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Celotex Vapor-seal Lath, used in place of

other lath, also does triple duty-serves as a excellent plaster base, as a scientifically co rect vapor seal, and as thermal insulatic of proven efficiency.

Architect Trueman Martini of Joplin, Mo., designed the pleasing residence—and kej insulation costs down b specifying triple-duty Celote Vapor-seal Sheathing.

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LATH

CELOTEX

VAPOR-SEAL

SHEATHING

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VAPOR-SEAL INSULATING SHEATHING

APRIL 1939

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Editor, Howard Myers; Managing Editor, Ruth Goodhue; Associates, Paul Grotz, Joseph C. Ilaza, Jr., George Nelson, Henry H. Saylor, Henry Wright; Assistants, John Beinert, Anna De C. Jr., George Nelson, Henry H. Saylor, Henry Wright; Assistants, John Beinert, Anna De C. Harbara Hunt, Madeline Thatcher, Nadla Williams, Allan Woodle. THE ARCHITECTURAL FORUM is published by Time Inc., Henry R. Luce, President; Erie Hodgins, Kalph McA. Ingersoll, Roy E. Larsen, Vie Presidents; Charles L. Stillman, Treasurer; W. W. Commons, Secretary, Publication and Subscription Office, Erie Ave., F & G Streets, Philadelphia, Pa. Subscriptions may also be sent to 320 East 22nd Street. Chicago, Illinois, Exceutive, Editorial and Udvertising Offices, Time & Life Building, Reckefeller Center, New York, Business Manager, George P. Shutt, Address all editorial correspondence to Time & Life Building, Rockefeller Center, New York, Suth, Address all editorial correspondence to Time & Life Building, Rockefeller Center, New York, Standard, Cuba, McNico, South America, \$4.00, Elsewhere \$6.00, Single issues, including Reference Numbers, \$1.00. All copies Mailed Flat. Copyright under International Copyright Convention. All rights reserved under Pan American Copyright Convention. Copyright, 1939, by Time Inc. VOLUME 70-NUMBER FOUR

MAN OF THE MONTH



Associated Press ... He cut the knot and let the latch string out (page 56)

THE MONTH IN BUILDING



BUILDING'S BEST BET. The fondest hope of Building's battalions is that the year 1939 will be one over which they can raise their banner. If reports for the first month of the year are any indication, those hopes have a good chance of becoming a reality; the total building volume for January rose about 6 per cent over the previous month, according to the Department of Labor's building permit reports.

Responsible for these first signs of an early spring is no juggernaut of heavy engineering, but small home building. During January residential construction totaled some \$72 million—a rise of 13 per cent over the previous month—which overshadows a 3 per cent lag in nonresidential construction, an 11 per cent rise in additions and repairs.

Home builders must look to their laurels, however, if they are to raise the volume of their activity to anywhere near the 1925 peak of \$200 million per month. To help in such laurel-looking, THE ARCHITECTURAL FORUM this month analyzes the residential market and finds that the low cost house is Building's best bet. It then shows how that bet can be covered. See page 233.

CERTIFIED OIL BURNERS. FHA

has taken pains to school its building inspectors in snooping out structural and mechanical defects in the buildings behind insured mortgages. But those inspectors could not find every piece of faulty equipment if they took each building apart. Result is that many a shady builder has installed second grade materials, put one over on FHA.

Principal offenses have been in oil burn-

er installations. Every FHA regional office has as many as a hundred complaints of unsatisfactory oil burners-either poorly installed or poor in quality. To eliminate such complaints, FHA has developed a new method of inspecting oil burners and will guinea pig it in the New York area. The plan requires that every newly installed oil burner in homes on which an insurance commitment has been made must be put through a performance test to prove its efficiency, and the contractor responsible must post a certificate near the burner stating the results of the tests. All the inspectors will have to do is check the results against FHA standards; if the burners flunk the installation test, the contractor has to make amends before the insurance will be given.

The performance test was developed with the technical assistance of the Oil Burner Industry Standards Committee. It is based on the per cent by volume of carbon dioxide in the flue gases. The burner passes if the CO_2 equals or exceeds 8 per cent for a firing rate of one gallon per hour or less, and not less than 9 per cent when the firing rate is greater than one gallon. The manufacturers' recommendations as to minimum firing rate for the total connected load will be accepted in conducting the tests, while the maximum rate will be limited to 125 per cent of the minimum.

