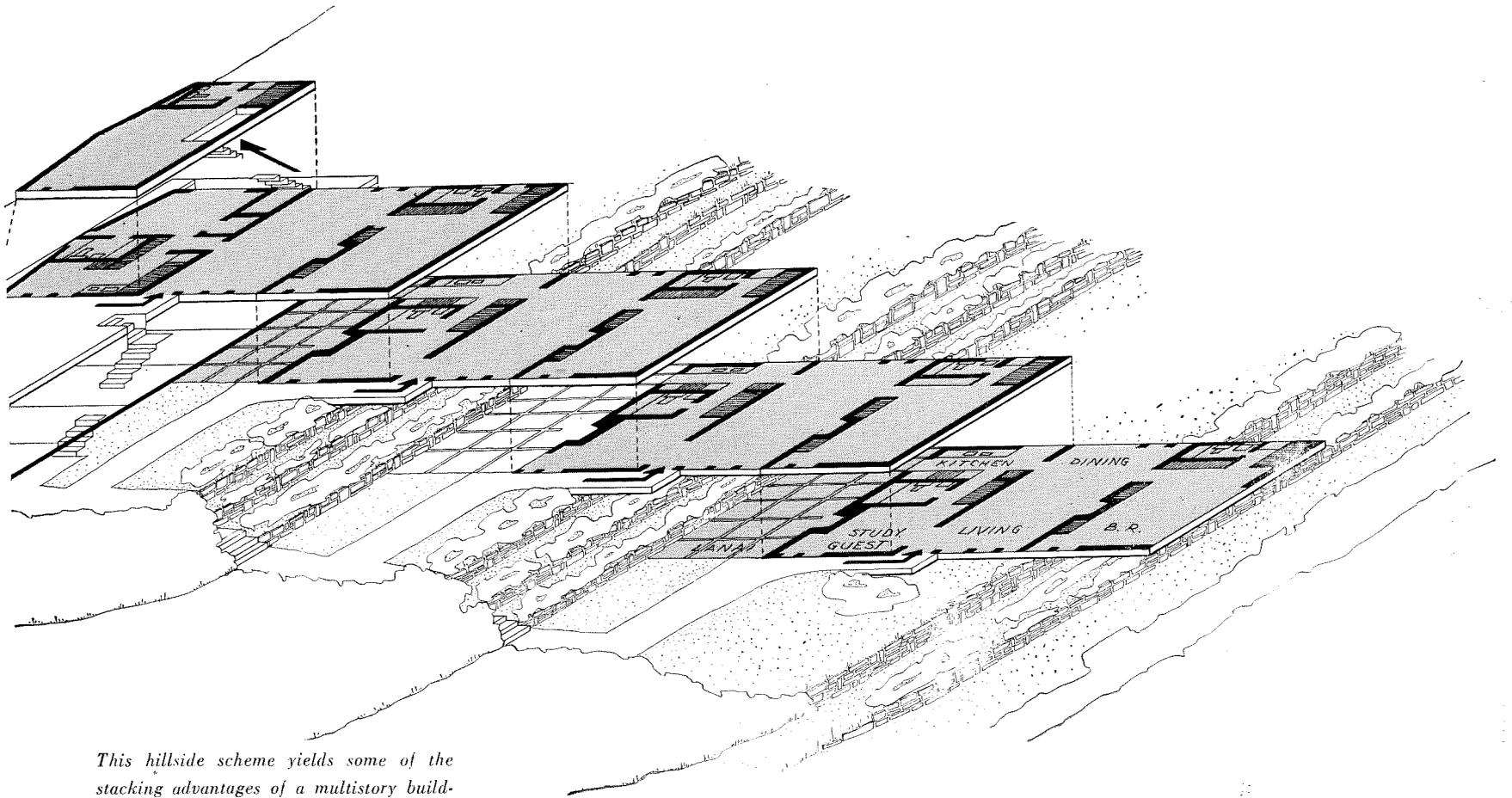


Each apartment is entered from a ramp (left) level with its living room. There are no indoor stairs. Garages are at top of the hill.



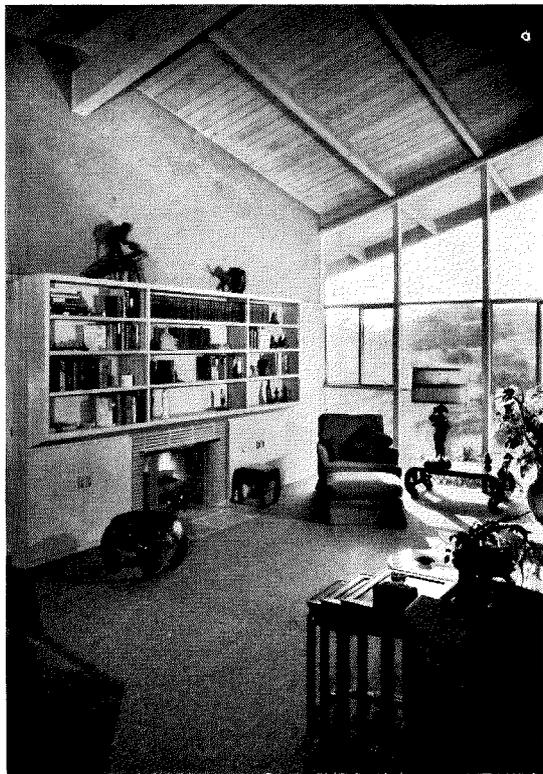
A driveway wide enough for guest parking follows the curve of adjacent Sunset Boulevard. In order to face the garages on the drive, Lind pivoted them as needed. The houses step down on natural contours wherever possible. At two points Lind bridges a 1' in 2' drop instead of cutting back the hill (see section). Looking uphill (above), the lowest apartment is at right. For economy, houses are conventional wood frame and stucco.

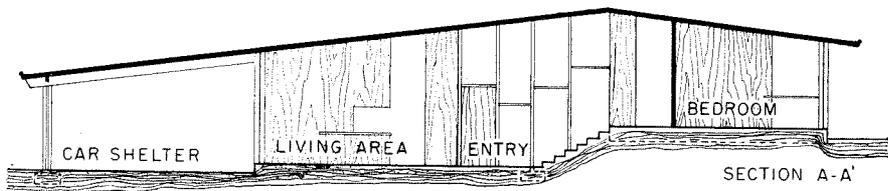
roof has several advantages (economy among them: Lind estimates a flat roof would have cost \$2,070 more) but tends to look as if it were on the verge of a landslide. Lind counters this visually by hooking his building in at the hilltop with a reverse diagonal. Partitions every 15' carry the whopping 135' ridge pole. Lind's design combines and resolves as many elements as a club sandwich. His main problem: to build on a limited budget apartments which would yield high rentals. The first house—there are three of them—was completed last fall and cost just under \$49,000 (exclusive of architect's fee, furnishings and landscaping) and brings in about \$1,100 in rentals per month. Tenants get a good deal for the money. All five apartments are exceptionally livable, have double-height living rooms. Four have outdoor living in the form of lanais or glass-screened decks, as well as two fireplaces, two bathrooms. Radiant heating coils are imbedded in 1½" of concrete laid on wood subfloors. Also, carpeting, curtains, ample built-in-storage and garages are provided. Of course the clincher is the fabulous vista of the Pacific and the Los Angeles hills which enters all rooms but the kitchen. Each house slopes downward lengthwise and the three houses are also stepped above one another in parallel. This gives every apartment good sight lines over the others.



This hillside scheme yields some of the stacking advantages of a multistory building while minimizing problems of vertical circulation. All but the top apartment are reached directly from outdoors. Top apartment has an inside stair going through the garage and over the first apartment. Most kitchens share a plumbing stack with two bathrooms. Garden and living room fireplaces of succeeding apartments have a joint chimney.

The houses are angled to obtain a view of both hills and water, to avoid ocean glare and sharp winds. Sliding glass doors in the garden room (right) form an auxiliary windbreak. 2" x 6" roof sheathing becomes the ceiling in the living room (below). 4' eaves keep rain streaks off of the windows.





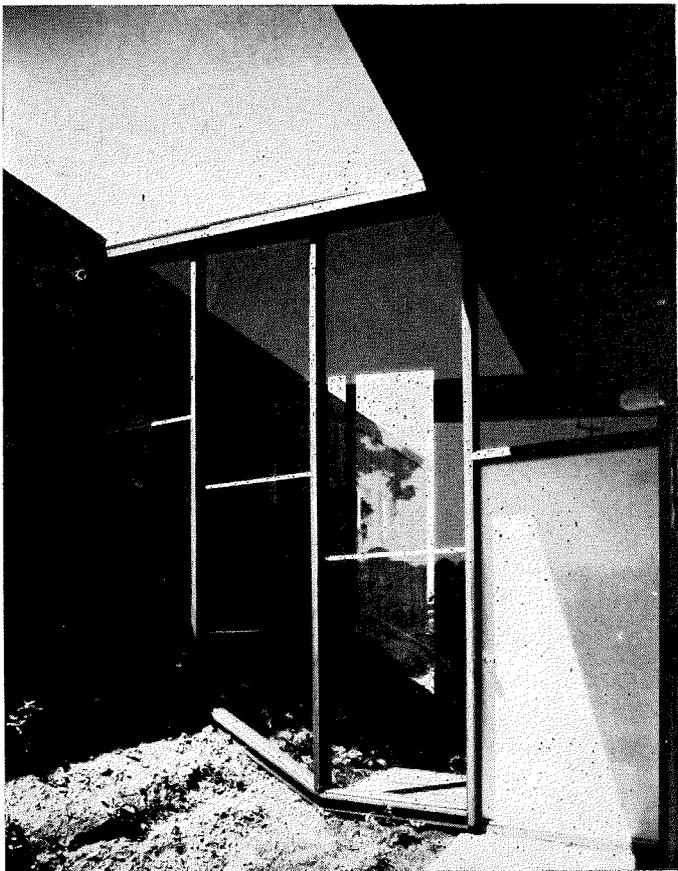
8. On a Palo Alto slope: a dramatic split-level builder's house

LOCATION: Palo Alto, Calif.
 A. QUINCY JONES JR., Architect
 EICHLER HOMES INC., Builder

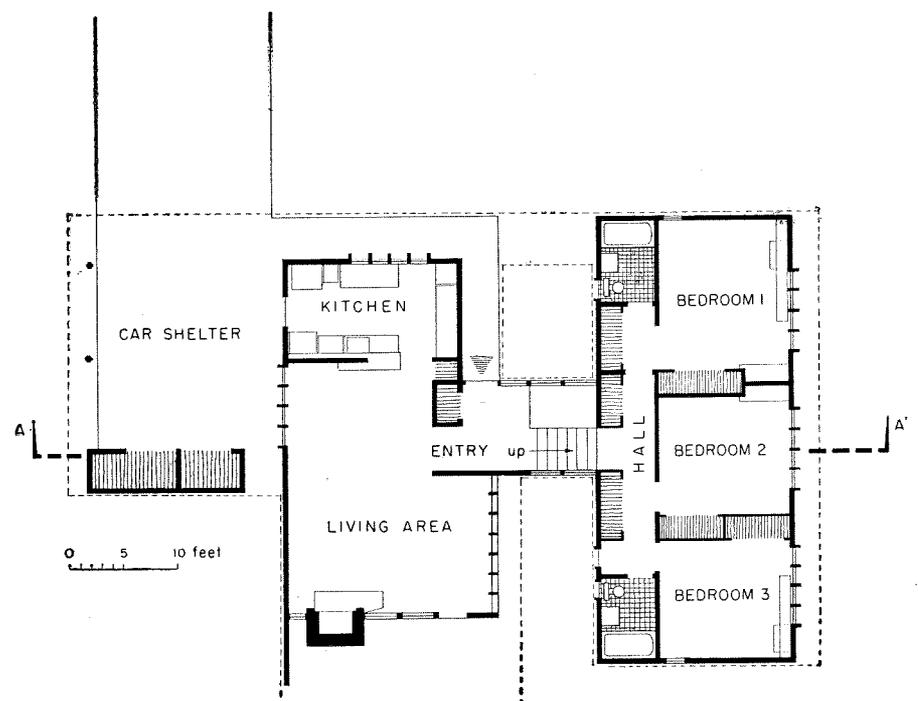
This advanced design was produced as a builder's house—a relatively high priced one for California at \$23,500, but one which indicates operative builders can use rolling land well. It splits the bedrooms and the living area into two separate wings, in a miniature version of many lavish custom-built houses.

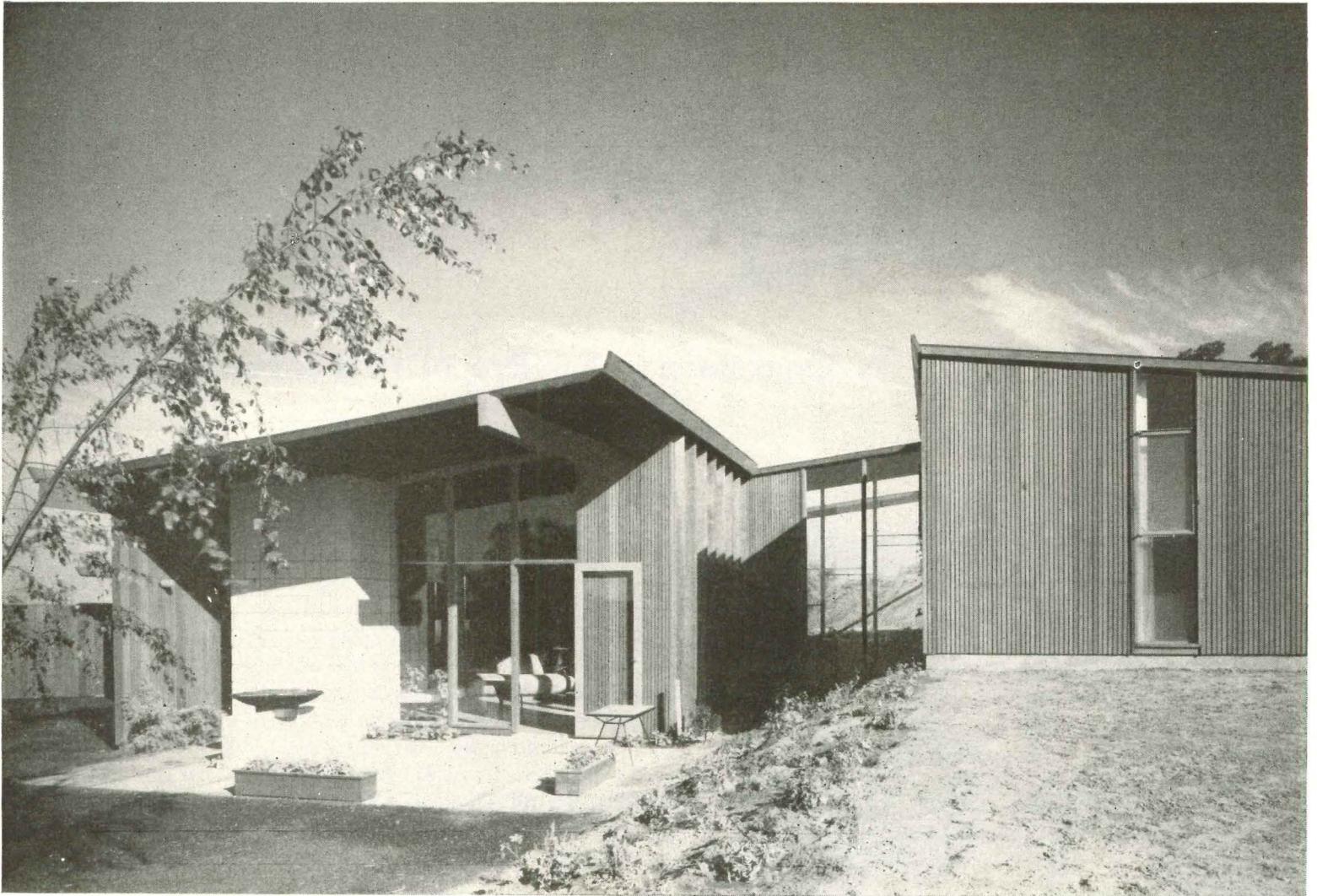
Grading costs for this land ran between \$150 and \$200 per lot (80' x 110') but this would have been nearer \$300 for a single house site bulldozed separately. Costs on the houses totaled \$14.30 per sq. ft., including a \$3,000 lot, contractor's profit and architect's fee. A similar house built on level ground in the same development showed little discernible saving in construction cost, but the link between the two wings has added value as an extra small room.

Both wings of this "binuclear" house sit on 4" concrete slabs, membrane waterproofed, containing radiant heating coils. Foundation costs ran about 6% of total. Builder Eichler also sold four-bedroom variations of the same plan, priced at \$25,000.



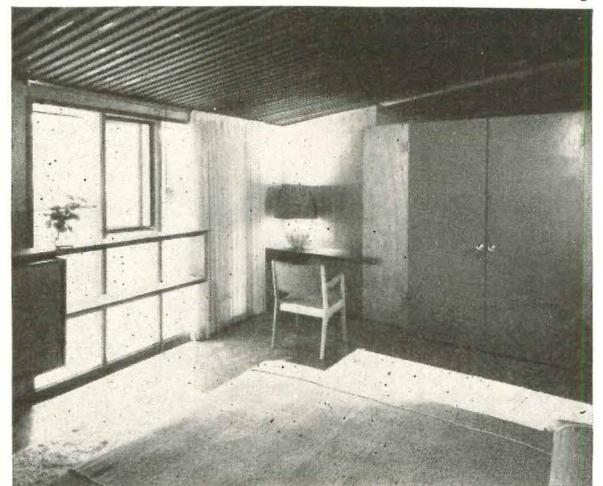
The link: stairway between bedroom block and living room block cost operative builder about \$115. When it was sent out for bids as a single house by individual contractor, this stair was estimated at \$150, providing an interesting index to the economy effected by repetitive building.





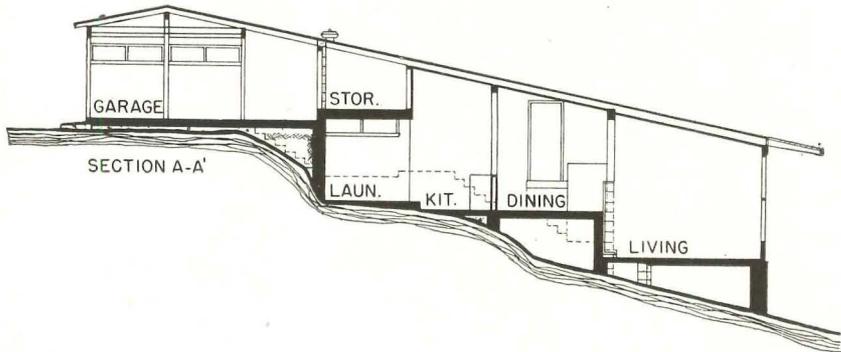
Looking down into living room, above, and looking from inside out, below. Roof is made of 2 x 2's and 2 x 3's laid on edge and nailed together in 2' wide panels. This laminated structure spans from 12-16' without intermediate supports and is used as ceiling finish inside. Window areas are cut up by frequent mullions, permitting substitution of 3/16" double strength glass for more expensive 1/4" plate.

Photos: Rondal Partridge



Bedroom, above, shows corrugated ceiling finish. Other wood walls are mahogany plywood. Most of glass is fixed, with some steel sash set in.





LOCATION: Rye, N. Y.
 HENRY WRIGHT, Designer
 WOODLE CONSTRUCTION & SUPPLY CO.,
 General Contractor

9. On a steep rock in Rye, N. Y.: a seven-level house

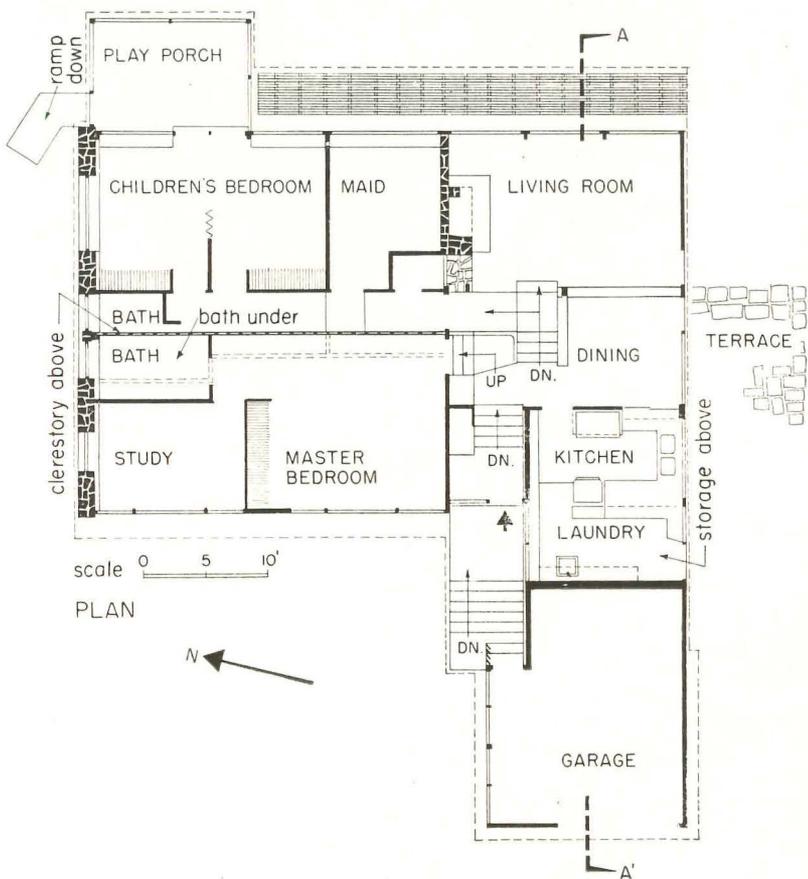
Photos: Ezra Stoller

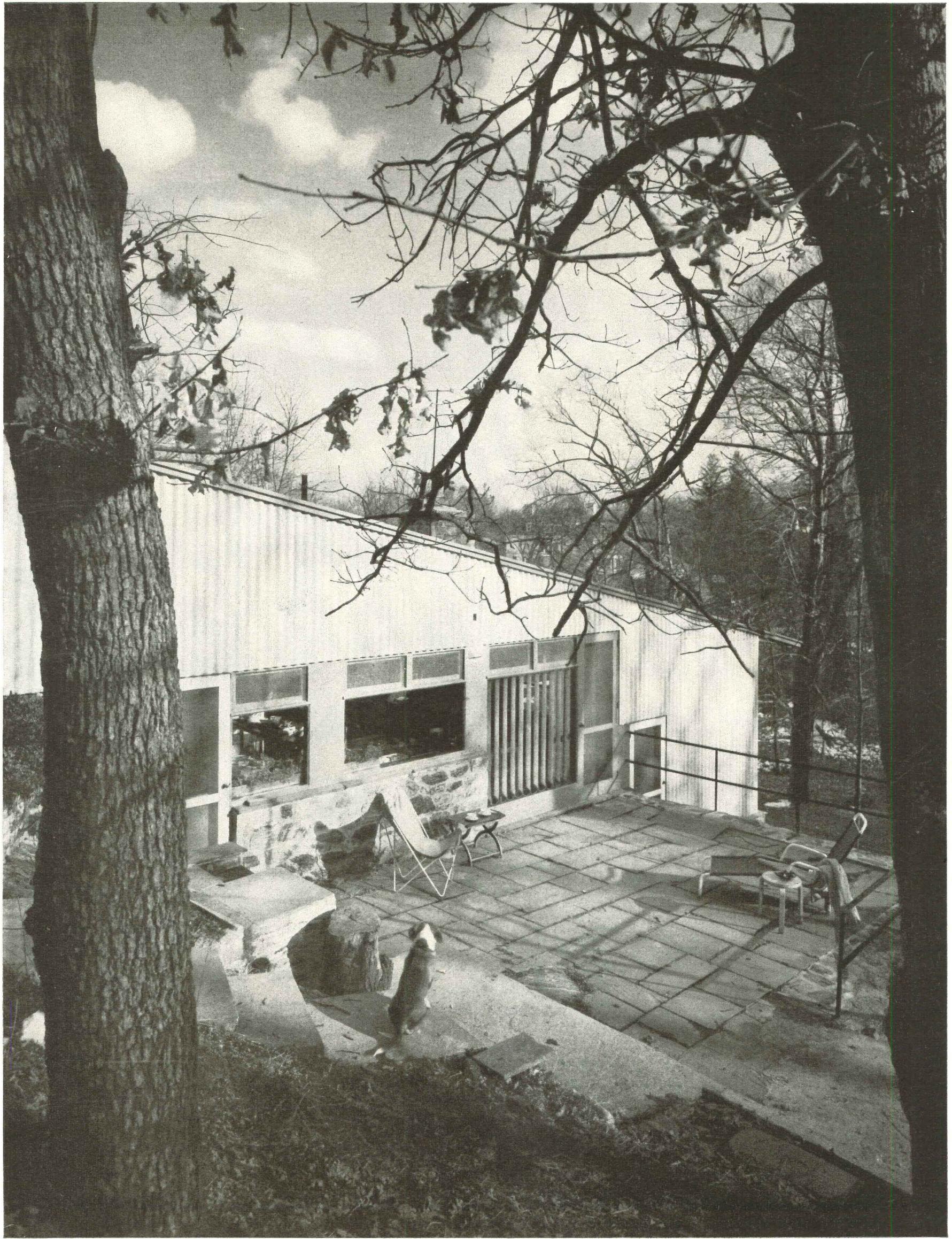


There were no excavations and no footings for this house. The only site work was a dynamite charge which blasted a flat shelf (for the kitchen and laundry) into the bare boulder which the whole building rides. All the structural walls bear directly on this rock, and on the steeper angles they are doweled to prevent sliding. A precise engineer's survey of the big outcropping dictated the design, and the hard contours were so well respected that at one point the finished floor of a ramp within the house is actually only 1" above the stone surface.