Mechanical draft oil burners must bear FHA's underwriters' laboratory seal of approval and be protected by the manufacturers' warranty covering at least a year of operation. In addition, the contractor making the installation must agree to service the heater at any time at no extra charge above the contract price. **UNDER FIRE.** Since the middle of February the Banking and Currency Committees of both the House and Senate have held hearings regarding the Bankhead-Steagall amendment to the National Housing Act. That amendment is designed to give the Federal Housing Administration a shot in the arm principally by striking out the present July 1, 1939 limit on the insurance of loans on existing property and by raising the limit of insurance outstanding to \$6 billion.

Although the FHA has had its full share of backers, it has also had its opponents. Bad blood has long existed between FHA on the one hand with its backing of bank and real estate interests and on the other hand the Federal Home Loan Bank Board and building and loan associations. Basically, it is a conflict between the proponents of mortgage finance and brokerage on a national scale, and those who believe that mortgages should be written by local institutions acquainted with local risks. But more immediately, bad feeling arises from the fact that FHA insurance draws many a financial institution into the mortgage lending field that had never operated there before, thus offers building and loan associations heavy competition.

In addition, under the provision permitting insurance of loans on existing homes, many a building and loan association loan has been refinanced as an FHA loan—by some other institution. Thus, no holds are barred as the building and loans fight the extension of FHA's powers.

The U. S. Building and Loan League issued a printed statement to both Congressional Committees taking a stand

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THE ARCHITECTURAL FORUM

BAL Published monthly by Time Inc., Henry R. Luce, President, Publication Office. Eric Ave., F & G St., Phila., Pa. Yearly Subscription: U. S. A. Insular Possessions, Canada and Cuba, \$4.00. Foreign Countries in the Postal Union. \$6.00. Single issues, including Reference Numbers, \$1.00. Entered as Second Class Matter at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879. Additional entry at New York, N. Y. Copyright, 1939, Time Inc. Spiral Binding U. S. Pat. Nos. 1516932 and 1942026. Other Patents Pending.

VOLUME 70 Number 4 against the extension of loans on existing houses and the increase of the insurance limit to \$6 billion. Impressive John H. Fahey, chairman of the Federal Home Loan Bank Board, took a stand similar to the League's in his statement before the Senate Committee, but stated that refinancing loans should be limited to a change of ownership. Such a limitation would prevent insurance-armed lending institutions from raiding building and loan mortgage portfolios.

An attack on FHA from another quarter came as a result of the American Federation of Labor's convention in Miami last February. Its Housing Committee registered a vigorous protest against the Fort Wayne plan (ARCH. FORUM, Oct. '38, p. 299) the financing of which was insured by the FHA rental housing division. AFL views with alarm the possibility that the plan be widely adopted, for the prefabricated Fort Wayne houses are built by relief labor to house reliefers whereas USHA low cost housing (which AFL backs) must be built at prevailing wages. To cut short FHA's venture into minimum housing, AFL's President Green offered an amendment to Congress that would prevent insurance of projects instigated by public housing agencies. He also proposed that FHA insurance on any kind of project be limited to houses built at prevailing wages, which would effectively throttle FHA activities in the small home field where union labor is the exception.

In spite of these attacks by AFL and the building and loan associations, present indications are that some sort of extending bill will go through in time to keep FHA's gears from faltering at the July 1 deadline. FHA appears willing to compromise, admits that it could get along for a year or so with \$4 billion, although \$6 billion would create a self-sustaining revolving fund, thus permit continuous operations. As 30-70 is the present ratio of operation between loans on existing homes and loans on new construction, FHA is well content with the committee decision, reached a fortnight ago, to limit refinancing loans to 35 per cent of the total. These compromises stand a good chance of being passed. Odds are that FHA will not be restricted by the Fahey change-of-ownership suggestion regarding loans on existing homes, nor by AFL's prevailing wage amendment.

RATES DOWN. Although the Federal Housing Administration sets 5 per cent interest as the upper limit on loans they will insure, it might just as well be the lower limit too. For mortgage lenders have held firmly to the limit of the law. Last month, however, President Henry Bruére of the \$583 million Bowery Savings Bank broke their hold when he announced that his bank would henceforth make loans at 41/4 per cent interest and had some \$10 million to invest in mortgages on either small houses or large scale projects in New York's metropolitan area.

Following his announcement, other banks went into hurried huddles as to how to meet that \$10 million of competition, came out of them agreed to equal Bowery's terms. Result is that Dime Savings Bank, South Shore Trust Company, Franklin Society for Home Building and Savings, and many another have also announced that their rates on FHA-insured loans will be 4¹/₄ per cent.



Bowery's Henry Bruére Associate

Bowery's decision means more to local mortgage makers than a reduction in rate. They will now have new and powerful competitors in the home loan field. For Bowery and other big banks have long been content to purchase FHA mortgages through brokers, have made comparatively few loans on small houses.

Three relatively small banks have been making and selling the bulk of the loans. For their pains these banks take a servicing charge of one-half of 1 per cent from the yearly rate. And as the mortgages are quoted at \$1,030 to \$1,040 per \$1,000 of face value, the net rate received by purchasers has been about 41/4 per cent. Thus Bowery will receive about the same gross return it always has, but must now do its own loan servicing.

An important reason why Bowery Savings Bank is turning mortgagee can be found in its portfolio of mortgages frozen solid by the State mortgage moratorium. Hope is that the mortgagors protected by the moratorium can be induced to exchange their old 6 per cent mortgages for the new low rate ones.

USHA CUT. In an ugly mood last month was the House Appropriations Committee when faced by USHA Administrator Nathan Straus and his request that USHA's administrative expenses be upped from last year's \$3.5 million to \$5.5 million. Reasons for their mood were first the sudden yen for economy in all of Congress; second, the slow progress that public housing must necessarily make when operating with tyro local housing authorities; and third, the attitude of Straus that rubbed self-esteeming Congressmen the wrong way. Result of their mood was an expense account \$1 million smaller than USHA wanted. But the Straus minions were left the privilege of using \$1.5 million of the \$4.5 million total for staff expenses at the site of projects-a sum the local authorities would have to pay back, and which could thus be reused.

Had that slice been all, Straus would have gone back to his Interior Department office well satisfied, but the Committee scissored an innocent-looking little clause from the act that put all USHA in a cold sweat. USHA manages the projects of the old PWA Housing Division, but the cost of that operation has always been taken out of operating income, in accordance with a provision in the Second Deficiency Appropriation Act. It is that provision the House Committee deleted, making the burden of such operations a part of administrative expenses. The bill went through the House without change, so the only hope for USHA is that the Senate revise it. For USHA could not carry the cost of operating PWA projects and pay for its own business as well.

EARNINGS. Reports from the material companies that supply Building's staff of life indicate that as far as earnings are concerned, the year 1938 was heavily overcast with occasional showers. Of the fourteen companies on this month's list, three report a 1938 deficit, and ten that 1938 was not as good a year as 1937. Only one, the up and coming National Gypsum, boasts an increase between the two years—of 34 per cent.

YEAR ENDING DEC. 31	1938	1937
Armstrong Cork	1,150,796	5,157,887
Bridgeport Brass	251,899*	733,181
Detroit Steel	188,756	692,789
Detroit Steel Products	173,288	787,174
Eastern Rolling Mill	375,871*	121,667
Formica Insulation	53,520	240,966
Johns-Manville	1,455,302	5,451,844
Lehigh Portland Cement	704,003	1,250,544
Libbey-Owens-Ford Glass	3,930,460	10,518,918
Lone Star Cement	3,060,436	4,079,825
National Fireproofing	273,787*	175,651
National Gypsum	921,632	687,428
Owens-Illinois Glass	5,383,805	9,361,627
U. S. Gypsum	4,725,497	5,421,010
*net loss	- and the second	

PRIMA VERA REALWOOD with walnut inlays

Realwood Formica is a new and important decorative material. Let us send you all the facts. THIS photograph of a chain store elevator lobby done in Formica Prima Vera Realwood with Walnut inlays is modern and beautiful. Modern because the true grain of authentic woods is provided in a plastic material that has all the valuable characteristics of a plastic—hard surface, chemical inertness that resists spotting, very low moisture absorption, uniform finish, and stability of color. The effect is beautiful because the grains of these fine woods are themselves beautiful.