The house was built in this precise, difficult way in order to leave the flat lower end of the plot clear for gardening—an obvious impossibility on the sloping rock. At \$17.50 per sq. ft. (a total of approximately \$35,000), this hillside house was about \$2.50 per sq. ft. more expensive than an otherwise similar two-story house on flat ground by the same designer.

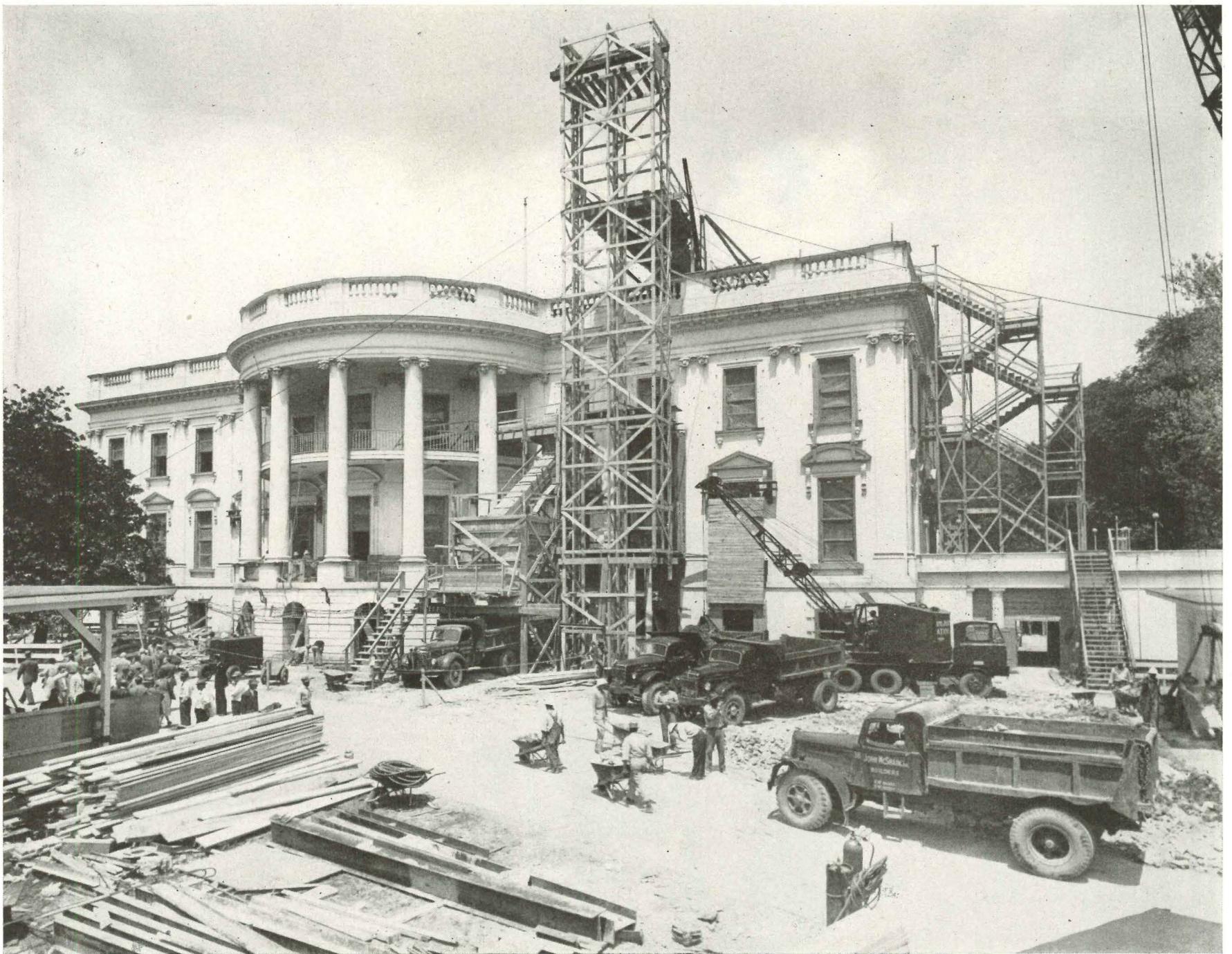
Left, looking down into the living room on the lowest level; below, a transverse view showing the only two-story section of the house. (Another bathroom is directly below the one at the end of the higher hall.)



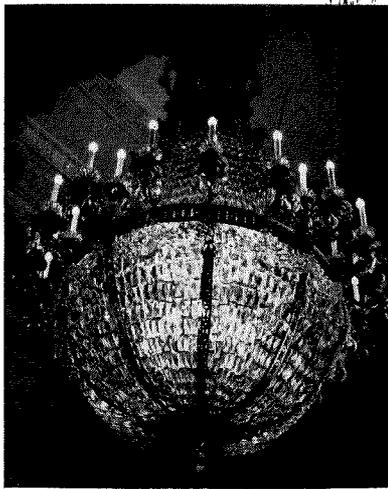


REMODELING JOB AT 1600 PENNSYLVANIA AVENUE

Abbie Rowe—Nat'l. Park Service



For two years White House and grounds were a litter of trucks and trash chutes, sheds and scaffolding. Sidewalk supers peered through the iron fence; leaseholder Truman paid frequent visits. His famous South Portico balcony (center) was left intact.



Dmitri Kessel

Indications of impending disaster:
massive chandelier danced and tinkled with the crowds
as heavy (70 psf) East Room ceiling sagged 6".

Abbie Rowe—Natl. Park Service



... and ancient floor timbers cracked
under the weight of Margaret Truman's grand piano.
Iron tie clamps were a temporary expedient.

THE new White House is a mere shell of its former self. In fact, after 2 $\frac{1}{3}$ years and \$5,761,000 of the public's appropriated cash, a thick exterior shell of Virginia sandstone is all that remains of the original Home of the Presidents, erected 1792. Inside and underneath, the rejuvenated building has the new steel and concrete bones of a skyscraper, the mechanical heart of a super-hotel and the conveniences of a Home of the Future. In interior cubage, it is half again as big as it was before.

But, to the flood of curious visitors the recent reopening has unleashed, the old place looks pretty much the same, with a new coat of paint outside and a certain sparkle inside that wasn't there before. This is as the planners intended it. The ground and first floor public rooms so familiar to millions of Americans were meticulously taken apart, spruced up and replaced, with the subtle substitution here and there of new flooring, new and reupholstered furniture and hangings.

But what, the taxpayer might ask, happened to that six million bucks?

First of all, a good portion of it is hidden in places where the Secret Service frowns on sightseers: behind the woodwork in the form of steel beams, ducts and conduits; in the second and third floor living quarters as new bathrooms, bedrooms, closets; and under ground level—much of the new White House, like an iceberg, is below the surface, underfoot and out of sight. There are two brand new basements and a mechanical area where there was virtually nothing before, housing large-scale storage, service shops, air conditioning, heating, incineration, electrical and water systems. (See p. 113.)

There was ample reason for renovation. The Executive Mansion was a shaky old firetrap, scarred and weakened by 157 years of use and abuse, standing more from pride and habit than any valid structural cause. In recent years more than one President had heard the eerie night sounds of old timbers grunting and groaning. President Truman reported an "over-the-waves" sensation when he walked across his second floor study, and crowds noticed the crystal chandeliers swaying and dancing ominously at large receptions. Every time the Marine color guard changed, the floors vibrated.

One day in early 1948 Margaret's piano settled slightly over

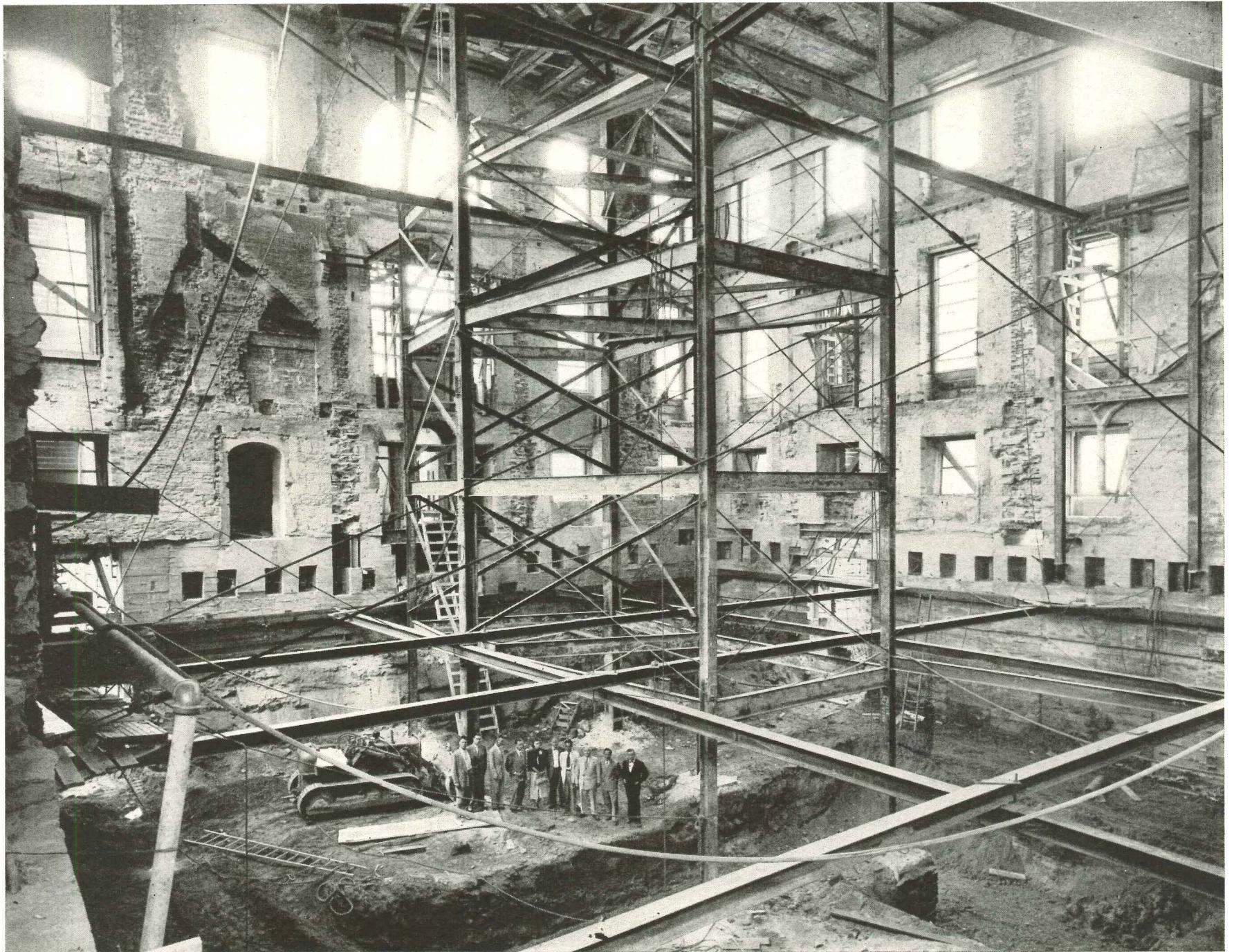
cracking floor timbers, and the East Room ceiling deposited a small pile of plaster dust on the floor. HST's bathtub—directly above one of the reception rooms—was discovered to be sinking slowly into the floor. The President said he "shocked the madam" by suggesting what a scene would have ensued had he come tumbling through the ceiling, wearing nothing but a bathtub, while she was entertaining the Daughters of the American Revolution at tea.

Contrary to rumor, neither the piano nor the tub changed floors abruptly. But Mr. Truman, a 33rd degree Mason who numbers among his hobbies the crafts of architecture and building, began to detect more and more structural faults and in January 1948 asked a committee of architects and engineers to take a careful look. Theirs and subsequent findings:

The original construction was good. For example, 18th Century craftsmen had laid the big sandstone blocks of the outside walls with joints of only 1/16" masonry that would be hard to duplicate today. But after a century and a half of tampering, the whole building was dangerously overloaded and as shot through with holes as a Swiss cheese. Almost every President since Adams had been enthusiastically "improving," punching doors here and there with abandon, boring holes in floor beams, studs and brickwork for pipes and wires, blithely dropping in heavy concrete and tile bathrooms at random on the old floor joists without regard to the structure.

Very nearly the last straw was a weighty steel-truss and tile roof put on in 1927 by Coolidge. In the original design, the top floor had been suspended from the wooden trusses that held up the roof, and these trusses in turn rested on the outer stone walls, which had adequate foundations to carry the load. In the Coolidge renovation a new third floor was put in, built on new beams and trusses of steel. These changes should have added up to greater permanence and strength, **but for one almost fatal error:** some of the trusses were footed on brick interior walls whose foundations were barely strong enough to support their own weight. Nothing gave way at the time, but with the tremendous load pressing down on them, the interior walls started to settle and a destructive load was thrown onto the crumbling central piers.

A 90-ton weight rested directly on one interior brick partition which was only nine inches wide at second floor level, was



Abbie Rowe—Courtesy National Park Service

never intended to be load bearing, and was grounded without any spread footings on 20' of highly compressible pulpy clay soil. The exterior walls carried much less weight and rested solidly on 8' spread footings, settling very little over the years.

In short, the middle of the house was dropping out through the bottom. The interior partitions were sinking slowly under their unexpected burdens, cracking apart and pulling away from the more stationary outside walls. When workmen began stripping away plaster late in 1948 they found gaps of 3" to 5" between inner and outer walls. Engineers looking over their shoulders said the slightest earth tremor would have sent the whole building crashing down like a house of cards.

Added to innumerable and unwise structural changes, the functions of the White House had multiplied far beyond the architect's original concept. Human traffic steadily increased: as the country's population doubled and trebled, the trickle of visitors to the capitol became a freshet and then a flood, and most of them went through the Mansion during visitors' hours. By the turn of the century, floors were creaking under state

Cavernous interior, here being inspected by a Commission group, resulted from gutting of ground, first and second floors. Steel posts and shoring held up third floor and roof while bulldozers scooped out two new basement levels.

Interior partition tiles (right) being laid up between new supports in ground floor hall.

These posts and beams, of steel encased in concrete fireproofing, are typical of new inner structure: an independent, load-bearing frame extending five floors from bottom basement to underside of old top story.

receptions of a thousand and more persons, and it became routine procedure to put extra props under the East Room, State Dining Room and Main Hall during those occasions. On Franklin Roosevelt's inauguration day, there was an average of 3,600 well-wishers in the building all day.

Proper ventilation at these peaks was becoming more and more of a problem; even portable air conditioning units failed to relieve the stifling atmosphere inside. The number of sightseers wasn't diminishing either: in the 11 months prior to the 1948 structural survey, no fewer than 440,000 visitors trooped through the main floors during the two-hour daily visiting period. Designed as a residence, the White House was trying to stand up under the traffic of a railroad terminal.

By September 1948 it was obvious that the combustible second floor was not the only trouble. Inspection holes cut into the floors, walls and ceilings during the \$50,000 survey showed that first estimates (around \$1,000,000) were sorrowfully low, exhumed long-buried mistakes that boosted the probable renovation sum to \$5,400,000.

When this stunning figure was released, the shaky old House was all but overcome by an avalanche of mail and highly vocal opinions. People were in an indignant tizzy; no one had realized that such difficulties could have been suddenly discovered in the famous White House. Some wanted to tear it down completely and build a new and different one from scratch; others suggested preserving it as a museum and offices only and moving the Presidential family to a suburban White House up the Potomac, something that would serve the President as Chequers (with offices at 10 Downing Street) serves the British Prime Ministers.

Early in 1949 Congress passed Public Law No. 40 creating a bipartisan Commission on Renovation of the Executive Mansion. Chosen were Senators McKellar and Martin, Representatives Rabaut and Keefe (since deceased, replaced by J. Harry McGregor, R, Ohio), and the President appointed two member-consultants: Douglas W. Orr, then president of the AIA, and Richard E. Dougherty, ASCE president. The Commission had estimates presented by the Public Buildings Service for 1) a totally new structure; 2) a complete demolishing and rebuild-

ing of the existing structure, salvaging and re-using the exterior wall materials; 3) a remodeling that would leave exteriors, roof and third floor intact; and 4) a brand new third floor and roof, leaving the exterior walls in place. Had they torn down the old building entirely and replaced it with an "ersatz" White House of new limestone, alike in every detail, the Commission now figures it would have been only about 5% cheaper than the scheme they adopted. (Marble or granite, also considered, would have been considerably more expensive.)

But a new building would not have been the real White House, and the majority of the American people seemed to want to preserve their No. 1 national and historical shrine. In any case, sentiment and symbolic values swung the decision towards preserving the old outside walls, and plans were drawn up by Lorenzo Winslow, AIA, official White House architect, the Public Buildings Service and a raft of structural, mechanical and historical experts.

As executive director and co-ordinating genius of the project the Commission picked Maj. Gen. Glen E. Edgerton, U. S. A. (ret.), who had spent 40 of his 64 years as an Army engineer before going to Iraq as a waterways, flood control and irrigation consultant to the International Bank. (Among his previous jobs: chief engineer for the Alaska Road Commission and the Federal Power Commission, engineer in charge of river and harbor improvement in Florida and the upper Mississippi, Canal Zone Governor 1940-44 during the Third Locks Project.)

Bids and budgets

A public invitation to bid on a cost plus fixed fee basis netted some 40 inquiries, 16 actual bids ranging in fee from \$100,000 to \$950,000. Contract went to the low bidder, John McShain, Inc. of Philadelphia, who has built more public works in Washington than any other contractor—the Pentagon, National Airport Terminal, new State Department building, Jefferson Memorial. To give a wider spread of bids and more competition, the Commission stipulated that the contractor would have to supply his own small tools, trucks, clerical staff and overhead expenses. This, plus changes in plans, delays and mounting costs, has whittled away McShain's profit to a substantial loss. Says he philosophically, "It has cost our firm a small fortune for the privilege of doing this work."

Before the renovation got under way in December 1949, workmen were hand picked, then screened, photographed and fingerprinted by the Secret Service. With 41 subcontractors and 100-plus different members of 19 AFL unions involved, there was an average of 260 men on the job at any one time, as many as 350 at the peak of operations last year.

During demolition, workmen dug up from under the first floor a marble box obviously intended for discovery some centuries hence. Contents: two 1902 Washington newspapers, seven Indian head pennies, two nickels, a dime, four two cent stamps and a bottle of rye whiskey. The President ordered the box buried under the building again for some later generation. Other incidents as work progressed: the discovery of a sturdy pair of hobnailed shoes some workman had proudly bricked into the Home of the Presidents during a past remodeling; a three-week plasterers' strike; in May 1950 a thick picket line bearing pro-FEPC placards (the tip-off came when Paul Robeson drove up, had his picture taken with picket sign in hand, drove off again).

The original completion time of 660 days stipulated in the contract would have had the general contractor finished and off the job by last September, with finishing crews winding up

Associated Press



ready for occupancy in December. The repeated delays that have prompted tenant Truman to keep a "currycomb" and a "shotgun" after the builders are explained officially by 1) even more difficult reconstruction problems than anticipated, 2) the fine finish-work required, doubly time consuming because one operation had to wait on the completion of another, and mostly 3) the Korean war and subsequent cost rises and tightening of materials. The 660 tons of skyscraper steel had been bought before Korea, but priorities on other scarce materials had to be obtained through NPA and were subject to lags.

In November 1950 a cutback revision was made to reduce the over-all cost of the project, and by such economies as substituting limestone for granite here and there, some \$250,000 was saved. But nevertheless, two more appropriations were found necessary as work progressed, one for \$261,000 and another for \$100,000, bringing the total up to its present figure of \$5,761,000. The "overrun" beyond first estimates, says the Commission, represented only about 7.8%, "reasonable" by today's standards for big building. As it was, contractor McShain who was originally required to do 15% of the total work on the job, wound up doing nearer 40% and towards the end keeping a double force overtime at his own expense to get the work finished in time for the President to entertain Queen Juliana.

Wrecking with respect

The actual renovation was a sort of architectural dentistry, a beam by beam replacement of virtually the entire structure. Everything had to be done with kid gloves lest the whole building come crashing down or some of the ornamental detailing be broken apart. Explains Murray Bonham, carpenter's foreman, "The idea was to wreck the White House gently, *without* any TNT. Whenever the men on the walls got too rough, I'd make them come down and put them to work on the wheelbarrows. I'd explain we weren't wrecking a tenement and they'd get the idea."

Doors, hardware, furnishings, paneling and decorations were carefully removed, packed and stored, the rugs sent to New York, the famous paintings and historic fittings to the basement of the Smithsonian Institution. Most of the ornamental plaster designs on walls and ceilings had cheesecloth backing, which enabled the crews of sculptors and craftsmen to remove many of them intact. (After the designs were removed, about 25% of them were shellacked and covered with a gelatin that hardened into a mold. From these molds the new plaster casts were made on site, sharpened into more precise detail than the originals, which had been dimmed by coat after coat of paint. The other 75% was replaced without alteration, and the whole bill came to something like \$70,000.)

New lifts for old sags

As the dismantling progressed, vertical tie rods were used to hold floors together and a complex steel crisscross of shoring was introduced to prevent collapse. Borings down to 100' had revealed a solid gravel stratum 18' thick under the 25' of soft clay, so interior piers and exterior wall foundations were poured in pits dug down to this level. Heavy steel H columns were swung in through the lower doors in sections and assembled in place on the new separate footings inside, extending upward the full height of the cavernous interior to support the beams and trusses of the top story.

Another delicate maneuver was shifting the weight of the old outside walls to new foundations, contracted, along with the

shoring, to the New York firm of Spencer, White & Prentis. "Quite a job," says Edgerton. "We would dig a series of pits 4' square and 27' deep down to gravel at intervals around the exterior, then pour them full of concrete. When these had set we would dig another set of pits elsewhere and so on until we had a continuous foundation consisting of 126 separate pits joined together." As the independent, load-bearing steel skeleton went up inside the shell, this new underpinning and the old walls were tied to it by heavy anchor bars. Thus the outer walls became, in effect, curtain walls.

One of the greatest gains of the entire renovation was new basement space, two full floors of it (roughly 350,000 cu. ft.), made possible by bulldozing out 10,000 cu. yds. of clay dirt almost to the bottom of the new foundations. Taken as a whole, the operation was an ingenious engineering trick: gutting the old insides of the building, while holding up third floor and roof, scooping out basement levels underneath, shifting the whole 85' x 175' masonry box to new foundations.

Planning for such an extensive project was laborious: 190 architectural drawings, 518 shop drawings, well over 1,000 each of structural and mechanical diagrams. A further complication: each President had had his piecemeal remodeling work done under the aegis of a different agency, and the architects had no clear up-to-date records to work from, other than 18th Century sketches and the McKim, Mead & White report of the 1902 renovation.

The innovations

Today, four years after the idea first took form, the new White House has close to 1½ million cu. ft. of interior space (excluding the two big office wings), where it had 1 million before. Thanks to the recent improvements and the declining value of the dollar, its total valuation including 17 acres of grounds has gone up appreciably from a figure of \$26 million quoted in 1940—to probably between \$40 and \$60 million, although no recent appraisal has been made. With its vast new mechanical plant and 72 (ten new) employees, it will cost \$367,200 to run for fiscal 1953, an increase of \$100,000 over fiscal 1951. (The electricity bill alone will amount to \$38,890.)

Counting the rooms as you would in a normal house, there are 54 rooms and 16 baths, as opposed to 48 rooms and 14 baths in 1949. The full breakdown, including storerooms and basement space:

	rooms	corridors, halls	baths	lavatories
new	107	40	19	12
old	62	26	14	6

What's new, by floors, starting from the bottom (security prohibits publication of some floor plans):

Mechanical area (approx. 160,000 cu. ft. under the lawn, enlarged from the previous installation): transformer room, electrical repair shop, carpenter shop, compressor rooms for the air conditioning system. To carry an estimated cooling load of 300 tons of refrigeration, two centrifugal compressors were installed, each with an 1,800 r.p.m. motor and a 200 ton capacity. One can provide continuous cooling in case the other is out of service for repairs.

Basement: storage rooms, laundry, engineers' office, dentist's office, control room, water softener, men's and women's locker rooms and lavatories, incinerator, elevator machinery.

Basement mezzanine: storage rooms, barber shop, valet, servants' dining room, men's and women's lavatories. Five separate heating and air conditioning units have ducts big enough for two men to sit in, are linked to a central control and to thermostatic controls that allow different temperatures in different rooms. In winter all rooms in the building are warmed by preheated air; second and third floors are equipped with hot water convectors as well. The air units are designed to keep such spaces as the huge East Room at the proper temperature whether there are two or two thousand people in the building. Steam for heating the water for the convectors is supplied by two sets of connections running from a government central heating plant into both east and west sides of the building. The new systems replace four types of heat used in the old building: steam, hot water, hot air and electric.

Ground floor (see plan): principal renovations here were a big new white-tiled kitchen that can serve up to 100 extra guests, with stainless steel refrigerators, steam tables, ovens, fluorescent lighting and a theater-size electrical control board. Also new: a three-room doctor's suite, two new freight elevators and two new stairways to the basements. Two new "sidewalk" elevators were installed outside for easy access to the basements.

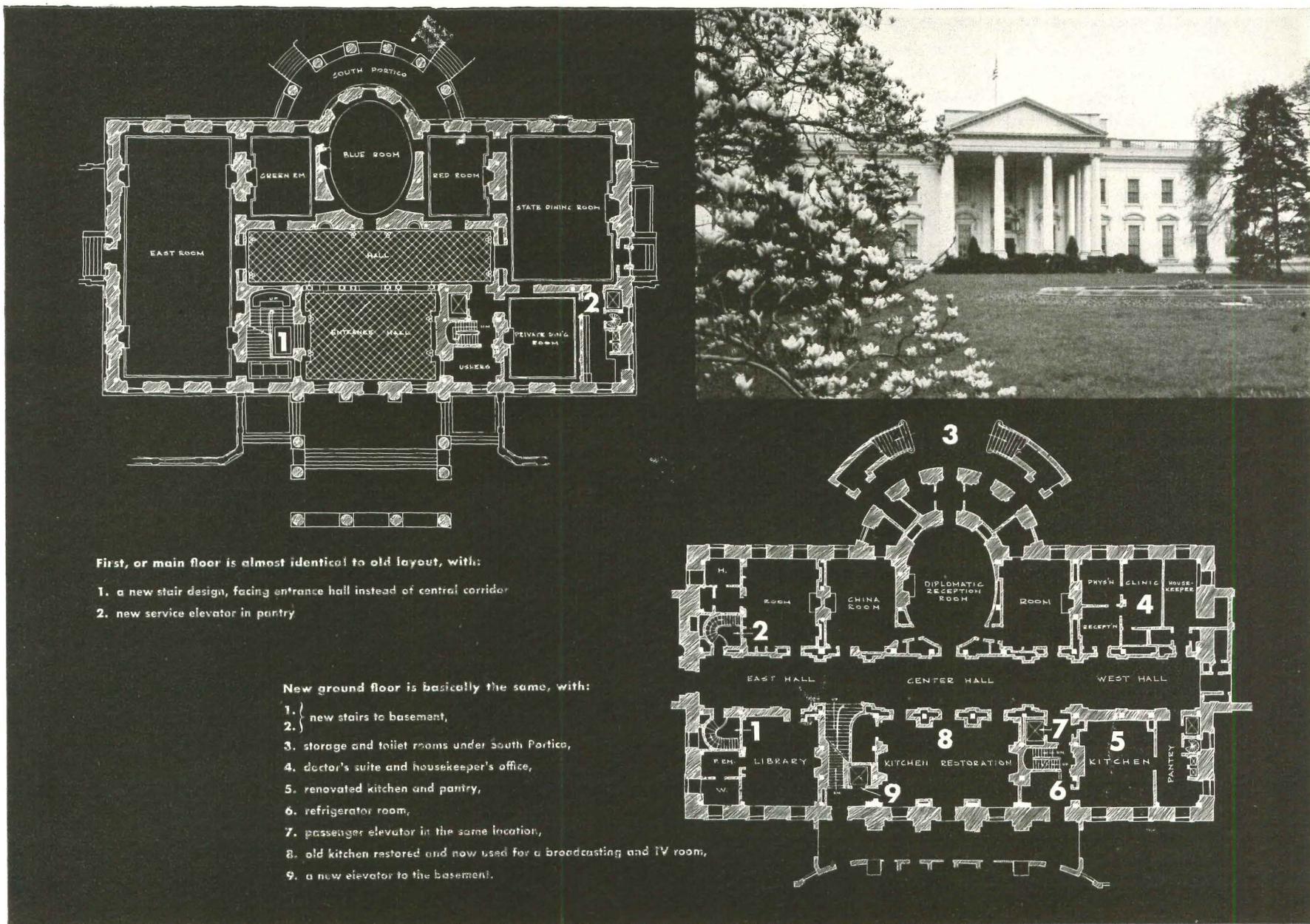
First (main) floor (see plan): major architectural change was converting the old main staircase from a narrow-width split-run design, facing on the inner hall, to a wider, single-width stair that can be entered more conveniently from the front entrance hall. Butler's pantry has a new service elevator.

Second floor: new living quarters for the Presidential family will at long last have enough closets, in the new space provided by replacing the thick interior partitions of brick with thinner steel construction. Also noiseless toilets, glassed-in tub-showers, new furniture, outlets for TV sets.

Third (top) floor: by raising the four corners of the 1927 hip roof, it was possible to add four new rooms, more storage space. Nestled behind the big stone balustrade and scarcely noticeable from the street, the old wooden solarium has been replaced with a polygonal metal one that has large picture windows overlooking the Potomac, bamboo furniture and blue-green walls. Hidden from worm's-eye view, it is not likely to offend architectural purists who complained so bitterly about the famous "Truman balcony" on the south portico.

Preserving the original interior dimensions of the historic ground and main floor rooms to within two or three inches

(Continued on page 142)



PHOENIX: bargain city in the U. S. for homes

Are the low-profit houses of Phoenix

a preview of what competition may bring to other cities?

"For giving values in homebuilding, Phoenix is the hottest spot in the U. S.," said Frank Richards of FHA recently.

Where else can a buyer get 1,220 sq. ft. of space with three bedrooms and one and a half baths for \$7,000?

"There's nothing wrong with housing that some real competition won't cure" is a familiar statement which seems to be borne out these days in Phoenix. At least it holds true for the customers, who are getting astounding bargains as the accompanying photographs show. Houses are \$1,500 less than in nearby Tucson, itself a buyer's dream town compared with most of the country.

While customers in Phoenix have the happy look of buyers at a fire sale, builders and subcontractors wonder how long they can stay in business. Many have already given up. "If this is healthy competition," they say, "we want no part of it."

FHA estimates some 7,500 houses were built in 1950, another 5,000 in 1951, forecasts 4,500 to 5,000 for this year. Mortgage money is so tight builders can't get FHA financing until a house is sold. There is no VA money except on direct government lending.

A builder named Rubenstein started the price slashing early in 1949 by offering a three-bedroom, 1,062 sq. ft. house for \$7,000. (He's out now, doing only Wherry Act jobs.) Then Sam Hoffman (*see p. 118*) put a 1,095 sq. ft. house on the market for \$6,475. (He's quit building in Phoenix, too.) Now John Long, Hugh Evans and a few others are giving even more house for the money.

Out-of-town builders may ask, how do they do it—what's Phoenix got that we haven't got?

Here is why it happens in Phoenix

1. Competition is so rough it has forced prices down and values up. In the past 18 months five builders have gone bankrupt and many others have gone out of business. To survive these days, a builder has to put the squeeze on himself (profits per house are as low as \$210) and on everyone he deals with.

2. Subcontractors want work, keep their prices low.

3. Labor is highly skilled, highly productive. Union leaders claim Phoenix has the best producing labor in the state. High quality workers are attracted there by the good weather, and by almost steady work since 1940. While wage scales are above the national average, production is too. Bricklayers get \$3.50 per hour but the best lay 1,000 bricks a day. Ninety-five per cent of workmen are organized, are proud of their skill and their ability to deliver a full day's work.

4. Land has been cheap. First buyers for out-of-city tracts paid less than \$800 an acre. Today land is from \$1,500 to \$2,500 per acre and FHA has set a minimum lot width of 65 ft.

5. Improvements are cheap, costing about \$4.50 a front foot (\$1 each for water, sidewalk and roll-curb gutter, \$1.50 for gravel and black-top road). Septic tanks are used.

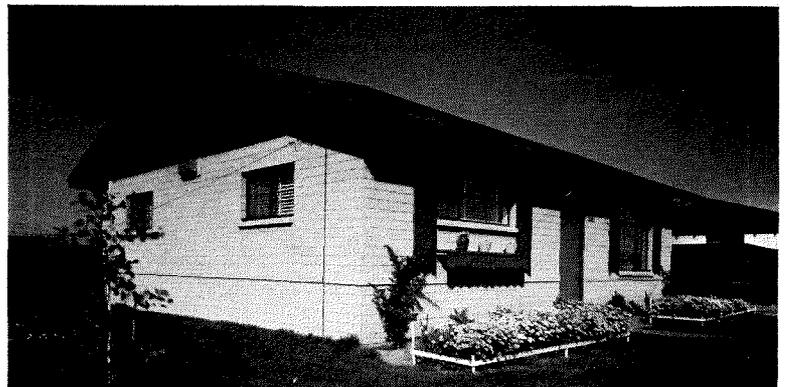
6. A builder's overhead per house is low because the weather lets him build about 51 weeks a year.

7. Dry climate permits economies such as cheaper footings and foundations, pumice block (made nearby) finished inside with paint or plaster without lath or furring strips, and an inexpensive heater. Cement slab serves as finished floor except in bath and kitchen. Outside city limits, where most building is done, codes are reasonable. Builders save at least \$300 per house on simplified wiring, plumbing and savings in land improvements.

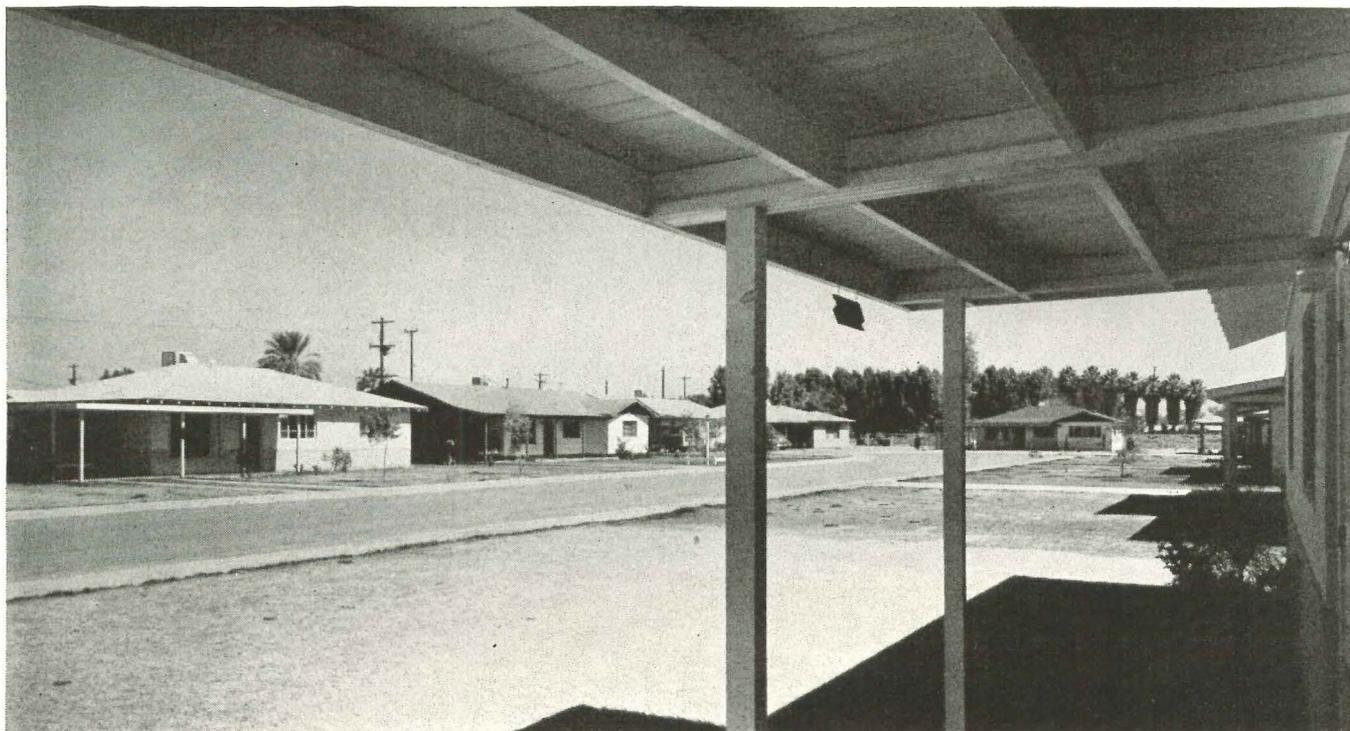
8. FHA says that some large builders make their entire profit on the discount their volume gets them under the wholesale price. **Is Phoenix overbuilt?** No one knows, and there is a wide difference of opinion. The city is still a real frontier and that makes it hard to predict what may happen.

West Coast industries are dicker with the idea of putting in annexes in Phoenix. If one or two airplane factories moved in, as they have into Tucson, there could easily be a need for several thousand more houses overnight.

Wage scales in Phoenix are as follows: bricklayers \$3.50; carpenters \$2.67; cement finishers \$2.42; electricians \$2.62; sheet metal men and roofers \$2.25; plumbers \$2.50; plasterers and lathers \$3; painters \$2.52; tapers \$2.65; laborers \$1.77 to \$2.



Smith & Sanderson sell this two-bedroom, Title I house for \$5,545. The roof overhang and the horizontal lines of the pumice block make the house seem larger than it is.



A group of Hugh Evans' houses in Cavalier Parkway showing character of neighborhood. Largest three-bedroom houses sell for \$7,395. Other three-bedrooms sell for \$7,000. Smaller two-bedroom are \$5,800. Evans turns the building operation over to a general con-

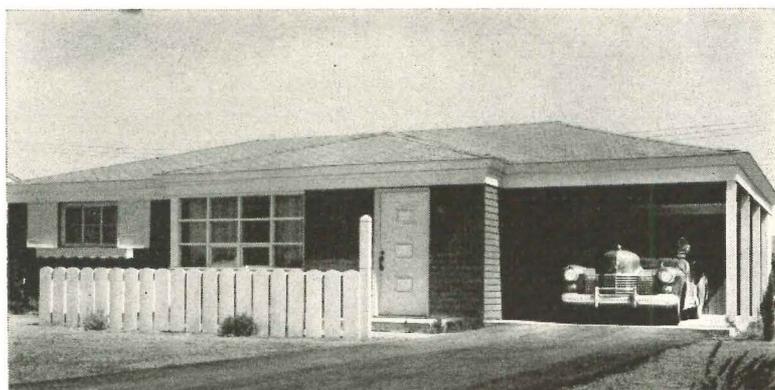
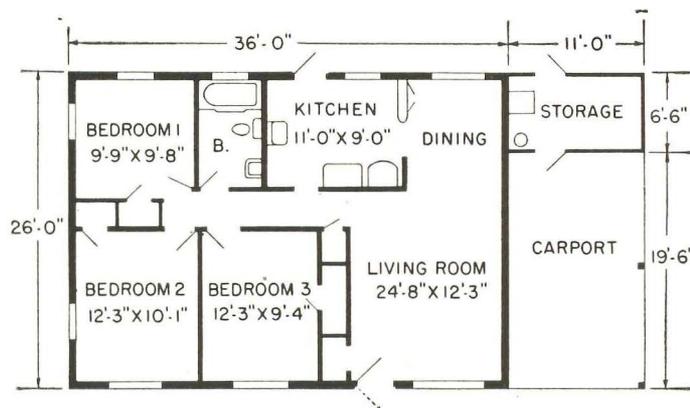
tractor, while he specializes on plans with architect L. W. Coffey and handles the sales. Evans is a great believer in bright colors, using blues, pinks and greens. Model houses are furnished to suit the tastes and pocketbooks of buyers. This also helps make sales.

Hugh Evans of Cavalier Homes

After ten years of building in Dearborn, Mich., Hugh Evans went to Phoenix in 1947. In the past three years he has built 500 houses and he is tough competition for all other builders. Last year he completed and sold one house a day for 100 days.

Evans says: "I do it the easy way. I sell the houses but I contract all the building." He is content to make about \$250 per house profit and his contractor makes the same.

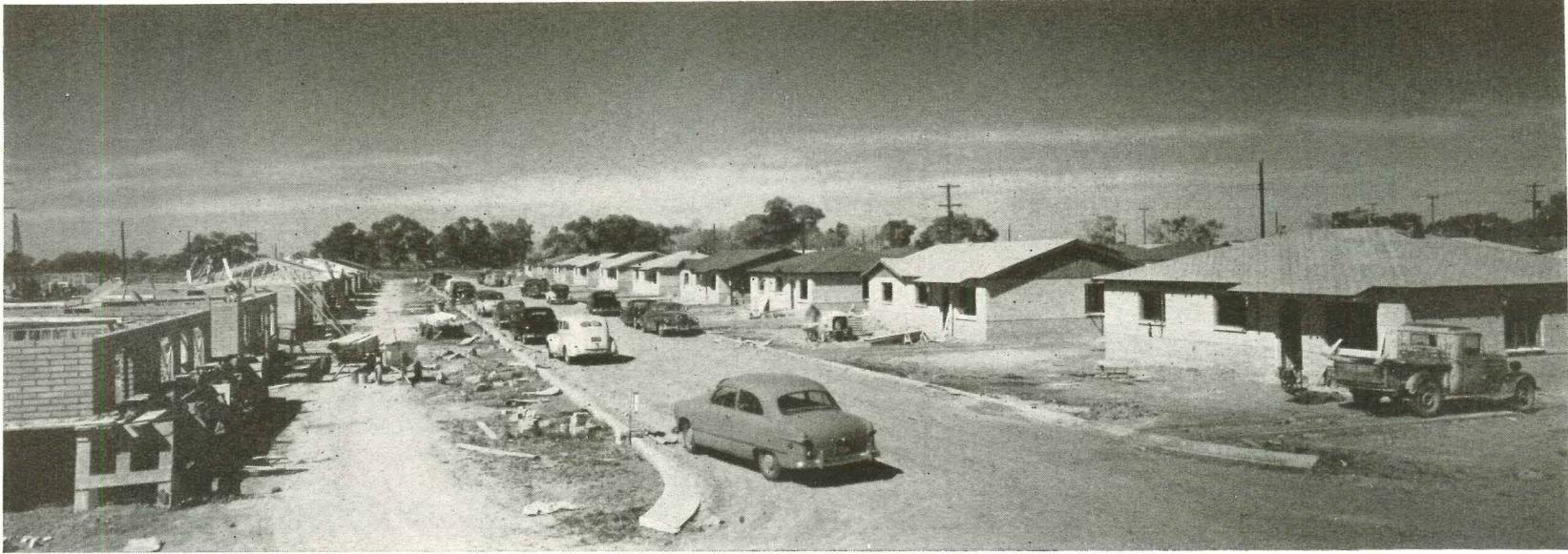
His 936 sq. ft. two-bedroom house sells for \$5,800. His 1,220 sq. ft., three-bedroom house is \$7,000, and he has a better house for \$9,395, which has three bedrooms, 1 $\frac{3}{4}$ baths and 1,416 sq. ft. With land prices and materials going up, he wonders if he can hold this price under \$10,000, which he wants to do because of the increased down payments under FHA on anything over that figure. Evans' reputation as a sound builder is a great asset.



Charles and Arthur Schreiber, architects and builders, produced this two-bedroom 930 sq. ft. house (plus carport) for \$5,700. Adding land costs and profit, they sell it for \$7,200. Its block construction is typical.



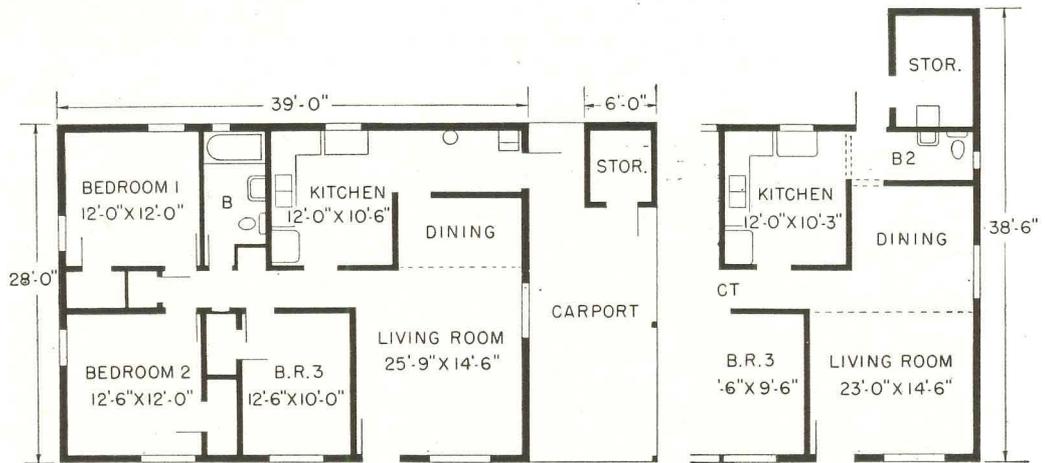
One of Evans' \$7,000 houses, with storage room behind the carport. Builders are required by FHA to provide duct work in ceiling for evaporative cooling, but will not let mortgage cover cooler.