> THE FORMICA INSULATION COMPANY 4620 Spring Grove Ave., Cincinnati, Ohio

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APRIL 1939

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CERTAINLY! Low cost homes [s2500 to s5000]] Use Gas for the 4 Big Jobs



Home at 116-23 230th Street, St. Albans, L. I., N. Y. Architect: William Sambur. Builder: St. Albans Associates, Inc. Cost: \$4,990.00 including lot.

Home at 11368 Mark Twain, Detroit, Mich. Architect: Earl T. Durbin. Builder: Harry J. Durbin. Cost: \$4,990.00 including lot.



LOW INITIAL COST—Are you up-to-date on the new gas appliances? Then you know how good-looking, and how efficient they are, and all about the work-saving automatic features with which each is equipped. The important thing is that only by choosing gas appliances can you buy so much comfort and convenience at such a low cost.

LOW INSTALLATION COST—No fuel storage space or basement is necessary, so you save on excavation expense. Major housekeeping equipment may be compactly arranged and centrally located, so elaborate flue, duct, and chimney work is cut down.

AMERICAN

LOW MAINTENANCE COST—The absence of complicated mechanisms and delicate parts in the new gas ranges, refrigerators, water heaters, and house heating equipment assures years of trouble-free service. Their simple sturdy construction takes full advantage of the efficiency and flexibility of this unique fuel.

LOW OPERATING COST – Modern gas equipment is designed to make Gas a more economical fuel than ever. New improvements in insulation and automatic control contribute to more efficient performance and prevent wasteful use of the Gas.

ASSOCIATION

For full facts about ALL these important savings, consult your local gas company

GAS

WHY ARE SO MANY LIFE HOMES USING **GAS** for the **4** big jobs?

LIFE Home at Atlanta, Georgia. Builder: Palmer & Sawtell, Atlanta, Georgia. Designing Architect: Richard Koch, New Orleans, La. Modified by Clem Ford, Atlanta, Georgia.

1st. Because Gas is clean, silent, flexible and economical.

2nd. Because no space is required for fuel storage and more money is available for important *living area*. Its adaptability makes Gas the modern fuel for modern homes.

3rd. Because modern gas ranges, refrigerators, water heaters, and house-heating equipment are compact, beautifully designed, equipped with the latest automatic devices and work-saving features. Yet you realize substantial savings, both on first cost and installation cost, by specifying these up-to-the-minute appliances.

That's why Gas is playing such an important part in 1939 home-planning, building, and selling. Ask your gas company for full details.

AMERICAN GAS ASSOCIATION



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I wish to enter A.G.A. Builders' Competition. I am a builder 🗌	C
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the written permission of the builder. Architect	REFR
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Signature	Be sure bear the Ges Ass

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THE ARCHITECT'S WORLD

THE AMERICAN FAMILY AND ITS SHELTER

By Charles F. Lewis

DIRECTOR, THE BUHL FOUNDATION, PITTSBURGH

Condensed from the author's contribution to a symposium on Home Financing, published as the Autumn, 1938, issue of *Law and Contemporary Problems*, Duke University Law School, Durham, N. C.

Nowhere has the impact of new and swiftly changing social forces been greater than upon the American family. Particularly is this impact reflected in the changing needs and wants of American families with respect to their shelter.

Among the factors which have changed the face of our life have been: a) the shift from a village to an urban existence; b) the shift from handicrafts to machine production and from a system of simple proprietorship to one of large enterprise; and c) the declining size of the American family.

These and other factors have affected powerfully the way of life and the attitude toward life in America, are changing the wants and needs of American families, inescapably and drastically, with respect to their housing.

The shift from a village to an essentially urban society has brought complexities with which the family alone is no longer able to deal. In the older and smaller units of the social order the common aspiration of every family was to own its own home. To have a bit of the soil, to have a stake in the land was for the average man a proud badge of his independence. He looked with ill-concealed superiority upon his less fortunate or less ambitious neighbor who was merely a tenant and who kept his roof over his head only by a landlord's sufferance.