Photos by Stuart A. Weiner

Long has 12 exteriors on his two \$7,000 houses. Buyers get a choice of one and a half baths without a carport or one bath with carport. All these houses have three bedrooms.

Floor plans at right are for \$7,000 houses with carport and inside storage or (partial plan) no carport and extra half-bath.



Builder John F. Long

John Long's houses are the best value in town, according to one FHA official. Thirty-one-year-old Long is an aggressive builder who shares with a few others credit for the remarkable bargains offered to Phoenix house buyers.

He was practically forced into building houses. In 1947, just out of the service, he built a home for himself. Before he could move in he was offered such a good price he accepted it. He built a second house and the same thing happened again. Now he keeps 40 houses under construction, tries to finish eight a week. He has sold as many as 90 houses ahead of construction by using full page ads in the newspapers. Unlike Evans, he is his own contractor, subs only a few trades.

His \$7,000 house has 1,092 sq. ft. plus a carport and outside storage room. It is of pumice block, plastered on the inside, has one and a half baths, asphalt tile in kitchen and baths, kitchen exhaust fan, 4" of rock wool in the ceiling, cooling ducts in the roof (roof cooler must be added by the purchaser), steel windows, tile drainboards, concrete ribbon drive and sidewalk, concrete curbs, black-top street.

When asked what he would add to his houses if he could get an extra \$500 for them, he laughed and said he would use it to make a decent profit rather than the \$250 he makes as both builder and contractor. More seriously, he said he would spend \$300 to get a forced air heating system, put 4' of tile in the bath, spend \$80 for a 2' overhang, use mahogany doors instead of pine.

"This competition is interesting," Long says. "It keeps a fellow on his toes, and gives the public a better house for the money."



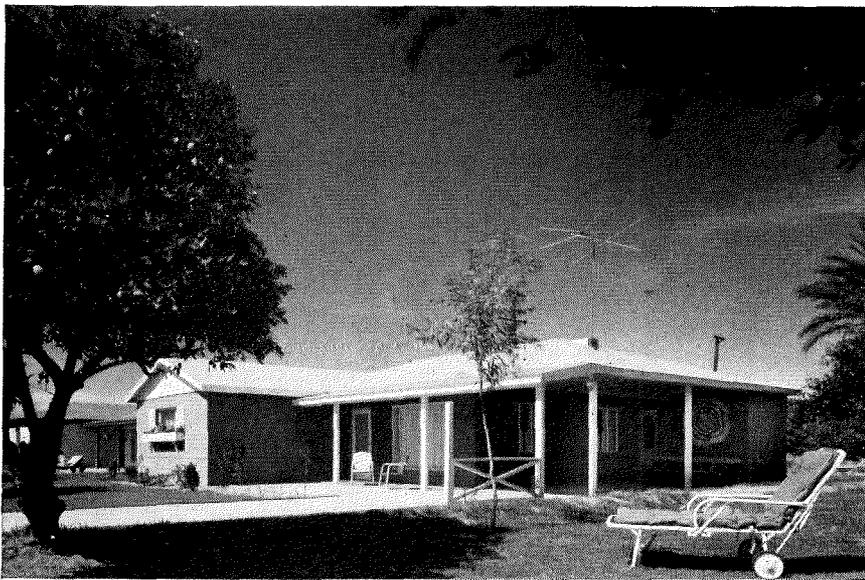
COST BREAKDOWN ON LONG'S \$7,000 HOUSES

Ditch digging	\$11	Lintels	46
Plumbing & labor		Doors	129
incl. heater & meter	770	Hardware	54
Electrical	127	Concrete & forms	344
Fixture allowance	33	Louvers	11
Plasterer	435	ABC fill & silt	22
Ducts	101	Total lumber	693
Insulation	38	Truck	40
Roofing	196	Misc. items	101
Bricklayer	495	Labor	720
Painter	275	Supervision	55
Glazier	28	Tax	93
Ceramic & asphalt tile	111	State compensation ins.	89
Cesspool & tank	85		
Lather	224	TOTAL (excl. raw land,	
Cabinets	96	improvements & profit)	\$5,575
Windows	153		

House at right is one of a group that Architect John Sing Tang did for Rancho Del Monte which sells for \$13,900 to \$15,900 and which is on half-acre lots. Architect held to a simple gabled roof over a rectangular plan, allowed for generous protective overhangs. In model shown he extended the roof to cover an outdoor living-dining-play area and the carport, leaving open rafters over the drying yard area. Long roof lines magnify extent of house and harmonize with horizontal character of the building. Kitchen, dining and living areas were left rather open. One model has two bedrooms and den, others three bedrooms. All have one full bath plus one partial bath, and carport.



Julius Schulman



Photos by Stewart A. Weiner

John Long also builds \$10,000 houses such as the one at left. It has three bedrooms, one and three-quarters baths, central heating, wider lot than \$7,000 house. Houses are located in an old orange grove—a sales advantage.

Long's \$10,000 houses (below) have plenty of room between them, and the orange grove provides pleasant atmosphere. Houses were designed by architect G. C. Conyers, are of same type pumice block as other Long models.



For more about Phoenix, see next page

SAM HOFFMAN OF PHOENIX

What kind of man is he, who swears some day to be the country's biggest home builder?

Sam Hoffman is different from all other builders. He is deliberately setting out to be the country's biggest homebuilder. At the moment he has a long way to go to catch up with the leaders, but his driving, restless ambition has already carried him into six cities where he has built some 3,600 houses in five years. This year he says he will build 3,000 more.

But building in six cities is not enough to satisfy Hoffman. In addition to his present operations in Phoenix, Tucson, Albuquerque, Denver, Cleveland and Pueblo he has already cast a calculating eye on Chicago, Omaha, San Diego and other spots where he is convinced his high-production, low-profit methods would let him undersell the market by \$1,500 or more. One obstacle is his shortage of sons and sons-in-law to run his new operations. He has mushroomed so fast he is short of key personnel. His building operations are run under F & S Construction Co. (for Father & Son) but he prefers to be known as Hoffman Homes.

Hoffman's meteoric rise as a housebuilder has taken only five years. In 1947 he turned up in Phoenix with his family and a truckload of possessions on his way west from Chicago to find a new place to live. He was stone-broke and looking for something to do. He knew the building business because he had been a plasterer and a cement finisher in Detroit, after he had come from Poland in 1923, and had also worked as a carpenter.

In Phoenix the housing boom was in full swing and to Hoffman, as to many another newcomer, housebuilding looked like a sure thing. Starting by building only one house at a time, he has skyrocketed his holdings until his paper assets are now over \$4 million. But rival builders point out Hoffman's total debt is also impressively high. They claim he is spread so thin he is like a clipped-wing plane: he must fly at full speed to stay up.

Photos: Robert Markow



Hoffman Homes' officers: (l. to r.) vice-president Robert Rosner, who manages Cleveland; Jack Hoffman, Secretary and Treasurer; President Sam Hoffman; vice president Sol Dichter, manager at Denver. Sam is proud his partners are college men, gives them lots of responsibility.

Can he keep going?

That's the big question about Hoffman. Rival builders in Denver, Cleveland and Pueblo, who have seen this outsider move in and drastically undersell them, relish the hope that Hoffman will overextend himself and go broke. They figure that he must operate on a shoestring, using other people's money—first the deposits of his customers, then the money of his suppliers who have to wait until houses are finished to get their payments.

"Sure we use our deposits for operating capital," says Sam Hoffman. "What's wrong with that? Anyone who wants his money back can always get it." Operating without interim financing helps him to undersell his competition. His payments to some suppliers may be slow, but he is a big buyer and seems to have no trouble getting materials. Even in Cleveland, where his only real financial trouble occurred, his credit is good.

Hoffman considers himself far more conservative than builders who plunge ahead on large scale operations before their houses are sold. "We never speculate," he says. "Every one of our houses is sold before we start construction."

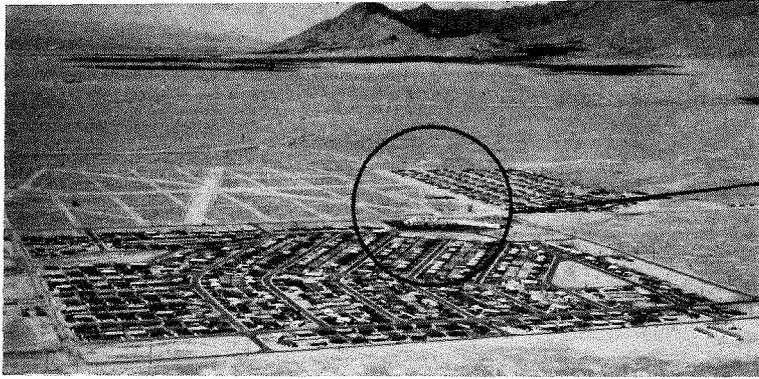
In his favor he has several long-term assets which may be the deciding factors that keep him in business. Wherever he builds his basic aim is to deliver the biggest value in town—a merchandising idea that is hard to beat. He has no soft and flabby waste in his operations, either in personnel or methods, because he cut his teeth in Phoenix where competition is so tough a builder has to be efficient. Having already experimented in six cities, he has learned a pattern for moving into a new town. Thus his greatest organizational problems are probably behind him. Certainly he should have learned a lesson in Cleveland, a Kasserine Pass into which he charged with insufficient knowledge of the opposition and no protection at all for his flanks. If he is smart, that should never happen again.

Sam himself is both the firm's greatest asset and its greatest hazard. The very qualities that carry him ahead—the fearlessness that stimulates him to slug it out with rival builders in strange towns—may be his undoing. His dream of sheer bigness may blind him to a need for consolidating his position before he moves to still more cities. He would like to build in a dozen northern cities in summer and move his workmen to a dozen southern cities in the winter. Hoffman himself has a cocky confidence. "Only the government can put me out of business," he says, thinking of restrictions that might shut him down.

Trouble in Cleveland and Denver

If other builders hate to see Hoffman move into their towns it is because his prices are so low. As a graduate of the Phoenix school of building, his idea of a fair profit is 5% or even less on the first houses he puts on the market. "His big houses are \$2,500 under the local market," said a rival Denver builder with wonder. "He could add a thousand dollars to the price and still sell them just as fast."

But Hoffman's aim is to sell houses as cheaply as possible



These airviews show a portion of Hoffman's projects in Albuquerque where he has finished about 1,200 houses. Shopping center above is at the Hoffmantown area.

and he is delighted when he can force other builders to cut their prices. "My public is my idol," he says. "My only relaxation is to go through the communities I've built and see the people." His profit philosophy is the principle of the quick nickel versus the slow dime. "Volume purchase and volume production are my secret." He prefers to build at least four houses a day wherever he operates: "Four a day is the happy medium. Below four, costs are too high. Over four, it's all gravy." One of the reasons he quit building in Phoenix was that the market was too small to let him maintain a fast production line. Also profits were so low (partly through his own price cutting) that he could make more money elsewhere. However he may build again in Phoenix this year.

In a new town Hoffman doesn't expect to make money on the first 50 houses, as he considers that a breaking-in period. But even so, he wasn't prepared for the trouble he got into in Cleveland and Denver. In both cities the local builders ganged up on him. They were helped by such factors as the weather and Hoffman's plunging optimism.

For his troubles in Cleveland, where at the moment he is probably between \$250,000 and \$300,000 in the red, Hoffman says he blames the weather. The winter before last was unusually cold and the spring was one of the wettest in history (even the experienced builders at Chicago's Park Forest were 500 houses behind schedule). Hoffman had hoped to build nine months a year but found the weather cut him to six. "My overhead jumped to 38% instead of being 8%, as it is in the Southwest."

But optimistic Sam had also underestimated the cost of construction. Both labor and materials were higher than he had forecast, and he seriously overestimated the volume of work he would get from his men. In Cleveland he discovered the unions fixed a worker's production and a man's output was considerably lower than in Phoenix. Other builders say he had planned to bring in many of his own men but the unions would not let him.

Sam himself makes no criticism of the Cleveland unions, but one of his staff says, "It was labor that crucified us. We couldn't get men, especially bricklayers." Finally, after a great deal of trouble, Hoffman got one crew of bricklayers.

There were other delays all along the line. He had trouble getting materials, paid nearly three times normal rates for items such as rock lath. Plumbing that cost him \$750 installed in Phoenix and \$1,100 in Denver was \$1,500 in Cleveland.

When Hoffman opened a sales office in Cleveland in 1950 he promised to build his three-bedroom, two-bath brick house (1,345 sq. ft. plus an enclosed garage) for the astonishing sales price of \$9,950. He had 418 sites and promptly signed up about 100 buyers who paid \$500 down and agreed to pay \$850 more when the colors were chosen.

This price was so phenomenally low that many prospects asked the local Homebuilders Association if the deal was honest. The Association sent five members to investigate. They warned

Hoffman that his house would cost much more than \$9,950 and he would lose his shirt but Sam went right ahead. To convince skeptical city fathers of suburban Euclid that he was an honest builder, he flew the city engineer, city inspector and one councilman at his expense to Albuquerque and Phoenix and turned them loose in his neighborhoods to talk with people who had bought his houses. They were agreeably impressed.

But in a few months, blaming material shortages and rising costs, Hoffman announced he was halving his original 418 house program; later he announced another cut to 100 houses. Then he raised his price to \$13,000 and offered to refund money to buyers who didn't want to go through with the new deal. Twenty-eight refused refunds and by bringing suit against him got their houses for \$9,950. Others paid more and he built 62 in all. Now the price is \$14,500 and he hopes to build about 117 this year. At that price, other builders insist his house is no bargain. It is larger than the typical Cleveland house at the same price and has an extra bath, but they say the heating system, interior finish and quality of wall between house and garage are inferior.

In Denver opposition from other builders reached the point where, as members of NAHB, they officially protested to FHA that he was not living up to its requirements. FHA sent an inspector out from Washington who found a few irregularities in Hoffman's houses, particularly in the quality of his wood trim; but when he inspected the houses of other big builders who had protested he found even more irregularities! "Hoffman was giving a better house for the money than anyone else," FHA reported. "They fell into the pit they'd dug for me," is the way Hoffman sums it up. But if Hoffman has forced some Denver builders to cut their prices, as he says he has, they have had the grim satisfaction of seeing him raise his. He is just beginning to show a profit in Denver where he has built steadily through the past winter and is optimistic about the future. Happily for him both Tucson and Pueblo are turning into boom towns and should be profitable places for his operations. He has made money in Phoenix and Albuquerque.

How Hoffman operates

Phoenix is his main headquarters and from here 28-year-old Jack Hoffman, secretary-treasurer, keeps the status of every Hoffman house in every town. Jack is a graduate accountant from the University of Illinois and, according to Sam, "the brains of the business." Son-in-law Sol Dichter was in charge of Albuquerque but now runs the Denver operation. Sol's brother Michael, as purchasing agent and trouble shooter, spends much of his time on the road. Son-in-law Robert Rosner runs Cleveland. Sam Hoffman keeps an eye on everything, flying 5,000 or 6,000 miles every week, some of it in his own airplane which Jack and Sol fly. Trains are never fast enough for him.

The firm now builds only two houses: the brick veneer which sells at \$10,000-\$14,500, and a three-bedroom, two-bath frame

SAM HOFFMAN OF PHOENIX

house with asbestos siding at \$8,450. A two-bedroom house built in Phoenix for around \$6,000 has been discontinued.

Mass purchasing is a basic practice. Hoffman says he buys five carloads of pipe and 50 million feet of lumber at a time. He buys all his furnaces from one firm, brings the local distributor in on the deal so he will do the servicing. "I won't tell you my costs because it would make other builders mad to know what I pay," he says. But despite his mass buying through the Phoenix office he also buys what he can in each community, sometimes paying more than he need to keep local good will.

He always builds a local woodworking shop where he makes his cabinets, window frames and does his precutting. He subs a varying amount in different cities, but it runs around 20%. With his own equipment he handles his land improvements, saying it costs him "only 7¢ a cubic yd. to move earth instead of 65¢, and \$50 to grade a lot instead of \$200." He has about 800 men on his own payroll, subcontracts plumbing, electrical work, roofing, tile setting and painting. He tries to plan the work so that five men and a foreman are a team on all jobs but uses no particular labor-saving gadgets or methods. His brick house is plastered inside, while the smaller one is of dry wall construction. Both are slab construction, with a warm air furnace in the attic which blows air through short ducts to each room.

Other builders criticize his interior trim and finish, but Hoffman shrugs this off, feeling that he is giving a bargain and that speed of finishing is essential to his low price. Among the firms who have bought his mortgages are Prudential, Teachers Insurance, Philadelphia Savings and the Bank of New Mexico.

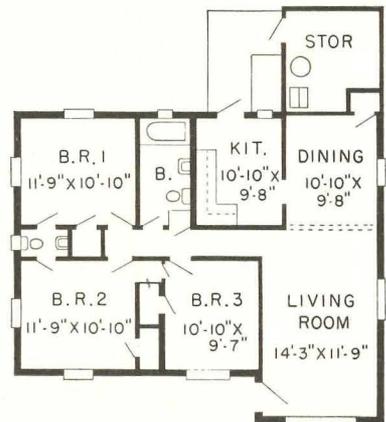
Sales are handled by Bert LaMar, general sales manager who has two men in each town. Sales costs are only 1/2 of 1%. Advertising manager Jim Woodhams is now preparing a national advertising campaign "just like for any other national product," and the firm will start plugging Hoffman Homes in newspaper ads in all towns where they are building and in a number where they plan to move. They hope to make "Hoffman Homes" a national trademark.

Sam Hoffman won't be satisfied until he is producing houses in scores of cities and at a rate that no other builder has ever equalled.

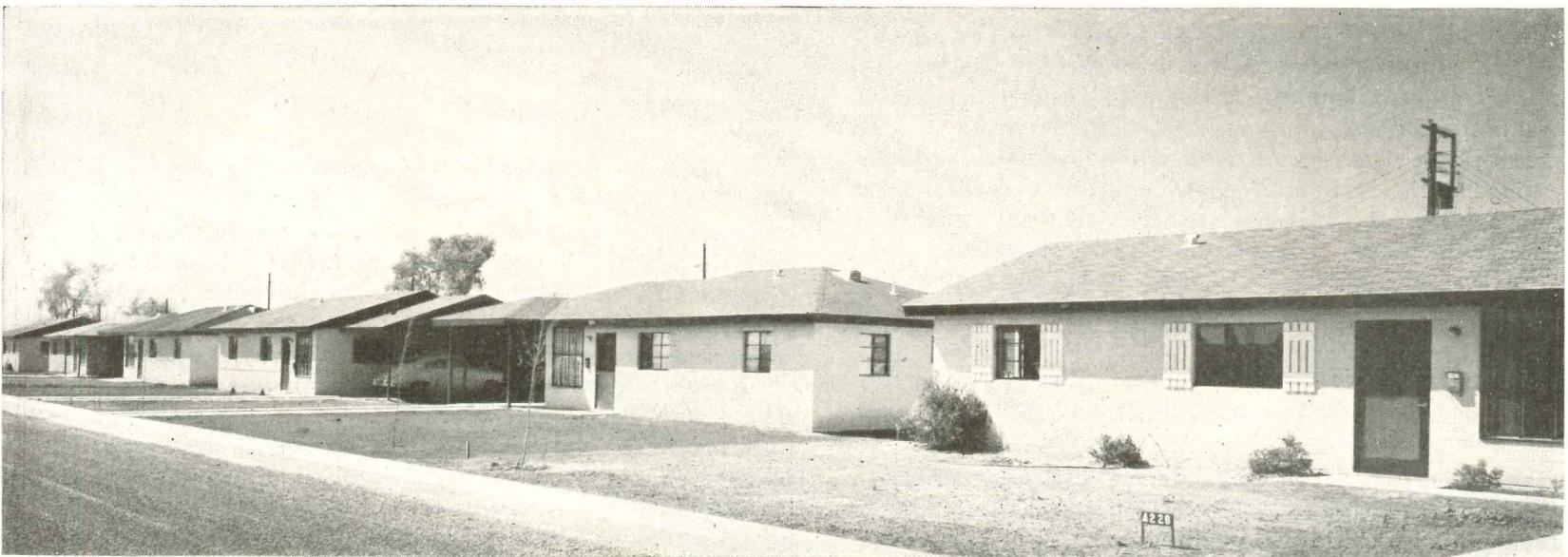
"My aim is to turn out a house every minute during the 8 hr. day. That's my dream. It's only a dream but I've seen a lot come true in the past few years."



Hoffman's standard "economy" house which he is now building in several cities at around \$8,400. It is a three bedroom, small scale version of the larger, brick veneer house. Half-bath between two larger bedrooms is a sales asset. This model has asbestos siding, typical frame construction.



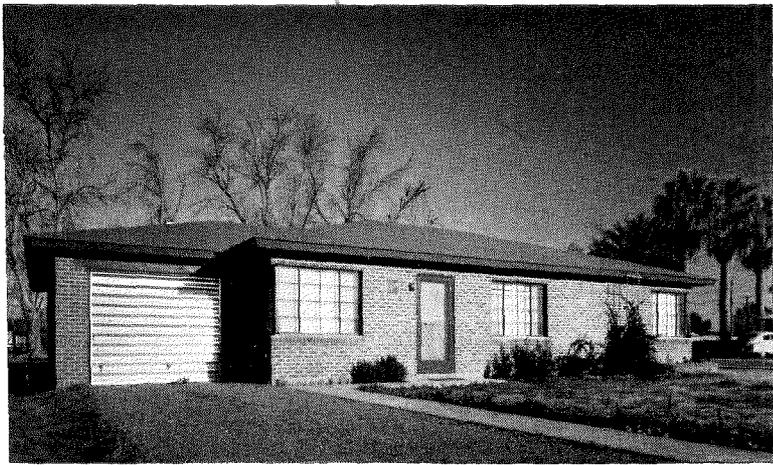
Floor plan above is for brick veneer house shown on opposite page and similarity to that of economy house is apparent. Row of houses below is in Phoenix; they are of pumice block. This model has now been discontinued.





Photos: Stewart A. Weiner

A row of Hoffman's brick houses on a cul-de-sac street in Phoenix. This is the standard "deluxe" house that is being built in all cities where Hoffman builds, and it ranges in price from around \$10,000 to \$14,500. It has 1,345 sq. ft. and is usually on a 70' lot.



Both house above and those at right are in Phoenix. Houses this size sold for \$10,000 there and were considered bargains. This is the same house built in other cities which was put on the market for as much as \$2,500 under existing prices for that size house. The garage is an expandable feature and many families have turned it into a den or extra bedroom. This house is always plastered, while smaller house has dry walls. Original design for this house was by Architect Ralph Haver of Phoenix.



ADVICE TO THE APPRAISER

To 600 appraisers working in 137 field offices of the Federal Housing Administration (FHA), a fat U. S. Government document called Form 2049 is the professional bible. Better known as the UNDERWRITING MANUAL, Form 2049 sets out to define for FHA's appraisers just exactly what it is that makes a building a good or bad mortgage risk.

While the MANUAL is admirably specific in discussing such matters as plumbing or the "Cyclical Fluctuations Percentage of Minimum to Maximum Employment" (whatever that may be), its authors are less sure of their ground when discussing "Architectural Attractiveness" or "Visual Appeal of Property." In fact, their vision seems to become increasingly blurred at the very moment when specific design features should be brought most sharply into focus.

To remedy this situation, HOUSE & HOME intends, from time to time, to discuss aspects of builder-house design which the FHA MANUAL to date has dealt with rather casually. While our message will be addressed primarily to the FHA appraiser, we hope and trust that it will not be entirely ignored by the homebuilding industry itself.

The subject of our first message is

THE BANANA SPLIT

. . . Or how to keep your house from seeming to fly apart in all directions

WHAT FHA FORM #2049 SAYS ABOUT DESIGN "A structure of the so-called 'shirt-front,' or one-sided treatment design, calls for a low rating. . . . Use of false effects . . . or the unusual . . . combination of materials . . . affect the rating of this feature adversely. . . ."—(Feb. 1938), Section 858.

"Simplicity is freedom from complexity, intricacy and elaborateness . . . the avoidance of excessive embellishments . . . of immoderate variation and inappropriateness in the use of materials. . . ."—(Jan. 1947), Section 418 (4) a.

One sure way of making a small and squat facade look even smaller and squatter is to cut it up into tiny panels of different facing materials—stone and brick veneers, asbestos or wood shingles, vertical or horizontal siding, large and small panes of glass. The patchwork quilt architecture that results from such vivisection is the *Banana Split* of the building industry.

The easiest way to tell whether you are living inside a *Banana Split* is to look at your street facade. In all probability, this will look like the scene of a tragically unnecessary collision between four or five entirely different (and very small) ranches. One may be of stone; one of brick; one may be covered with dark siding; the other with light shingles. The only thing that these very different ranches will have in common is a roof, and *that* (more often than not) forms a very tenuous bond indeed.

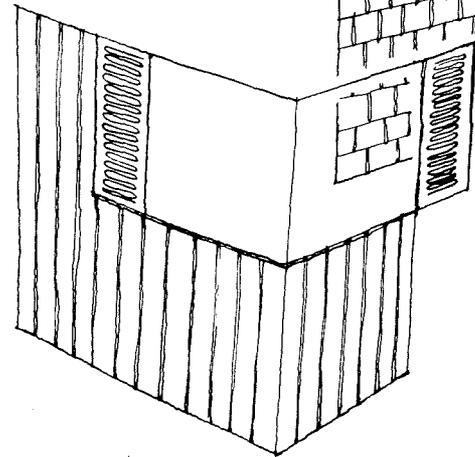
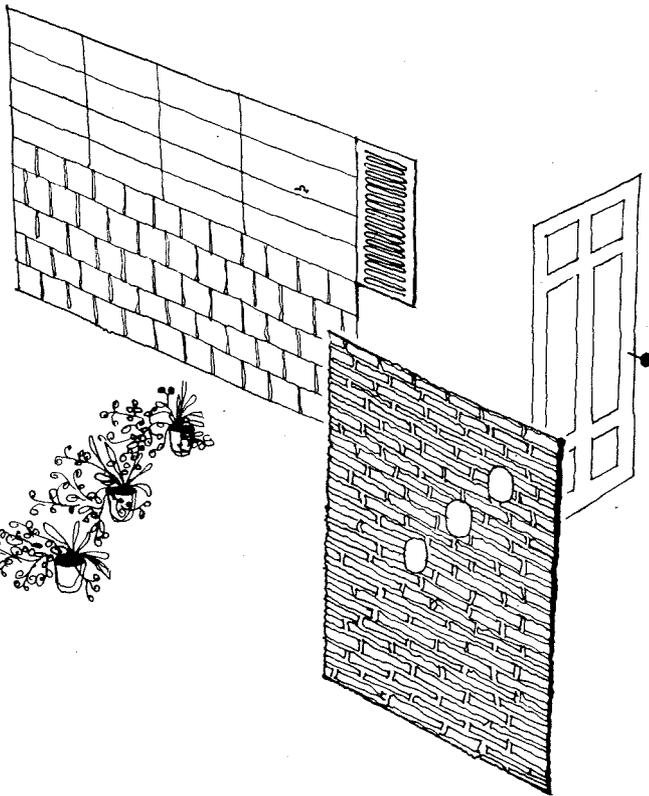
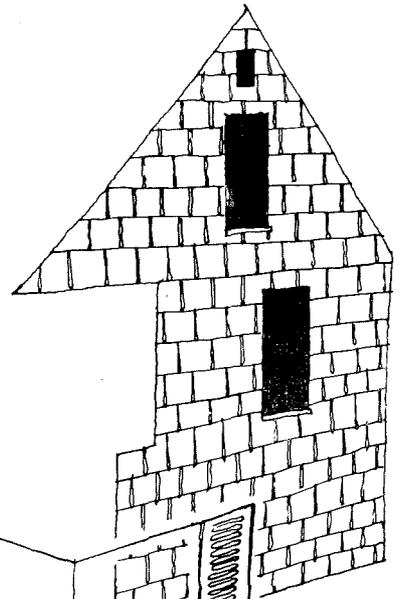
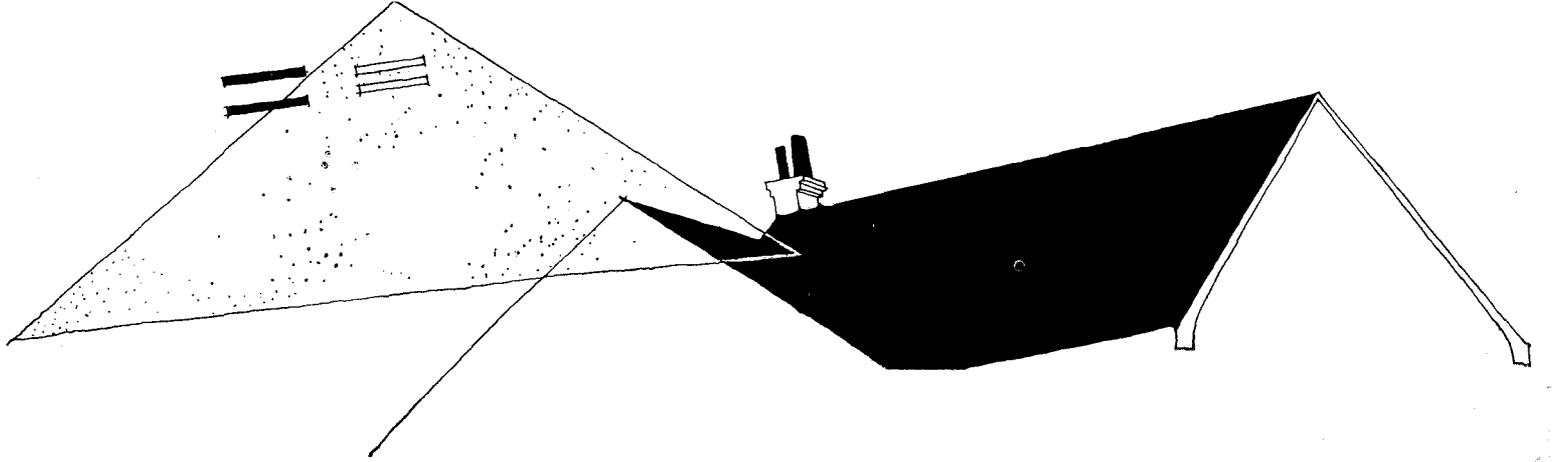
On these pages we have assembled some fairly typical (and by no means extreme) pictures of *Split Banana* facades, and shown, next to them, some builder houses whose facades seem relatively calm, well proportioned, clean and effective.



An early pioneer of the *Banana Split* is J. T. Halstead, Ebenezer Cottage, Broad Lane, Rochdale, Lancs., England, whose facade treatment includes such assorted tidbits as broken pots, plates, oyster shells, jugs and beer mugs.

The ingredients of segment below of the American skyline are stone, asbestos shingles, and brick, vertical, horizontal and diagonal siding, scalloped eaves and other frills. The result is variety bordering on chaos. Note the sense of impending conflict conveyed by some facades, and the rapid changes in window openings and sill heights.





For \$11,490 some homeowners are entitled to asbestos shingles, vertical boards, brick veneer, a paneled door, asphalt shingles, plywood gable ends (with two stripes), miscellaneous windows and three flower pots. Such wealth of assorted detail, however, does not make for a unified design, much less a unified street pattern. For less ecstatic solutions to the builder-house, turn the page.

Photos: Don Forbes Studio, J. Alex Langley, J. Leigh Sheridan



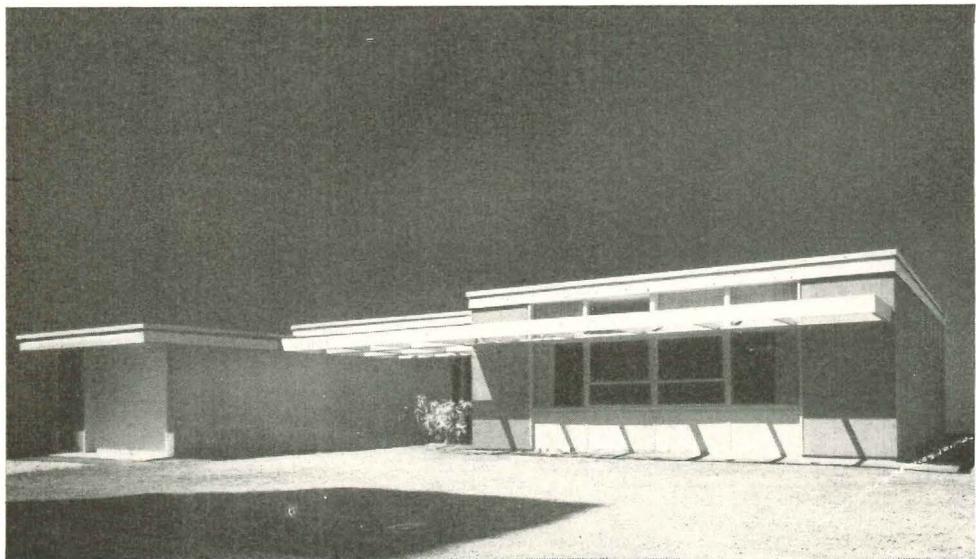
THE BANANA SPLIT

Gottscho-Schleisner



These two houses have virtually the same three-bedroom plan; yet the Harman steel prefab (left) is simple and clean, while the house above boasts half-a-dozen different and conflicting materials and patterns on its principal facade. Note also the differences in fenestration.

The three-bedroom house by architect Gregory Ain (right) was built in New York's Museum of Modern Art garden in 1950. Its clean surfaces, modular rhythm and simple roof lines help unify an otherwise complex composition. In the builder-house shown below, arbitrarily placed brick veneer panels and broken roof lines accentuate (rather than diminish) the architectural complexities of the house.



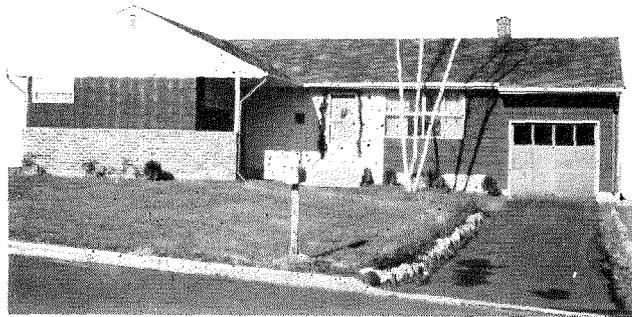
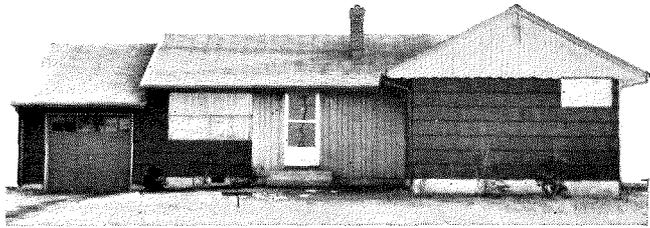
Esra Stoller



How dignified and handsome a suburban street can be made to look is effectively demonstrated by architects Funk & Stein in their Palo Alto development. Plain surfaces, rhythmic fenestration, strong roof planes produce a unified street.

Ernest Braun



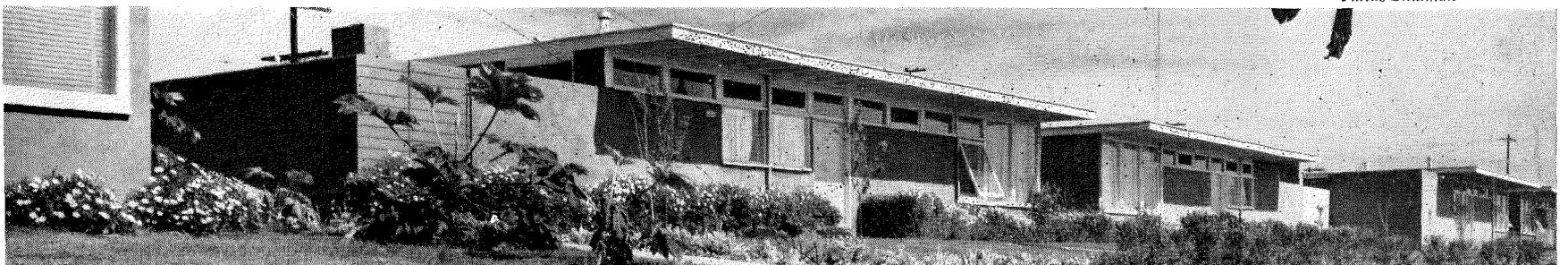


Ben Schnall

The four houses shown here have just about the same basic plan. Yet whoever designed the three miniature ranches at the left seems to have been determined to use every surface finish known to Sweet's catalogue. The result: three houses that appear to have suffered periodic (and disconnected) expansion programs. Levitt's Landia house (above) has only one surface material (striated asbestos), a clean and uninterrupted roof line, simple and well proportioned fenestration. Result: it looks bigger than all the other three laid end to end!

A similar example is architect Gregory Ain's Mar Vista project near Los Angeles, in which each facade is a coherent simple and clean-cut design. Variety is achieved through changes in planting without damage to the unity of the streetscape.

Julius Shulman



THE HEAT PUMP

A new unit advances an old principle.

Air-to-air system frees the heat pump from its chrysalis of wells and buried grids.

As heating unit AND air conditioner, its possibilities look promising.

But high cost keeps it in luxury category today

For residential use the building industry generally has snubbed the heat pump as impractical, expensive and complicated. But when a U. S. commercial giant, General Electric, sets up a separate department for the manufacture, sale and promotion of a new unit it may be time to take another look at the possibilities. Chief factor in the resurgence of this long known principle is the demand of the American housebuyer for year round comfort, as evidenced by the increased use of air conditioning units in new houses (*see p. 128*). This trend emphasizes the heat pump's ability to pump heat either *in* or *out*, through one machine. And the heavier the demand for cooling, the better the heat pump is able to compete with existing systems.

It uses these laws of nature:

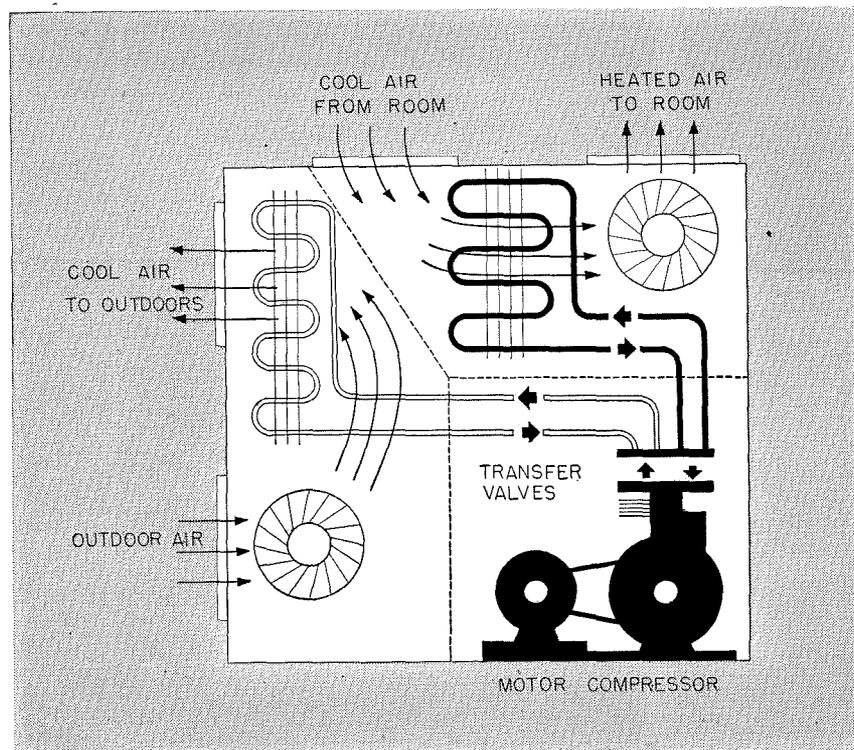
1. Heat exists in air at all temperatures—low or high.
2. Heat always flows from a higher temperature to a lower one.
3. Heat is absorbed by evaporating a refrigerant. Compressing a refrigerant raises its temperature, enabling it to give off heat.

How it works

GE's unit, to oversimplify it, acts as a giant reversible refrigerator. In winter, it extracts heat from outside (and there is some heat in even the coldest air) and warms the inside air. During the hot months, it removes heat from within the house and exhausts it outside. Conveyor of this heat is the familiar refrigerant, Freon 12. The unit uses no coal, oil or gas in either process, but operates entirely by electricity. Ordinary duct work carries the filtered and dehumidified conditioned air throughout the house.

Biggest meaning to housebuilders and architects is that the unit can be planned right into the house without the "tailoring" necessary with heat pumps that use water or ground as a heat source. With an assembly line set up at Bloomfield, N. J., GE is able to offer "ready to wear" 3 h.p. units capable of heating and cooling homes of 1,200–1,500 sq. ft. heating area, and 5 h.p. models sized for homes of 2,000–2,500 sq. ft. All the installer has to know is the size of the house, local temperatures, and type of insulation to be able to recommend the proper size and installation.

Its performance coefficient of 3 (in an average season) means the heat pump gives up 3 units of heat to the house for every one that it "buys" in electrical energy. Utilities using coal or oil as



WINTER: Outdoor air gives up its heat to much colder evaporated refrigerant. Compressing this refrigerant raises its temperature and enables it to give off the absorbed heat to the indoor circuit compartment where air from the house travels over the heated coils, then is returned.

original fuel estimate that they can deliver current to the user equal to 30% of the energy in the fuel. This means that the heat pump delivers 90% of the total fuel energy, as against an ordinary furnace's 50–70%. The next goal is a coefficient of 4, which will enable the machine to make substantial fuel savings since it will produce heat equal to 120% of the fuel energy.

Why air-to-air?

Most of the 2,000 heat pumps now in use in the U. S. have constant temperature well water or ground as a heat source, using deep wells for water systems and underground pipe grids to extract heat from the earth. Both types of installations are expensive and demand optimum conditions in underground water and soil. But the extension of the heat pump market from areas with abundant high temperature (45–60°) water sources into zones where either restricted water sources or lower (35–45°) temperatures are the rule makes a system based on universal and unrestricted air most likely to succeed.

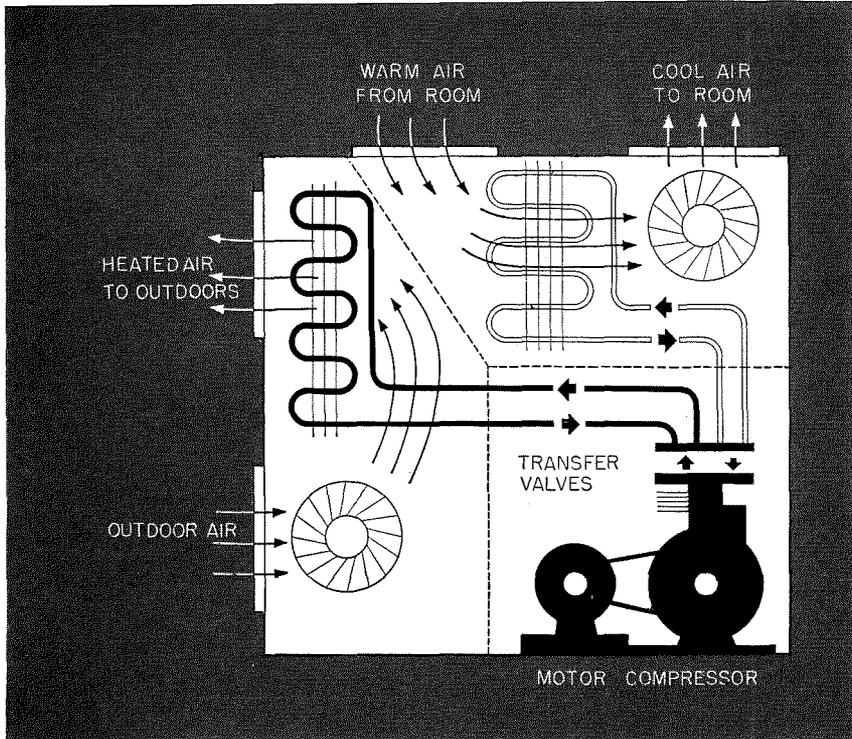
GE is wisely limiting its initial marketing efforts to selected areas, mostly in the South and Southwest, in order to maintain close contact with installations while training a national organization to correctly apply and install this new equipment.

A serious drawback to the air-to-air systems is the cold air of central and northern U. S. Today, supplementary resistance heating coils are added to heat pumps in these areas, controlled by outside thermostats. When the outside air drops below the temperature level needed to satisfy the heat load, the additional units cut in. As further technical refinements are made, the heat pump using air should expand its effective range.

Still a luxury item

No heat pump is a "cure-all," and the new GE unit is no exception. There have been too many Sunday supplement stories about "free heat" from ground or air. In cold zones of the U. S. the plant needed to extract heat from low temperature air may be so large as to be uneconomical, and the need for cooling may be limited. But in any area where the cooling load approaches, or exceeds, that of heating, this unit promises to make sales conscious builders sharpen up their pencils and wonder, "How much?"

Right now, the biggest drawback to mass sales is the high orig-



SUMMER: Warm, moist air from house passes over refrigerant coils, where it gives up its heat and excess moisture. This heat passes to the outdoor circuit compartment where it is dissipated to the outside air. The then-cool, dry air is recirculated through the house.

inal cost of the equipment, not operating expense. Because installation figures vary greatly, it's impossible to get exact costs, but the ordinary heat pump installation would run 20-50% more than the price for a furnace and air conditioner combined. With mass production just beginning, GE engineers are aiming at eliminating this differential and making the heat pump completely competitive with any complete air conditioning system.