*

Almost over night this simple early American family found the village grown up about his house, the village grown into a town, and the town grown into a great city. Bit by bit its land was cut away until finally all that remained of once proud acreage was a narrow city lot with strangers' houses built up close on each side, with noisy commercial and industrial uses just around the corner, and with traffic thundering past the door.

This new existence the family has found precarious. It has been no longer able to police and protect its home. It has delegated police protection, and even the drawing of water, to the city government; and the lighting of its lamps and the cooking of its meals to private enterprise. Against invasions of all sorts in this neighborhood the family is defenseless. It leans more and more on its city government for protection against intolerable social invasions and against destructive industrial incursions.

Under the new order, for great numbers of our people, all of the once vaunted glories of home ownership have passed, the old shibboleths have lost their meaning, and only the hollow fiction remains.

The shift from a system of handicraft to machine production, and from small proprietorship to large enterprise has likewise powerfully affected the family and its attitude toward its house. Under the old order, as under the new, bad times came and went away, but even in bad times for the cobbler there was some work at his bench. But, under the new order, when the factory shuts down there is no work at all. The perils of cyclical employment are greater than ever. To them have been added the perils of technological employment. All have made for economic instability and insecurity.

Associated with these factors has been the mobility of industry itself, arising from its great restlessness as it has sought to adjust itself to the pressures of swiftly changing circumstances. This mobility has added to the workers' problem and instability of residence. In the simple, handicraft, rural days a family with confidence could plant itself on the soil for life. Today, large numbers of our people, particularly among the white-collar workers, must as a matter of economic necessity keep themselves free to follow the beck and call of opportunity or of transfer to a distant city.

It is hardly strange that under the impact of these new forces the American family should be declining in size. It requires for its use, therefore, not so much space either in land or buildings. Convenience and economy more and more have been satisfied by providing that space which is required vertically instead of horizontally. Until recently it has been feared that this process of change might mean that eventually the family would lose contact with the soil altogether. Convenience and economy, mobility and independence, have seemed to be served for these families by renting rather than by owning their homes.

All of these factors are developing a more realistic attitude on the part of multitudes of families toward their housing requirements. It is no longer sufficient to attempt to refute these forces by singing of "The Old Oaken Bucket." The feeling of insecurity brings many families to realize that independence is to be had not by attaching oneself to a city lot but by avoiding long-term commitments which can be terminated only by great difficulty, by great loss, or by both. By sheer force of social and economic necessity American families are forced to substitute practicality for sentimentality in seeking to satisfy their housing needs.

*

This is not to imply that there is no longer a place for individual home ownership. It has its place. One must have every sympathy with the aspirations of families who want to own their own homes and with every effort of industry and finance to assist them on an honorable basis. But it is time for all of us to recognize that changing conditions of life are making ever increasing numbers of American families to want to rent their homes rather than to buy them.

It must be recognized, too, that until recently there has been no adequate recognition of this great change and little effort to satisfy this tremendous potential market. For the most part landlordism has been absentee or amateur. We have lacked in America in any large sense both landlordism based upon constructive investment motives, and property management of a professional nature. Moreover, the homes available for rent even more than the homes available for purchase have been exposed to those social and economic invasions which zoning so far has failed effectively to control or prevent.

In brief, the present situation offers to the American construction industry, the savings institutions, and to business management the opportunity to build a new kind of blightproof residential community to be managed on a long-term investment basis—a kind of community in which American families can find a way of living suited to their new needs and wants.

The fundamental reason for the hit-ormiss, topsy-turvy development of most American cities is that they have been built small-scale. Capital in the large sense has been busy with building up great enterprises of industry and transportation; it has neglected the housing field and has left it largely to the speculator and the jerry-builder. Today, the same opportunities for great expansions of industry and transportation no longer exist. On the other hand, a great new market based upon profoundly changing human needs has opened in the field of residential construction. Capital is frankly challenged by this unusual opportunity for sound and productive use of its funds.

Essentially this will be an investment and not a speculative use of capital. And the investment returns to be had now and over a long period of years will compare more than favorably with the experience of industry generally. The results will far surpass those that owners and lending institutions have had with residential real estate under the old and passing systems.