Operating costs, however, are already within range in many areas. From experimental installations, GE has obtained some typical operating costs. They assume a 1,200 sq. ft. six-room house, well built and insulated, in the New York area. Using average electrical rates, the annual operating expense would be:

Heating	.....	9,500 KWH	\$190	approximately
Cooling	.....	1,200 KWH	24	"
Annual cost	.....	10,700 KWH	\$214	"

In the southern Texas area, GE found that the same size house (without storm sash and with less side wall insulation) would have this annual operating cost:

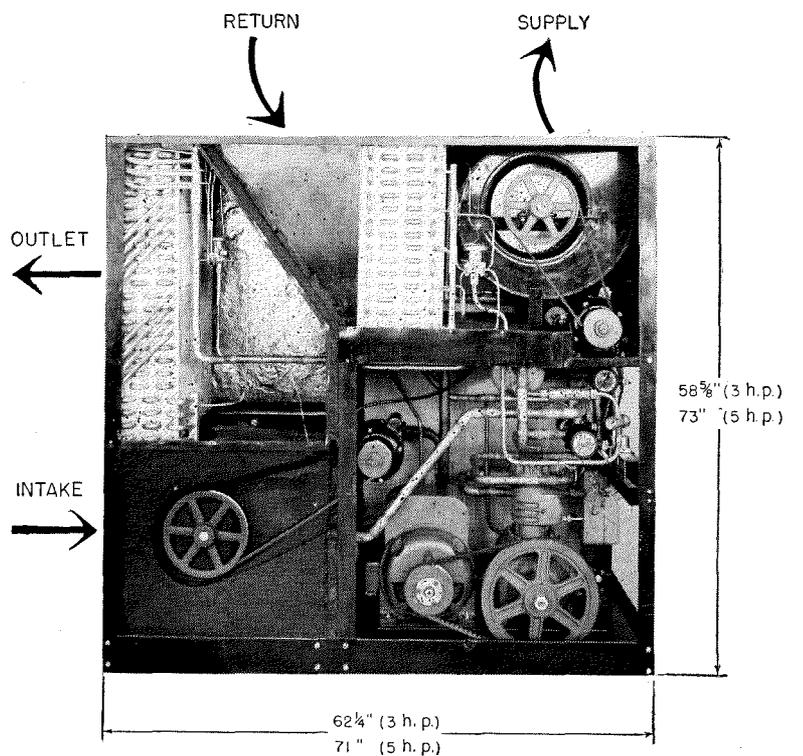
Heating	.....	3,200 KWH	\$ 64	approximately
Cooling	.....	5,800 KWH	116	"
Annual cost	.....	9,000 KWH	\$180	"

Costs for specific areas are subject to a wide variation, mainly because of utility rates being set up on the basis of ordinary residential loads. A heat pump might cost \$60 annually to operate in one city and five times that in another part of the country. As the market for this machine grows, power companies will be better able to compute an applicable rate for the current it uses.

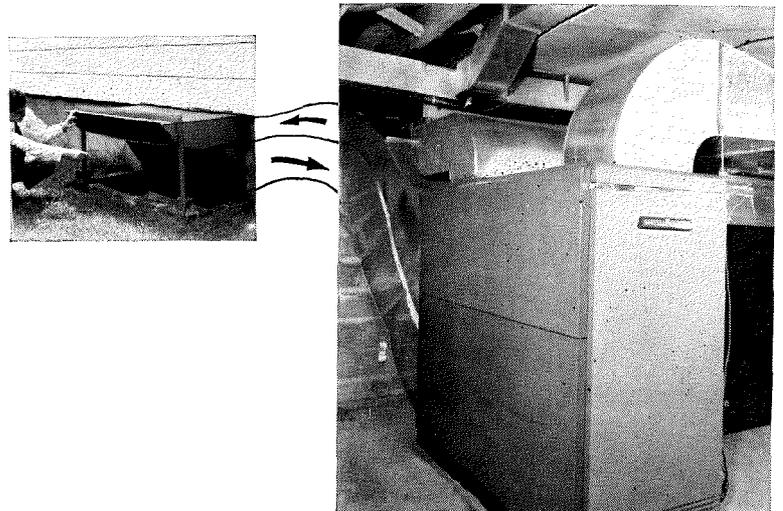
The true economic usefulness of the heat pump only appears when it is not considered as a "heater" only, but as a machine for providing air conditioning throughout the year. In turn, its potential depends on four factors:

1. Climate—where cooling is necessary and desirable
2. Electric power—its availability and comparative cost
3. Consumer habits, and familiarity with heat pump advantages
4. Economic—area buying power and national prosperity

The heat pump stands today about where the automobile did in 1915. Basic principles have been mastered, but cost still restricts the market. Yet to come is the mass production needed to cut cost, widen the market. Automobiles were once expensive, too.



COMPACT UNITS are 28 1/2" wide, fit through doorways. Though integrated system is new, component parts (compressor, motors, heat transfer surfaces, etc.) have been tried and proven in other GE equipment.



DUCTWORK required compares with that needed for air conditioning, is larger than for heating alone. Automatic switch, controlled by house thermostat, makes changes between heating and cooling as often as necessary to maintain the desired temperature.

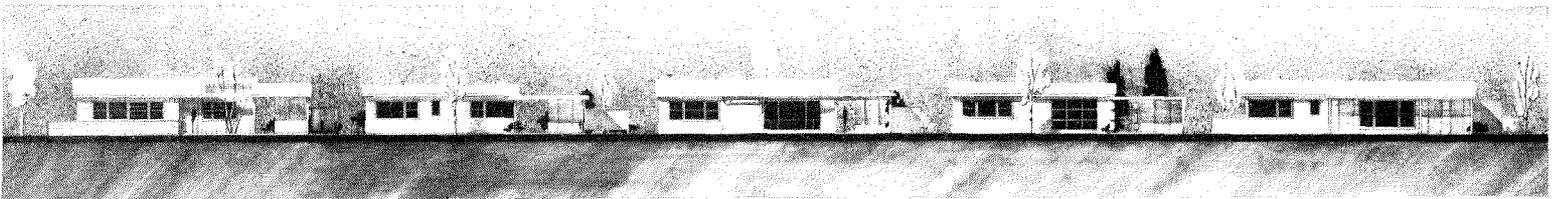
FULLY AIR CONDITIONED HOUSES FOR \$12,500

**Dallas builders start a revolution
with contemporary houses
designed around a central air conditioning system**

Location: Dallas, Texas

GEORGE MARBLE; GUY BARNUM, ASSOCIATE, Architects

LEWIS & LAMBERTH; LAUGHLIN & SILVER, Builders



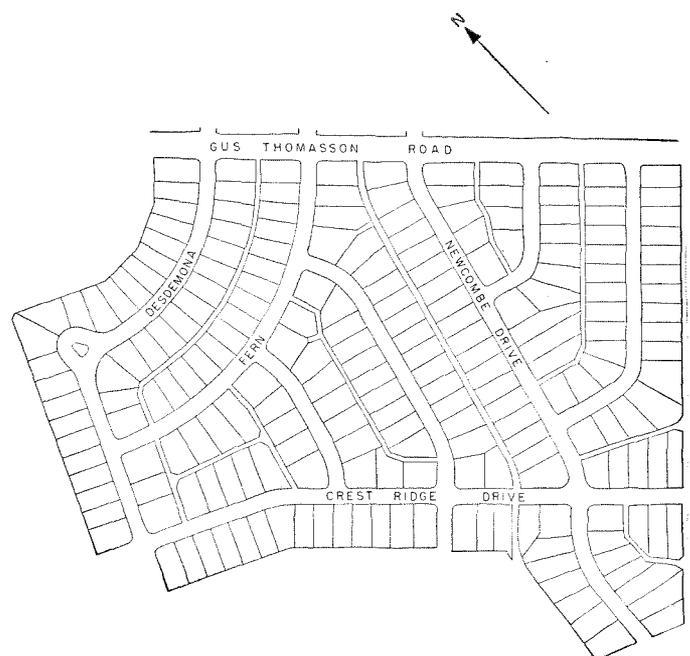
Six different floor plans are being built with three facades for each plan

For years Dallas has had a reputation for some of the most conservative builders' houses and some of the hottest summers in the U. S. A. But last month Dallas changed the first and coped with the second with a group of houses that are notable for their fresh design, for being the first large group to be air conditioned and for selling at the remarkably low price of \$12,500.

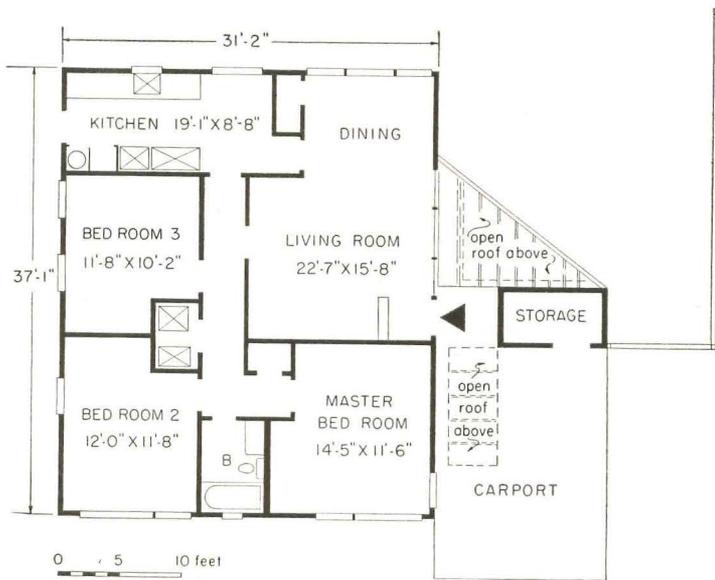
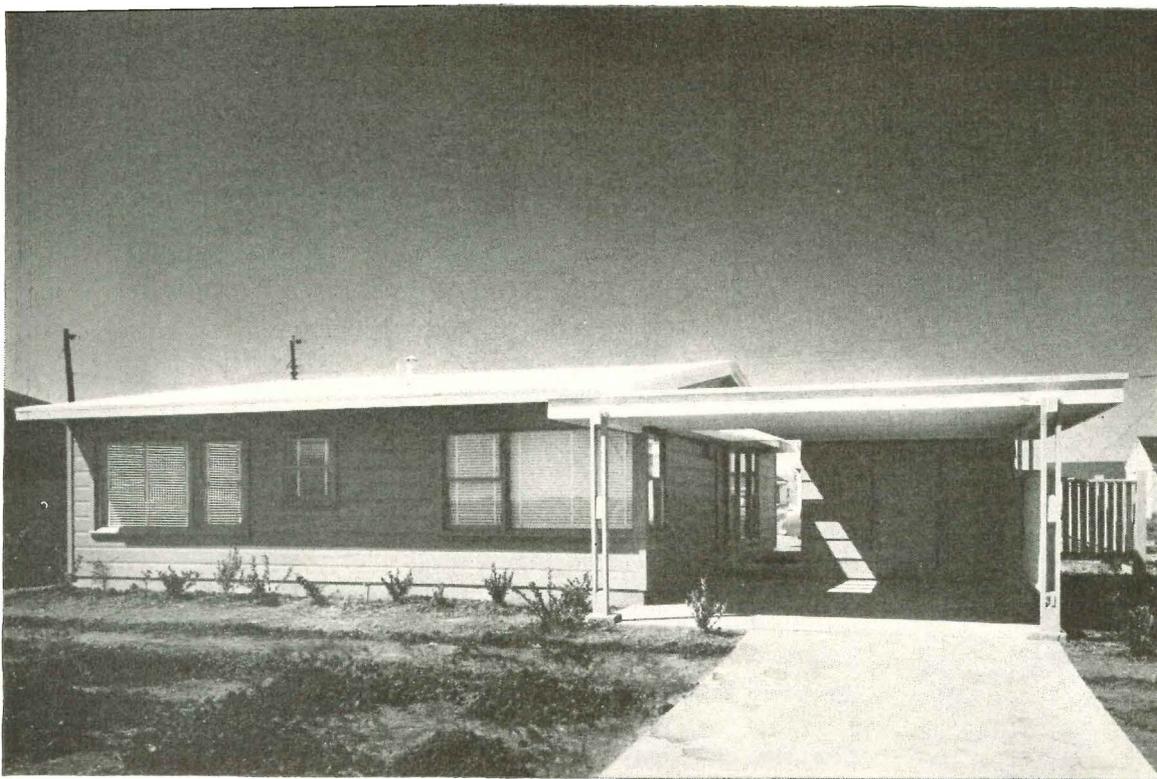
Dallas builders have known for a long time that some one would have to make history by air conditioning a house in the \$10,000 to \$15,000 price class. That honor has now gone to two teams of builders: Lewis & Lamberth, and Laughlin & Silver who worked together on the houses shown here.

The impact of these new houses will be felt far beyond their immediate vicinity. Like the first cars with four-wheel brakes or automatic transmissions, they will be widely copied if they sell well. At least a dozen other builders have already admitted they will install air conditioning too if the public takes to these houses.

Dallas is already one of the most highly air conditioned cities in the country. But up to the present most houses with a central cooling system have been in the \$25,000 and up class. Owners of smaller houses have been content to cool one or two rooms. Merchant builders have not been sure that buyers would want to spend as much as \$1,000 extra for a central cooling system. Since the opening of these houses on March 23 that question has been answered. Some 25,000 enthusiastic people crowded through the houses the first Sunday. Enough made the large down payments (up to \$2,900) to convince the builders that they will have no trouble selling their 214 houses.

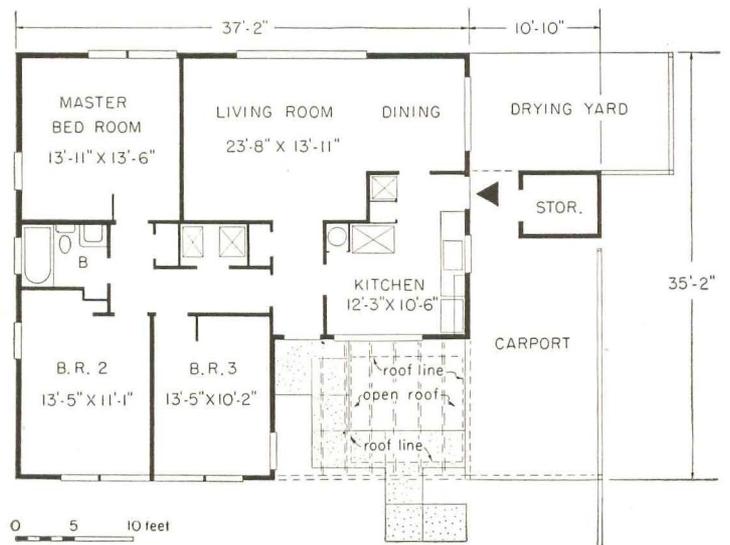


Two building firms bought the land and developed it together. Each will build half of the 214 houses. This, the first contemporary project to be built in Dallas and approved for its forward-looking design, reflects great credit on local FHA and VA officials, as well as on the progressive builders.

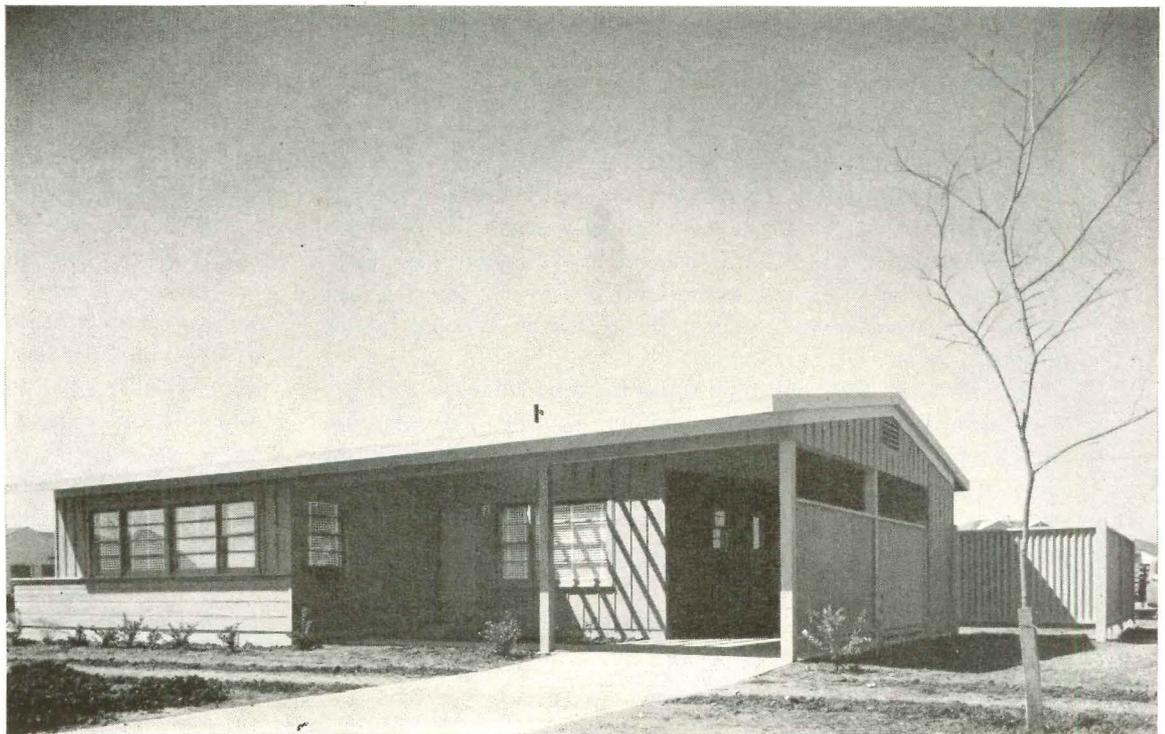
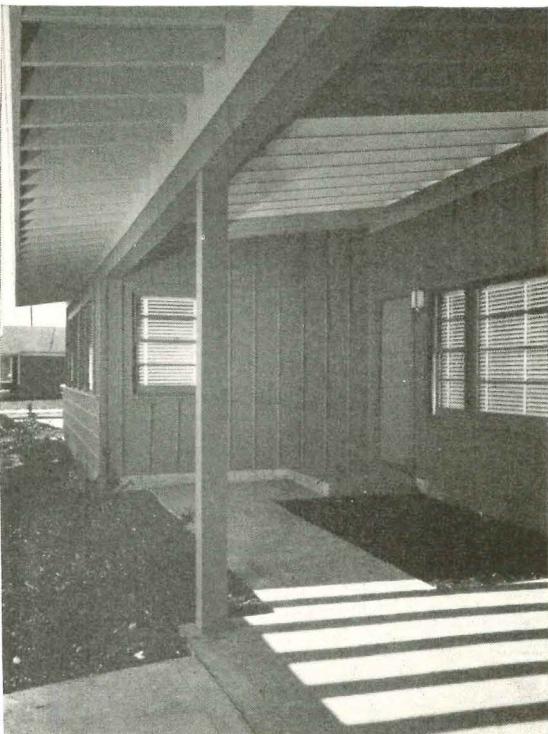


Front entrances (below) have adjacent planting beds and carports have outside storage rooms. Both exterior and interior color schemes were worked out by Basil O'Dell who controlled outside colors by fixing their sequence.

Living or dining area (above) usually faces the rear. Exteriors (above, left) are board-and-batten, plywood and batten, painted redwood horizontal or vertical siding, or shingles. Wide overhang and carport reduce air conditioning cost by shading windows.



Photos: Photo Associates; Ulric Meisel



Houses designed around cooling system

From their earliest inception, these houses were designed around the air conditioning plant. The builders, architect and engineers from the distributors of the air conditioning equipment worked together.

"This job was a pleasure to work on," said J. B. Lowe, president of Texas Distributors, who sold the equipment. "Usually we are called at the last minute and told to put in the system. This time we were in on the job from the beginning." Because nearly everything possible was done from a design point of view to help the air conditioning system, a 2 ton cooling unit was used instead of a 3 ton cooling unit which this size house would normally require. Not only was this a saving in original cost, but operating costs will be considerably cheaper.

As the design team analyzed the house they concluded that the first way they could lessen heat and cooling losses was to reduce outside wall and roof areas by making the house as nearly square as possible. The next point was to reduce the size of west windows where hot summer sun would penetrate. They wanted to eliminate all windows on the west but say that FHA and VA objected. To reduce sun load from the west they have planted shade trees that will eventually screen the windows. If they had been willing to be a little more radical the design team would have sealed all windows shut, on the assumption that as families get used to year round air conditioning they will leave windows closed as a cleanliness measure. This has been the experience of the owners of many large air conditioned houses. All windows are equipped with Venetian blinds.

Another design feature that reduces sun load is the wide overhang. The carport and, in some cases, an abbreviated front porch provide shade, too.

Insulation is also an important factor. Walls and ceilings are insulated with 4" of mineral wool batts. As an alternate the builders may use reflective aluminum foil on the theory that it will retain less heat during long hot spells.

The builders expect to lose very little summer cooling through the floor. On top of the 5" slab they laid 1" x 4" screeds in mastic. On top of the screeds they put red oak flooring. In kitchen and bath they used a plywood subfloor and linoleum or rubber tile. The dead air space around the screeds acts as insulation. Their engineers advised them that a slab floor would lose less summer cooling than an insulated wood floor over crawl space.

To bounce heat off the roof the builders are using white or light-colored marble chips, which materially reduces heat gain through the roof.

Cooling system is new version of old model

The cooling system is a General Electric 2 ton unit that is paired with a GE gas-fired furnace. Both use the same ducts. The cooling unit has been on the market about six months and is a slightly modified version of the firm's store and office cooler that has been on the market for ten years. This model was designed expressly for home use but in its basic operation is not new or experimental. It can be teamed up with other makes of hot air furnaces, either oil or gas fired.

An advantage this cooling unit has for areas that are both hot and humid is automatic "muggy weather" control. The operation of a room cooling thermostat causes a face damper to close and a by-pass to open. Thus the first stage of the cooling operation serves to remove more moisture than normal because the lower coil surface temperature condenses more moisture from the air passing over its surface. During the final stage of the cooling cycle the total unit capacity is lowered somewhat, and if the thermostat

senses the need for more cooling effect, the by-pass closes, the face damper opens and the full capacity of the unit becomes available.

Because the cooling unit and the furnace are designed to operate in parallel instead of in series, a considerable degree of flexibility in duct work results. Units can be spaced widely apart, or placed side by side. Because the air conditioner has its own fan, it operates independently of the heating unit. This means that it is not necessary to upset or rebalance heating air flows because of the addition of cooling to the heating system. The cooling unit occupies only 5.43 sq. ft. of floor space.

The heater-cooler, in a room at the center of the house, blows air through short ducts to wall outlets near the ceiling in each room. Return air is picked up at floor grilles on the far side of the room, and is brought back through cement ducts under the slab. This is a design that has been used successfully in a number of large houses in the area. Return air could be allowed to drift back through a hall. This would save about \$55 per house but would be considerably less efficient.

Capacity and cost

The calculated loads worked out by engineers for these houses are as follows:

Sensible cooling load	17,500 Btu/hr.
Latent cooling load	1,700 "
<hr/>	
Total cooling load	19,200 "
Total heating load	52,500 "

These calculations are based on maintaining indoor conditions of 80° dry bulb temperature, 50° relative humidity when outside conditions are 100° dry bulb, 78° wet bulb and upon maintaining an indoor temperature of 70° when the outside temperature is zero.

To handle the above loads the installed equipment has the following factory ratings:

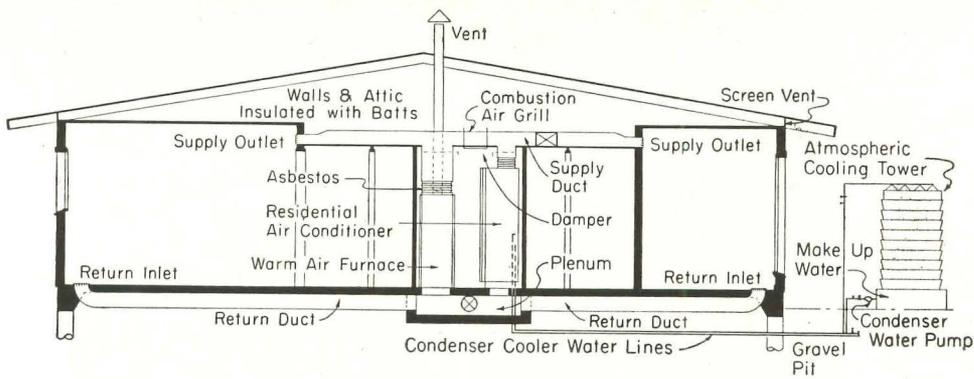
Air conditioning unit:

Sensible cooling	17,700 Btu/hr.
Latent cooling	6,900 "
<hr/>	
Total cooling	24,600 "
Furnace unit output	72,000 "

The installed cost to the builders of the two units is \$1,500. The cooling unit alone costs about \$1,000 which figure includes \$100 for plumbing and wiring, \$90 for a cooling tower and \$90 for a 1/4 h.p. pump.

Operating costs, based on engineers' estimates and field experience in Dallas during the past few years, are reported to be approximately \$140 annually. Cost of electricity (most of which is for the cooling unit) is \$93, gas for the heating unit will run to about \$40 a year. Water will cost about \$1 per month when the cooling unit is operating. (The unit re-uses 98% of the water, wastes almost none.) While the conservative figure on operating costs is \$140 a year, the actual experience in Dallas with central air conditioning systems in tight, well designed houses shows that the average monthly operating cost on a year round basis is less than \$4 per month per ton of installed air conditioning capacity. With this figure, annual operating costs for these houses may run around \$96 a year. In addition to these costs, however, a family has to pay a service man at least \$20 a year to switch over the system in the spring and fall, and to prepare it for operation. Servicing the first year is paid for by the builder.

If these figures are borne out, they should have considerable influence on FHA and VA as well as on other builders. It is reported that FHA frowned on year round air conditioning in build-



These 8" cement ducts under the 5" slab cost about \$55 per house. Short supply ducts run from center of house to each room.

ers' houses in another Texas city on the theory that operating costs would be so high buyers could not keep up the payments.

E. P. Lamberth believes that operating costs are going to be surprisingly low and that in addition, families living in these houses will pick up several budgetary by-products. They won't have to operate attic fans or the usual electric fans or window coolers. He is sure families will save quite a bit of money on summer entertainment as they will want to stay home rather than go out to air conditioned restaurants and theaters.

Builders subcontract most of work

Both Lewis & Lamberth and Laughlin & Silver work on an open shop basis. Lewis & Lamberth subcontract nearly everything, but keep several teams of carpenters for special work. Laughlin & Silver hire their carpenter labor direct, subcontract the balance. The air conditioning equipment is installed by the plumber.

Down payments on the houses amount to \$1,350 under the VA and \$2,900 under FHA. The first group of mortgages was sold by the American General Investment Co. of Dallas to Metropolitan Life Insurance Co.

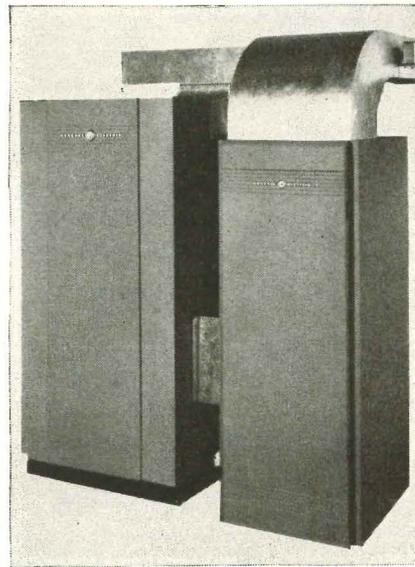
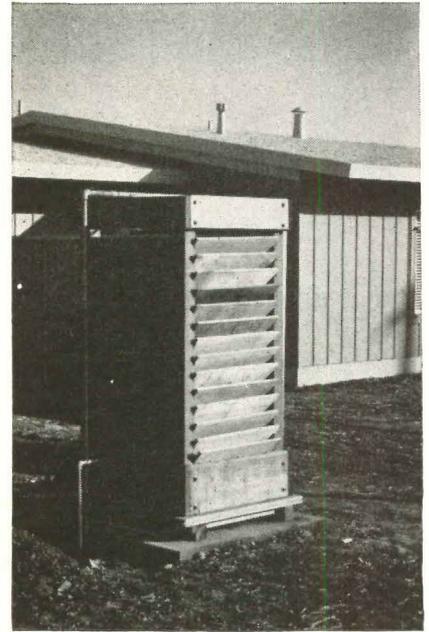
At the opening on March 23 some 25,000 people saw the two model houses and lined up to go through a tent where the builders exhibited plans and various pieces of equipment, including cut-away models of the air conditioning machine.

It was the most successful opening that any of the four builders have ever had. They took down payments from 25 buyers and then gave up because of the crowds. "Even with the big down payments we're sure of our sales," said Lamberth. "In fact, we're tickled to death about the houses, and the public seems to be, too."

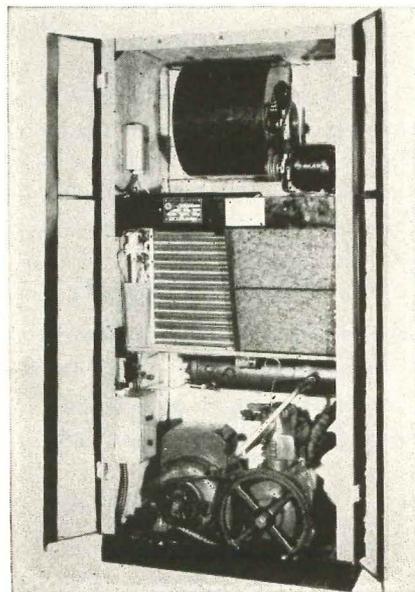
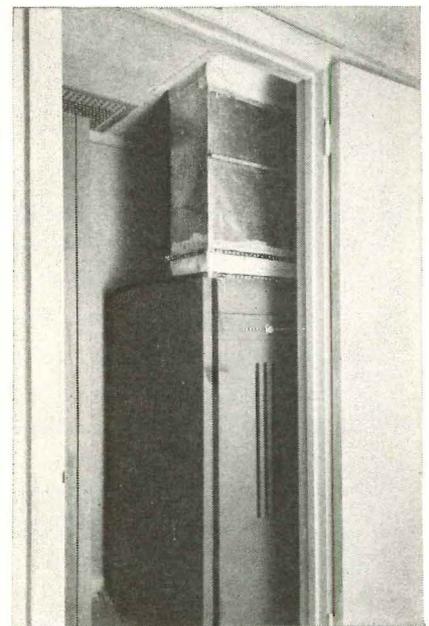
COST BREAKDOWN

Concrete work	1,200	Insulation	178
Lumber, doors, millwork ...	1,875	Venetian blinds	124
Windows	450	Mirror and miscellaneous ...	37
Labor	1,350	Grading, shrubs and trees ..	125
Hardware	100	Architect, engineering and	
Plumbing	900	decorating fees	100
Heating and air conditioning	1,550	FHA, VA, building permit	
Wiring and fixtures	265	fees	87
Flooring and floor finishing	450	Lot	1,250
Linoleum	39	General overhead, selling costs,	
Painting	600	financing, and profit	1,320
Built-up roof	360		
Bath, wainscoat and floor ..	140	Total	\$12,500

Thanks to the cooling tower, 98% of the cooling water is re-used. During summer season, cost of water is about \$1 per month. Redwood tower costs \$90.



Photograph above shows how cooler (at left) and heater are paired together. Cooler alone takes up 5.43 sq. ft. of floor space. Photo at right is Dallas installation, where both units are in a central closet. (Cooler is out of picture at left.) Below: cooling unit with machinery exposed, one filter removed.



GROSS-MORTON SHOPPING CENTERS

Some ABC's for homebuilders interested in developing their own commercial land.

THE TEACHER: a successful builder who shares hard-learned know-how gained from owning 138 stores

Many U. S. homebuilders, usually alert to profit opportunities, are throwing one away—the commercial land which exists only because of their efforts. After literally creating whole new communities and rich, profitable markets, they are letting others lick the frosting off the cake.

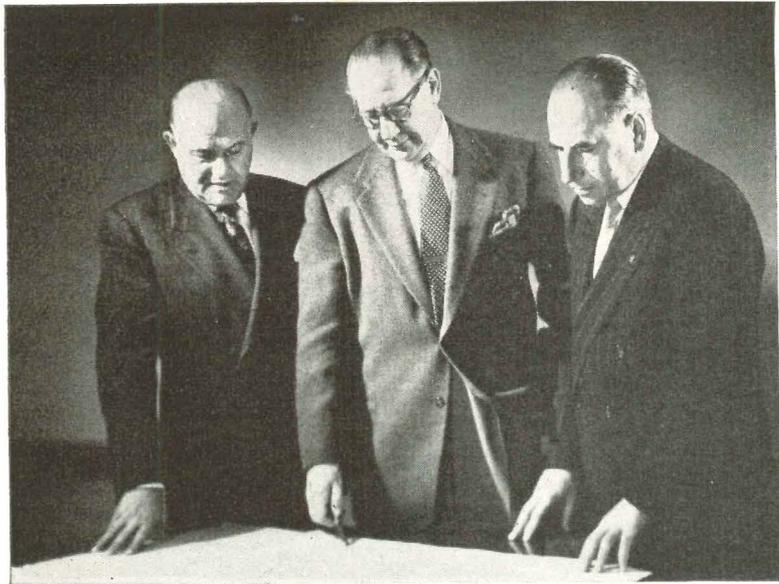
Some builders are not so philanthropic—or shortsighted. Some appreciate that the increment in value of commercial sites properly belongs to them and is theirs for the taking. Long Island's Gross-Morton Co. understands this well. Where once they left the commercial facilities for their residential areas to chance, today their shopping centers are counted on to bring an additional 5-10% yearly profit on each area. What Gross-Morton have learned should be an object lesson to all builders. The lesson: shopping centers are a legitimate—and profitable—concern of the residential builder.

Alfred Gross: "The biggest mistake made by housebuilders is in not properly surveying the market. They don't know the answers they need to know about population, location, income potential and competition."

There was no guesswork when Gross-Morton built their 54 unit Glen Oaks shopping center in 1949-50, and 1951's 29 stores in Windsor Park. As a basic market for the first they had their own 3,000 garden apartments in Glen Oaks Village, with its 11,000 population. Aerial photographs, block-by-block house counts and traffic measurements helped Gross-Morton determine that they had no important competition for a market of 50,797 people, with over one million persons within 15 mins. of the center, by car. Figures like these are what attracted key retailers and a major department store, May's, the hub around which the center is planned.

Windsor Park's project is also in the center of 2,538 Gross-Morton apartments, but is planned on a smaller scale because it is not on a main traffic artery and because Fresh Meadows' center (with an important department store) is only 1½ mi. away. At Windsor Park the high volume "key" store is a supermarket.

George M. Gross: "Be sure your project is protected from others cashing in on what you build up. Don't leave 'coattails' hanging out for them to jump on. Zoning is one way, but it's undependable. Ownership, and/or occupancy, is best."



This second generation triumvirate runs Gross-Morton. Founded in 1896 by the late Max Gross, the firm is now headed by (l. to r.) Vice President Lawrence Morton, Vice President Alfred Gross and President George M. Gross. They own 138 stores in New York's Queens County, 93 in postwar shopping centers, the remainder in older retail districts. They have built over 15,000 houses and apartments, and fulfilled \$75 million in FHA commitments.

Because builder Gross kept his shopping center away from the ends of Glen Oaks Village, he was able to bring a full block of apartments to each end of the stores. The land across the Turnpike had already been built up with single homes, except one piece owned by, and intended for use as, a church. Thus he was able to surround the center with a buffer zone on all four sides. Anyone planning more stores in the area will be a long way from May's department store, and Glen Oaks's parking lot. (Owners of a nearby center, who neglected this precaution, are now helplessly watching new blocks of stores go up around their development.)

Lawrence Morton: "Empty stores can murder you. They're the face of death at the feast. Plan your center in units, and build one at a time. It's better to have vacant land than a vacant store."

All three Glen Oaks units were built and rented singly. In fact, completion of the last building was deliberately delayed to keep pace with a temporary lull in renting demand. But because Gross-Morton controlled all the land, there was no hurry. The growth of the center could parallel the growth of the home area around it.

George Gross: "Today you have to sell your tenants. You'll find them reluctant to sign leases until the building is actually underway. And when you apply for a mortgage, the size of that mortgage will depend mainly on two things: 1) how much of the project is rented? and 2) what are the minimum rents?"

Gross-Morton had first made up an elaborate brochure, 18" x 22", consisting of architects' sketches of the center, site plans, a regional map (showing highways and transportation serving the stores, and the relation of Glen Oaks to the rest of Long Island) plus a detailed three-mile-circle map with accurate population figures. These went to all leading chain and independent stores, and brokers active in the field. After bagging key retailers like May's, Woolworth's and Whelan Drug, Gross-Morton could pick and choose tenants for the remaining space. (The drawing power of the department store permitted them to lease the supermarket space to a little-known chain at a higher percentage than the top supers would pay.)

Lawrence Morton: "You have to resign yourself to paying 10-20% extra for alterations after work is underway. The cries for changes start even before the merchants sign the lease. Here is where the architect is all-important. He must be familiar with the changing needs and operations of the chains if he is to have any chance of keeping the alteration costs within bounds."

Architect Leo V. Berger is also consultant for May's and brought to the job 25 years of experience with both chain and independent operations. Berger was able to hold alteration expenses to 10% of the building costs because he is familiar with the ever increasing demands of retailers for more end-use facilities and equipment (supermarkets and five-&-tens both insist on lighting fixtures to their specifications, and the first often demand, and get, built-in refrigeration). What these extras can mean is illustrated by the super and five-&-ten building costs of \$15 to \$16 per sq. ft. (fire-proof construction in the New York area), as against \$12 per sq. ft. for the rest of the stores. Except for the steel framing, Gross-Morton were able to use the same subcontractors who were doing their apartments at the same time. Better utilization of both labor and materials was made easy by the fact that the projects were side by side.

Berger included two 50' malls to break up the 1,100' frontage and to furnish interior space for low volume "service stores." A 6' cornice gives shade and weather shelter, while soffit lighting (maintained by Gross-Morton) keeps every foot of the block bright and cheerful. Mall benches are handy for the foot-sore shopper, and the 25' sidewalks provide both for pedestrians and the "baby buggy brigade." Working with Berger was site planner Leo Novick, who was handed one of the key problems—parking.

Planner Novick: "Acreage alone will not solve the parking problem. Free traffic flow is the main consideration. If you design for a busy Friday night, you'll never have to worry about ordinary periods. Remember, many of your customers are poor car handlers, so don't skimp on center aisles and driveways. They need the room."

For their 185,000 sq. ft. of retail space, Gross-Morton provided 265,000 sq. ft. of parking, a 1½-to-1 ratio. In an endeavor to squeeze out even more space, Novick's planned concrete traffic islands were omitted, but painted lines failed to control haphazard parking so the 6" high islands were restored. Stalls are 18' deep, with 30' driveways, giving each bay a 66' width and making parking possible without backing and filling. Both Gross-

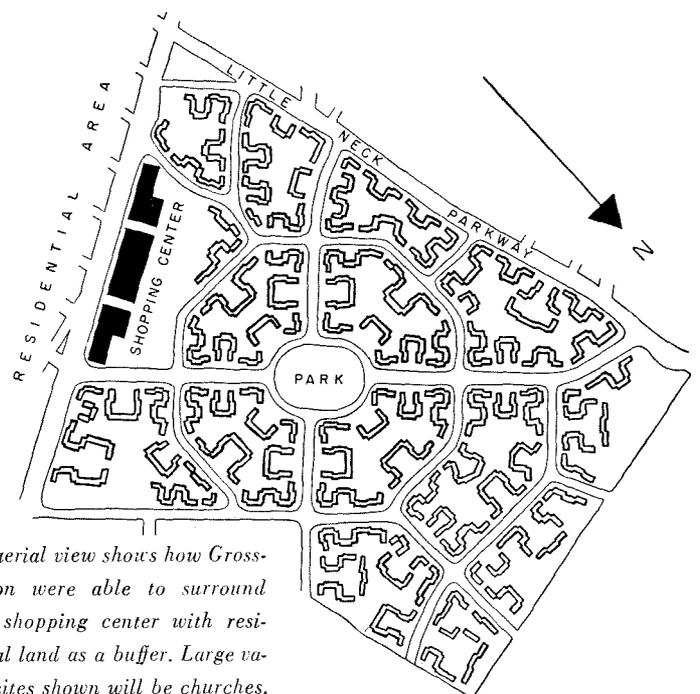
Morton and Novick would have preferred both front and rear parking, but zoning restrictions and demands of merchants for frontage on busy Union Turnpike forced all parking to the rear. Signs direct traffic to the side street entrances. (One Novick suggestion, dropped for space economy, was the planting of trees on traffic islands, which would have shaded the desert of concrete.)

Al Gross: "A shopping center is a speculation, a risk of your own. Until the building is up and the leases signed, there is no mortgage money. But if you control your own land, and are financially able, you should develop your shopping center as a lifetime income producer."

Lest anyone doubt Al Gross's insistence that shopping centers involve risk, Gross-Morton point out that on new leases, the lessor's percentage of gross volume has dropped an average of 33⅓% since 1947. Competition among the many new centers for tenants and the skidding retail profit margin have both contributed to this drop. Supermarkets, the hub of most small centers, will now pay only 1-1¼%, instead of a former 1½-2%. Big variety chains which used to pay 5 and 6%, now stop at 4%. To this must be added the increased facilities needed and the higher construction costs (with corresponding greater builder investment, for the mortgage is scaled to minimum rents, not costs). This trend is offset by the increase in dollar volume of most merchants.

Mortgage commitments will be roughly five to seven times the annual minimum rents, perhaps slightly more with a list of top-drawer stores. This gives an extra importance, beyond their customer pulling power, to securing the top chains. (Though the rental would be about the same as what their present tenant pays, Gross-Morton think today they would rather have a leading supermarket at a smaller percentage because of the extra people it would draw to the center.)

Al Gross: "Merchants are all alike, from Macy's to a neighborhood shoemaker. Each will insist that his rent should be lower because of all the people he is going to pull to your other stores (whose percentage will be higher, of course.) But if you don't get your return from the department store, if you don't get it from the supermarket, if you don't get it from the five-&-ten, who do you get it from—the barber?"



This aerial view shows how Gross-Morton were able to surround their shopping center with residential land as a buffer. Large vacant sites shown will be churches.



WHY AND HOW THE FURNISHED MODEL HELPS SELL BUILDER'S HOUSES

Why decorate?

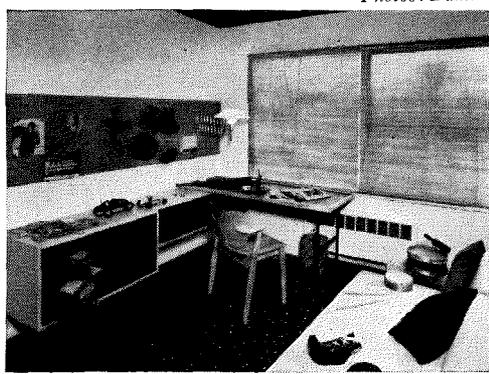
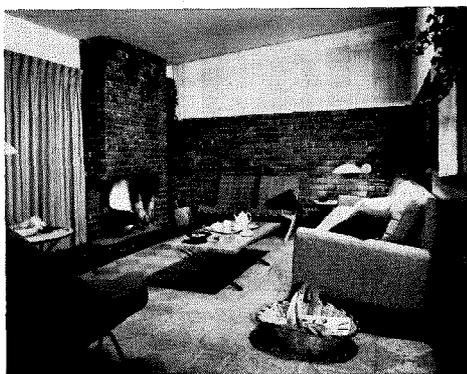
More and more builders are using the furnished model house as a sales tool. Why? They find it is cheap advertising, creates good will by giving customers new ideas. They say good decorating hides shortcomings, makes small rooms look bigger, any room look better.

Several have found it worth while to "move the furniture from one house to another. First it sells the model, then it sells the one exactly like it down the road."

One says that customers "know the 12' x 20' living room is there all right, but wonder will the big sofa fit next to the fireplace?"

Another admitted that his decorator so enhanced the looks of his house that he "revised the price upwards."

Still, most builders are not getting full value out of the money they invest in furnishings.



Photos: Damora

To give model house lived-in look, New Design Inc. stresses accessories, curtains wide windows with nylon (opposite) and split bamboo (above). Dining table was produced by Knoll Associates from Nakashima model.

How to make it pay

It is not hard for a builder to pay his money and get his house filled with furniture. But to get sales results calls for considerably more—some of it well in advance:

▶ A good floor plan (Oct. issue '51) without doors and windows in the walls most obviously suitable for sofas and beds is appreciated by the decorator as well as by the housewife. Decorating demonstrates exactly how the house will look when it's lived in.

▶ The decorating job must be expert. Since neither the builder nor his wife is usually qualified, and as a small discount, if any, is apt to be given by big stores, it pays to find a competent interior designer or assign the job to the architect. (Less furniture is better than less taste in its selection.)

▶ There must be ample planning time. No interior designer can produce top results for the builder who rushes in and announces that the house must be ready in two weeks.

Say builders

Carl Freeman: "Model houses bring large numbers of people to the property. Visitors in a properly presented model are relaxed, interested and communicative."

Joseph Eichler: "We've just proved again that a furnished model is the way to sell houses—this time in a subdivision of 16 houses, five different plans, priced from \$17,500 to \$22,000. The plan with the furnished model, though less suitable to the average family's needs, sold first. The best plan did not sell unfurnished; when furnished, we sold it within two days. . ."

Newell & Daniel: "We are sure decorating helps sell the house—the model with the furniture in it always sells first."

Jo Shapiro (Joseph-Martin Assoc.): "Anyone who builds even five houses a year should have a furnished model. The model makes sales faster, which in the long run is enough economy to cover the cost of furnishings."

Sam Levin (Hillside Terrace): "We once had a house with no model, and it went very slowly. . . It pays over and over to have a good decorator and pay for her services."

Stackler & Frank: "We wouldn't do a development without a model—and any builder who does is missing a good merchandising technique. . . . Decorating should play up the house, not the furniture."

Virginia B. Hall (Danherst Corp.): "Our own sales center will have one house furnished in modern, one traditional—not only to appeal to varied tastes, but also to demonstrate the versatility of the Gunnison home."

Sidney Roth: "One psychological value of the furnished model is that it makes a woman start furnishing in her own mind. Before long, she's ready to make the move and see for herself how her ideas look."

Harold Lewis: "Our new Long Island development, North Woodmere Park, will have about 130 houses. In three or four weeks, we've sold about 25 houses from two models—the decorators dramatized the best points of the houses."

Walter Driver (Driver Construction Co.): "The furnished model pulls far more people than an empty house . . . but gets maximum results only if it is in the price and style bracket leading the field to begin with. . . . The model simplifies customer color selection—which can be a big headache. . . . Here in the Southwest, we find new homeowners are overwhelmingly in favor of modern furniture."

California builder Joseph Eichler moves furniture from one house, as it is sold, into next (right).

Beatrice West emphasizes dual purpose at Levittown (smaller photo) with coffee table that rises to card height.

What cost decoration?

While occasionally a department or furniture store will do a job for publicity (national magazine tie-up preferred), nine times out of ten the best the builder can hope for is a discount. Sometimes a small firm will supply furnishings at cost plus a fee to cover operating expenses; more often, the price is closer straight retail. Few decorators will touch even a low priced house for less than \$2,000.

Several color stylist-decorators offer builders a service stressing exterior and interior color selection. Probably the best known is Beatrice West, who has done more than 64,000 houses in 29 states for 165 builders (Levitt among them) and proved conclusively that good color is the cheapest, surest way to sidestep monotony and add to the sales appeal of the tract house. She plans color schemes "from the outside in and from the roof down," works out the minimum number of colors for the maximum number of color combinations.