Let us look briefly at the two elements of the proposal: first, that a large part of the new residential building should be in the development of large scale, planned communities built in one operation from the ground up and managed on a longterm rental basis; and, second, that the object of capital employed in this enterprise should be not quick speculative profit, but sound and secure long-term investment yield.

*

The practicality of both of these principles has already been convincingly demonstrated in practice. At Chatham Village in Pittsburgh and elsewhere ample evidence is to be found. This experience proves that the large-scale planned community, socially integrated and controlled, held in a single ownership over a period of years and motivated by sound purposes, will be secure from many of the perils of invasion that beset the ordinary district of single family homes owned by many separate owners. Physical maintenance of all the properties, under largescale operation, can be permanently guaranteed. The social quality of the community can be guaranteed. The district can be protected from invasions of undesirable use, regardless of the adequacy or the inadequacy of city zoning systems. In short, the districts, if large enough and if wisely administered, can be maintained against neighborhood depreciation regardless of what may happen in other parts of the city. Such districts cannot become obsolete. Such districts will not cease to be taxpaying civic assets.

No less has it been demonstrated by the so-called limited dividend companies, from Boston in 1871 to Pittsburgh and other cities today, that limited dividends pay. Notable is the success of the City and Suburban Homes Company of New York, founded in 1896 by Mr. R. Fulton Cutting and associates. After years of operation, in 1933 in the midst of the depression this company could boast of assets of nearly \$10,000,000, a surplus of more than \$1,380,000, and net earnings of from \$263,000 to \$445,000 per year through four depression years. Its average annual dividend rate, from 1899 to 1936, was 4.65 per cent. Or let us take six noncooperative apartment projects built in New York City under the New York State Housing Board. All have been consistent dividend payers in good times and in bad. Or let us take, in the City of Washington, the Washington Sanitary Improvement Company, which with assets of nearly \$1,500,000 can boast that from 1897 to 1923 it paid an annual dividend of 5 per cent, and from then, straight through the depression, of 6 per cent.

*

The only grief of limited dividend companies, apparently, has come from operations too small-scale or from speculative procedures inescapable in installment selling. Where these companies have treated their properties as investments and have continued to operate them on a long-term rental basis, they have been uniformly successful.

The building of such large-scale housing enterprises as have been here discussed not only offers new areas for capital investment, but also opens up inviting fields for completely integrated, nationally operating, home-building companies, capable of applying to large-scale construction sound organization procedures and management policies. Such companies are almost certain to be a development of the comparatively early future. In time they will control quarries, brickyards, forests, lumber mills, and a wide range of material and equipment factories.

Here, then, is a new industry waiting to be created, an industry capable of employing hundreds of millions of dollars in construction annually, able to stabilize yearround employment for a large part of the building trades, and competent to make a major contribution to economic and social security in the building of cities for the new day, cities composed of residential districts built and kept blightproof by the application of principles tested and proved in other industries and other investment fields.

"Architecture, of all our pursuits, can least

afford to disregard the past. Of all works

of art, be they literary, deliniative or built

in three dimensions, only a small percent-

age live to interest succeeding generations.

The architect must not be swept away by

the current architectural mode, the cur-

PAIRED

Parallels of Criticism: Architecture and the Past

"You read of Colonial houses and English houses and Normandy houses and Gothic churches and the charm of this style and the loveliness of that style. All of that has nothing to do with architecture. We are done with all that 'parroting' of the past; mere copying of what our ancestors did is at best only attempting to recover something that has gone; and because the styles we are taught were produced by people no longer living, and for kinds of life that have passed forever with the coming of the machine, we can never even copy them with perfect sincerity."—TAL-BOT F. HAMLIN.

rent inspirational fancy. If his work is to be valued in years to come, he must have the spirit of humility. He must instruct himself that certain elusive but enduring qualities in buildings of the past have caused them to have the same allure now as in the beginning. It is a part of his culture to search out these qualities so that such qualities may also be built into his architecture."—EDWIN BATEMAN MOR-RIS.

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AFTER THE MACHINE, WHAT?