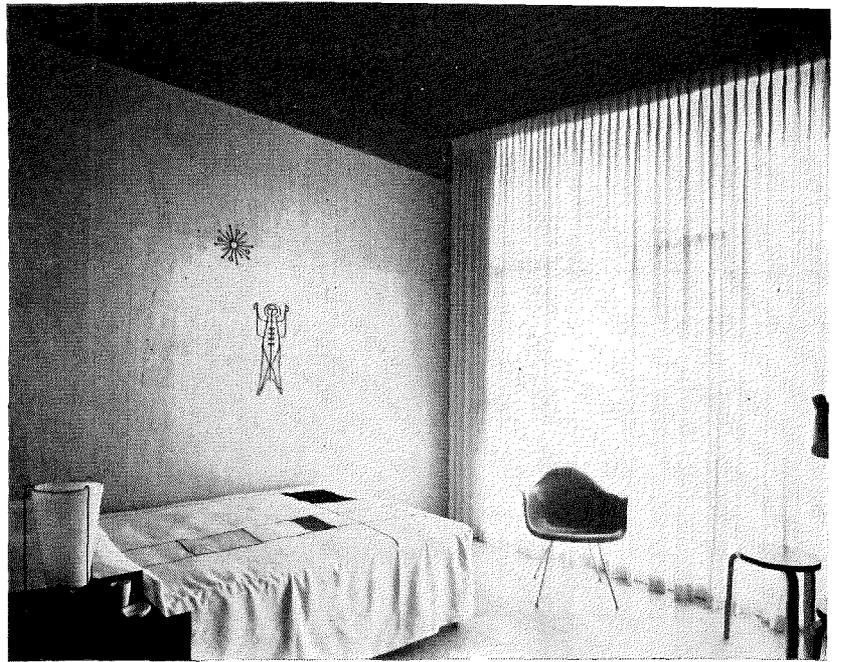
The cost of such services varies with the number, size and price of the houses: for a minimum of 100 small houses, \$10 per exterior and \$5 per interior. Fewer and larger more expensive houses cost more.

To furnish a model house, Miss West charges an additional fee for traveling and working time, size of house and several other factors. She pays careful attention to the pocketbook of the average prospective owner (furnishings for a small Levitt model came to under \$1,000). "You have to make a woman feel that she can afford to get the same effect. Otherwise, she's scared away because she thinks the house won't look as nice with what she can afford," says Miss West.

Of the builders who operate as their own decorators, Joseph Eichler has worked out an unusually simple and successful system. He has bought a few good, modern basic pieces (beds, sectional sofa, dining table and chairs), which together with built-ins suggest the real livability of his houses. He moves the furniture from one house to another; except in the original model, spends *no* money on curtains—instead, he tacks up a fabric sample to suggest pattern and color ideas.

In Las Vegas, Nev. an enterprising Sears-Roebuck salesman, Ed Frietas, realized that furniture and house sales problems dovetailed: he could use an outside hook to bring customers into the store; a builder could use evidence that furnishings could be bought on a budget. A developer listened to the Frietas plan, liked it, and has put it to work to their mutual advantage.

Each purchaser of a house, and each good prospect, gets a copy of the floor plan with furniture drawn in to scale, together with three cost lists itemizing the furniture piece by piece and room by room, on a sliding scale of quality. Most expensive furniture set-up comes to \$1,827; middle range \$1,468; cheapest \$1,211. Customers can juggle budgets to suit themselves. (Neither store nor builder spent a penny on actual decoration.) Result, after just two weeks: Frietas had furnished three houses and the builder had made four house sales.



Rondal Partridge



Ray Jacobs Studio

How to decorate: 10 pointers

1. Simple modern furniture, of light woods, gives a cleaner, more open effect than does traditional in dark finishes.
2. Small-scale furniture makes a room look bigger.
3. Double-duty furniture cuts down on the number of pieces needed, saves both money and floor space.
4. Decoration can prove how multipurpose rooms work, show how the guest room can also be used for TV, for instance.
5. Built-ins look neat and save space. Their cost to the builder whose carpenter is on the job is comparatively small.
6. Skillfully arranged furniture may divide a long, narrow living-dining room, create the illusion of better proportions.
7. Patterned wallpaper helps fill up a sparsely furnished room but different patterns in adjoining rooms make a house look restless and seem smaller.
8. Good color costs no more than bad, outdoors and in.
9. For a small house, one basic color carried throughout is better than a hodgepodge of exuberant variety. Fabrics may supply accent colors.
10. It pays to respect regional differences. A modern house in a Colonial neighborhood can do with a few old prints.



Photos: Ben Schnall



Subdued pattern, and peripheral arrangement of Jens Risom living room furniture (top) and built-in dining area cabinets (above) gain expansiveness in builder house rooms by Designs for Business Inc.

Sales psychology

Being human, home seekers are strongly and subtly influenced by human factors; builders being merchants are quick to see what draws crowds and gets their money:

▶ *“Women immediately put themselves in the place of the decorator,” says one builder. “And the minute a woman starts comparing and deciding where she would put her furniture, it’s practically a closed sale.”*

▶ *People stay in a furnished model house longer, feel more at home, are more relaxed, interested and conversational. There’s more to talk about—more on which to pin a sale.*

▶ *Conversely, a model saves the salesman’s time because he doesn’t have to prove that the bed or sofa will fit the wall space.*

▶ *Chances of publicity are better. “Nobody’s going to take a picture of an empty room,” is the way most builders sum this up.*

▶ *It’s difficult for a layman to visualize a finished, furnished room. Besides, everyone appreciates being given ideas.*

▶ *For many builders there’s too much gamble to building a number of houses in advance of sales; a model makes it easy to sign up customers ahead, be sure subsequent houses will sell.*

▶ *Imaginative decorating is a distinguishing factor. House hunters who have gone from one \$12,990 house to another—and another—may end up in complete confusion, except when a furnished house makes a lasting impression. That’s the one they’ll buy.*

**Have you tried
furnishing a model house?**

**If so, how did it work
as a selling tool?**

**Who did the job for you,
a professional decorator, a store?**

**How much did it cost
and how did you finance it?**

HOUSE & HOME would like to see any pictures you had taken and to know what the public reaction was to any decorating jobs you have had done, with a view to publishing them in a future decorating roundup.

A STRONGER, CHEAPER STORAGE WALL is engineered at University of Illinois

A new kind of storage wall that every builder can make for himself has just been developed by the Small Homes Council at the University of Illinois. Sponsor was the Lumber Dealers Research Council.

The rear panel is made from a 4' x 8' sheet of $\frac{3}{8}$ " plasterboard which is glued with linoleum paste to a sheet of $\frac{1}{8}$ " untempered hardboard. Sides, divider panel and shelf are $\frac{1}{8}$ " hardboard.

▶ The new closet wall is 20% cheaper than conventional stud wall closets. Materials and methods are common to builders and present no problems.

▶ Cabinets have full-access fronts, more interior space than thick-walled closets, waste less room space.

▶ The panel forming the back was judged the best of 22 experimental panels tested by the University.

▶ Although rear and side panels are thin, they are combined to afford three-way stiffening that gives storage wall great strength and rigidity.

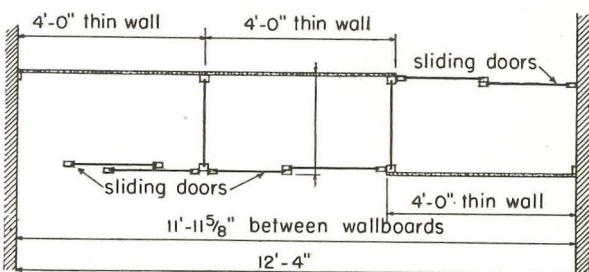
▶ Panels can be made and assembled on the job.

▶ A variety of fronts may be used to suit the builder's discretion.

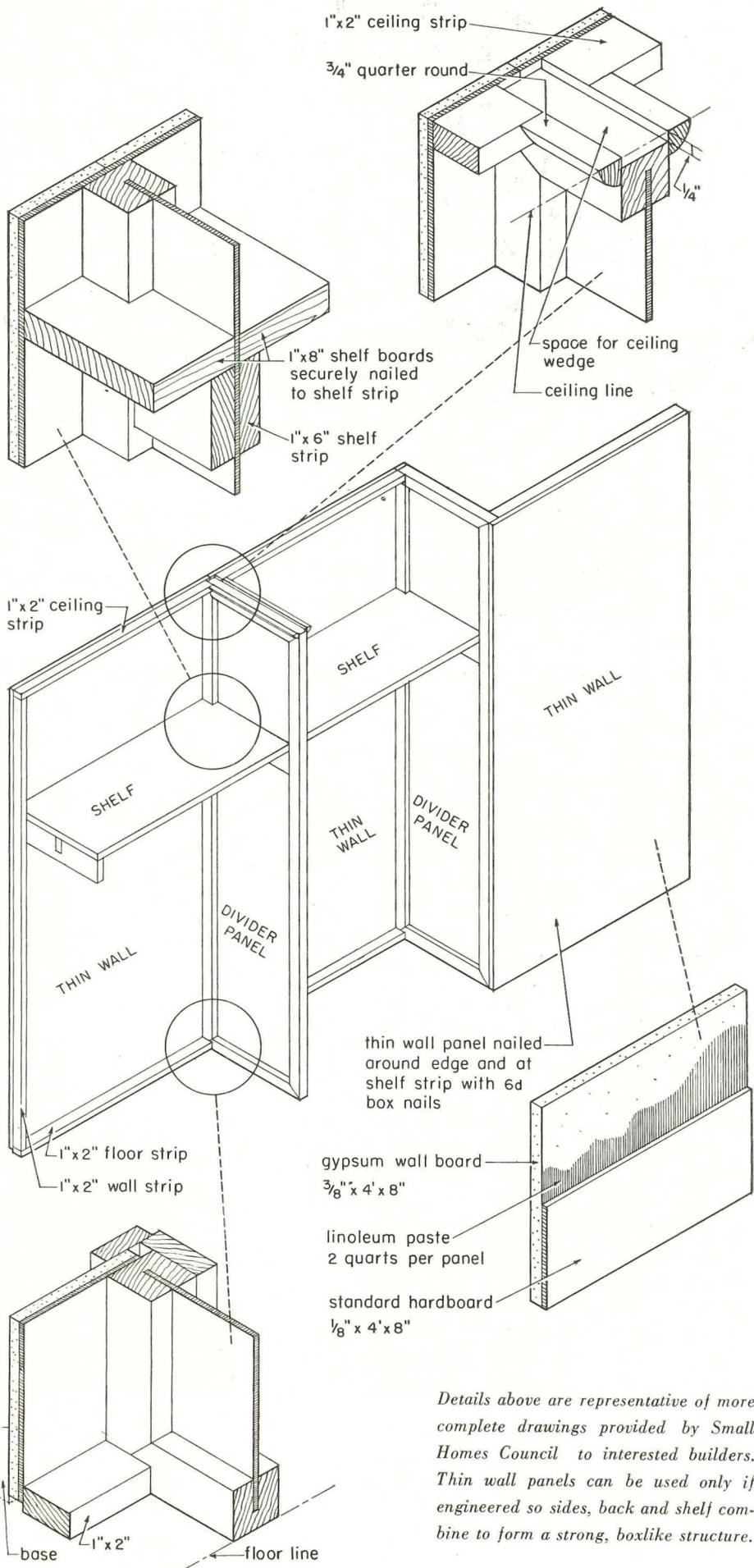
Although only $\frac{1}{2}$ " thick, the rear panel withstood drop and deflection tests which proved it had unusual strength. While a 60 lb. sandbag dropped from 4" broke through a panel made of plasterboard, a 4' drop of the same sandbag did not damage the laminated panel.

Entire design is engineered so that rear panels, two sides and shelf are combined to give a box type, three-way stiffening which permits cheaper, thinner panels than if normal construction were used.

The new storage wall was presented to builders at a two-day course held by the Small Homes Council. The truss on the next page was also shown. Builders can get full details by writing the Small Homes Council, Urbana, Ill.



Rear panels use full width and height of 4' x 8' sheets, involve no cutting. Sides are $\frac{1}{2}$ " sheet of hardboard.

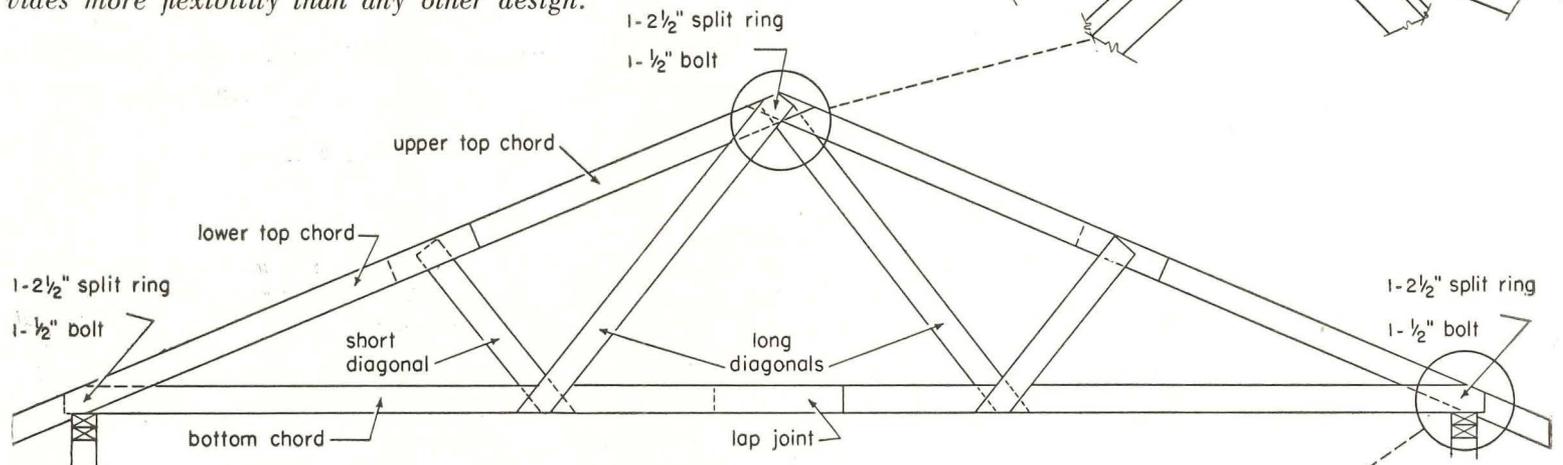


Details above are representative of more complete drawings provided by Small Homes Council to interested builders. Thin wall panels can be used only if engineered so sides, back and shelf combine to form a strong, boxlike structure.

NEW W-TRUSS HAS GREAT FLEXIBILITY spans 20' through 32',

with or without attic storage

After several years of experimentation, University of Illinois engineers have come up with an improved truss which they claim is easier to make, faster to assemble, stronger, and provides more flexibility than any other design.



A great deal of engineering skill went into this truss. One carpenter and a helper can precut, bore and preassemble the four part unit (upper right) needed for all trusses for a 1,000 sq. ft. house in one working day.

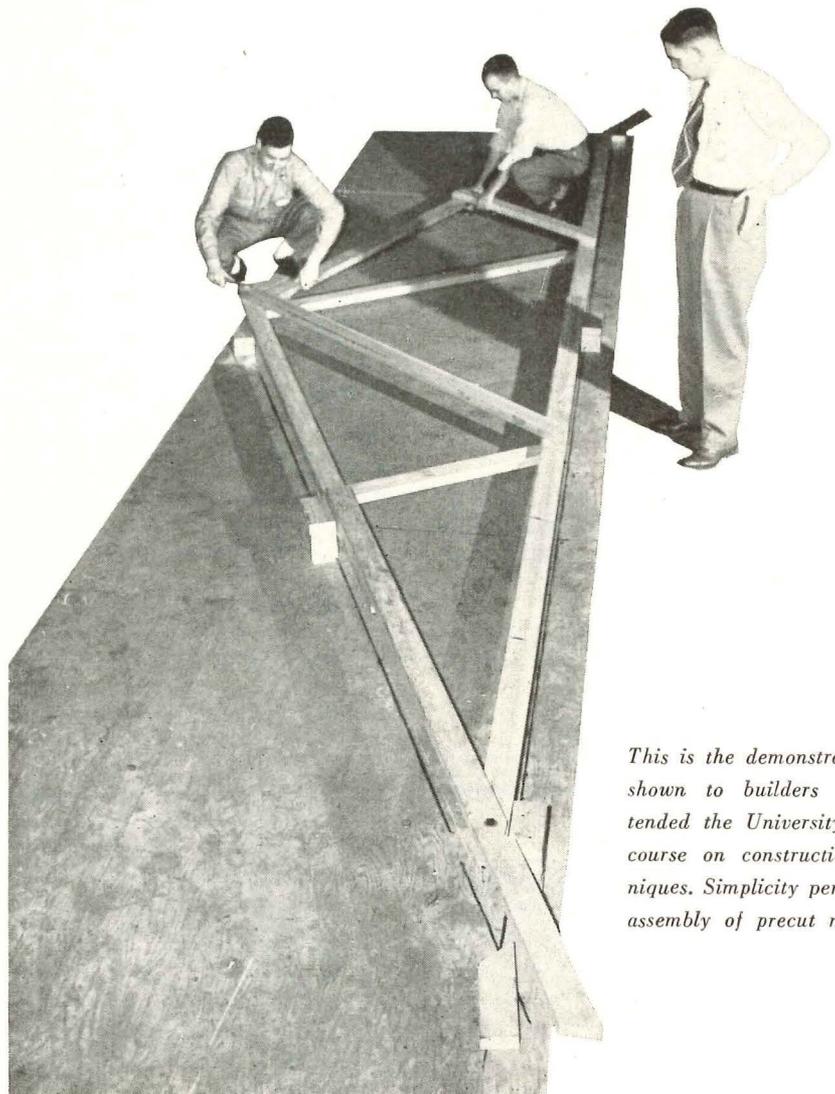
The same design can be used for spans that range from 20'-8" to 32'-8". One series is for houses that use attic storage, another for houses without storage. Each of the three main truss members contains one lap splice. This allows the use of ring connectors at the three major joints without the close tolerances that would otherwise be required.

The lap-splice design permits the truss to be adjusted in span and to be laid up without splice plates, gussets or filler blocks. Another advantage is that a major subassembly (detail at upper right) can be made and stored or transported in a minimum space. Final assembly may be quickly completed on the job site.

The W-truss (25'-8" span) was designed for one size of lumber (2" x 4") and only five lengths are used. Material must be 1,100 psi stress grade or better, equivalent to Coastal Region Douglas Fir #2. There are no left or right members to confuse the carpenters. Jigs are easy to make and directions provided by the Small Homes Council give all necessary information for making them.

University engineers who designed the truss state that the tension quality of toe-nailing is so unpredictable it is valueless. For that reason the trusses were designed to be fastened to wall plates with light metal framing anchors which make toe-nailing unnecessary and load the nail in shear rather than tension.

The new trusses were designed for a slope of 5-in-12 and are to be spaced 24" on center. If used for slopes that vary considerably from 5-in-12, they must be redesigned. The use of ring connectors is a vital part of the design. Overhangs up to 30" can be used by extending the top chord.



This is the demonstration jig shown to builders who attended the University's short course on construction techniques. Simplicity permits fast assembly of precut members.

What future for the sewerless toilet?

In March HOUSE & HOME reported a revolutionary new plumbing system: the sewerless toilet (p. 110).

Its future may depend on answers to two questions:

1. Will the sewerless toilet operate as smoothly as inventor Carl Boester says tests at Purdue indicate?
2. What acceptance can its developers expect for it?

BECAUSE of the newness of Boester's invention, the final score on the first question cannot be tallied yet. However, Oklahoma City builder Bill Atkinson, who has been testing it for 30 days in his factory, believes results will be satisfactory. "If it works out it would be the answer to our prayers. It will save very extensive sewer plant installations. In areas where septic tanks won't work, the only alternative up to now has been to put in a central sewage disposal plant which is terribly expensive." Results have been very good "with the heavy load we're putting on it." His tests should help to resolve such possible drawbacks as these:

"Additional research will need to be done to facilitate the removal of foreign materials which occasionally drop into the toilet." (Leon Raider, Builders Division, Raymond Rosen & Co.)

"As the device must operate continuously, the noise level created by the continuous rushing of water into the bowl may be great enough to be objectionable." (Harry J. Taillé, Rochester Gas & Electric Corp.)

"The question that arises, pointed out by Boester, is what can be done with other waste water, such as laundry and kitchen wastes." (Earl W. Smith, President, Earl W. Smith Organization)

"What happens in the event of power failure?" (Curt C. Mack, Assistant FHA Commissioner for Underwriting)

"If the water that is being constantly recirculated should become discolored or dirty, this probably would be objectionable." (Harry J. Taillé, Rochester Gas & Electric Corp.)

"Some of the public health people are inclined to think that the cost of power may be a [determining] factor." (Curt C. Mack)

There is a general agreement that the sewerless toilet would need to be thoroughly proved by actual practice in the home.

"Though I attribute amazing possibilities to the sewerless toilet my company believes that it will have to be tried out for three or four years before it can be adopted." (Richard Geiger, Spiegel Construction Co.)

Another stumbling block gloomily brought up over and over again is how difficult it will probably be to get official approval for this system.

"In practice, the central FHA office seldom tells local insuring offices what new products they can or cannot use. However, it advises them when they seek guidance. It is possible that eventually some offices will accept this new type of toilet while others will say no. In general, FHA policy would be to prohibit its use in areas where community sewage systems exist." (Curt C. Mack)

"We find that FHA and VA are relatively receptive to new ideas but real difficulties may develop with local municipalities." (Richard Geiger)

"I have had so much trouble overcoming local codes that I cannot imagine Boester's invention will be immediately available." (Charles Goodman, architect)

That VA authorities may take an open-minded view of the sewerless toilet is indicated by the reaction of Bert King of the loan guarantee section of that agency. He is enthusiastic about its possibilities. "If it measures up to claims, it will be just the answer technicians have been looking for in respect to sanitation facilities in areas where septic tanks are not feasible." Builders were delighted with certain specific savings which they foresee:

"Naturally, one must approve of any machine or method which conserves our natural resources, and since this toilet uses the same water over and over again, it deserves approval from that point of view." (B. M. Garland, James B. Glow & Sons)

"The economy of installation and of operation is of interest in the economy house field." (James M. Albert, Albert Construction Co.)

"It would create a great saving of critical metals." (B. M. Garland)

"I venture to say that in most areas of the country it would increase the usable land by at least five times. The saving in cost would certainly amount to at least \$500 per unit, if we consider the cost of main sewer installations. There would also be a saving in the time element of construction." (L. Robert Rolde, Mortgage, Land Developments)

"It would seem that the system could be very well utilized wherever economical sewage disposal is needed, such as in temporary living units, trailers, airlines, trains, etc. Certainly this is a great improvement over the use of septic tanks." (The D. C. Burns Realty & Trust Co.)

But the greatest enthusiasm for the sewerless toilet was generated by the hope that it will open up land to builders which they have been unable to use up to now.

"There are many sections of Long Island that do not have sewage facilities and where a high-water table makes it impossible to build them satisfactorily."

"The sewerless toilet will help here and also in areas where there is no public water disposal system as it will make it possible for the homeowner to have a private water system without fear of contamination from sewage waste. This new toilet should also be a boon to many defense areas where water and sewage are not available." (Leonard L. Frank, Stackler & Frank)

"If the claims made by Carl Boester are substantiated by further research and field study, I think that the sewerless toilet will find immediate acceptance and open up areas for development hitherto unusable, because of improper or unsatisfactory soil conditions." (Emanuel M. Spiegel, First Vice President, NAHB)

The sewerless toilet may contribute to greater flexibility of the plan of the house and the relation of house to land.

"Assuming that this toilet is mechanically right (and I assume it is) and that the sink and other waste sources of the house can be taken care of, I see a great many possibilities for flexibility in three different ways:

1. Flexibility of position for the toilet within the house itself, making possible a greater variety of floor plans.

2. Flexibility of location for the house on the ground—at present houses have to be located for short sewer connections.

3. Flexibility in using houses in temporary locations or in locations otherwise unavailable." (John Highland, architect)