By Albert J. Nock

An excerpt from "Letter from a Dutch Uncle," The Atlantic Monthly, May, 1938

Looking at the sixteenth century wood carving in the Wester Kerk at Enkhuizen, one gets an impression of the human spirit yearning for a perfection of detail and finish which is possible only by means of the machine. It is the same general impression which one gets—at least I do —from all late medieval and Renaissance sculpture, especially things like the filigree work that is appliqued on the front of the Cathedral at Albi. You might say it is the outward and visible sign of an inward and spiritual longing for the machine; the machine, which should be capable of doing all sorts of wonderful and almost incredible things in the way of finish and detail, and doing them right, doing them perfectly, and duplicating them as often as you like with not a hair's breadth of variation. So too, when I see the severe plainness of our modern woodwork, its ostentatious abandonment of detail and ornament—say, for instance, in our new domestic furniture—I wonder if it may be evidence that the human spirit is pretty well fed up with the machine and its ghastly perfections, and is moving toward something else as blindly and ignorantly as in the sixteenth century it was wavering and wabbling toward the machine.

WHAT DO YOU READ?

On the theory that the architect does read, and might, with helpful encouragement, read more, the A.I.A. Committee on Education has tackled a new job. Through its chairman, William Jones Smith of Chicago, recipes were sought from the better known literary gourmets in the profession. Some of these we have the privilege of passing on from time to time to those who would read if guided in their choice by someone who has been over the road. This month, Dr. Leicester B. Holland, F.A.I.A., Chief of the Division of Fine Arts, The Library of Congress:

James McNeill Whistler Ten O'Clock The Esthetic Basis of Greek Art Rhys Carpenter The Architecture of Humanism Geoffrey Scott Discourses on Architecture Emile Viollet-le-duc Design (A Treatise on Discovery

P E Nobbs of Form) The Autobiography of an Idea Louis H. Sullivan Kindergarten Chats on Archi-

tecture Louis H. Sullivan Art and Modern Life Laurence Binyon Laurence Binyon The Flight of the Dragon Lewis Mumford Sticks and Stones The Brown Decades Lewis Mumford The Sense of Beauty George Santayana Readings in Art Appreciation Alfred M. Brooks Great Artists and Their Works Alfred M. Brooks The Mind of the Artist: Thoughts

and Sayings of Painters and Sculptors on Their Art

Cicely M. Binyon

FAIR AND COLOR

By Bruce Bliven, Jr.

An excerpt from The New Republic, December 7, 1938

Earlier expositions have been chromatically dull: Chicago in 1893 was nearly all white, like the Buffalo exposition in 1901 and St. Louis in 1904. Texas in 1936 was tawny yellow. Chicago in 1933 used a few familiar colors experimentally. New York in 1939 will be all the colors of the spectrum. In airplane view the main avenues which radiate from the Theme Center of the Fair form a wheel, with the Trylon and Perisphere as the hub. And each of these avenues has been assigned a primary color. From the warm, off-white of the Theme Center the hues along each street will increase in intensity as one gets farther and farther from the central axis, and the buildings and murals and plants will all be in harmony. Along the Avenue of Patriots, for example, the color ranges from white through the pastel shades of vellow to gold at its extremity. On Constitution Mall the series is through the reds to burgundy, and on the Avenue of Pioneers from the pale blues to ultramarine. A Fair visitor, confused by the bigness of it all, can approximate his distance from the center of things by a glance at the color of the nearest flower or building.

Two details about the care with which this color idea is being executed are worth mention. One is that the botanical experts are conducting a series of tests in their special flower beds to determine the exact hues of certain species that have seldom been grown before in these parts. They are also noting the exact tones of fading flowers. The Fair will be as continuously in bloom as is possible: the hundreds of beds containing approximately 2,000,000

plants will be replanted three times during the summer (if the Fair lasts no longer). But fading plants will have to wither in hues suitable to the basic color scheme or out they come. The other detail concerns the colors in the murals and on the exteriors of buildings. Architects have never used outdoor colors to such an extent before. And because many of the pigments had to be especially developed for the Fair's use, they are bound to fade during its existence. So in a special paint-testing enclosure these colors have been exposed to the winds and heat and rain of Flushing Meadows for nearly two years. The color experts, even though they can't prevent the fading, have charted its rate. The-colors now being applied are too bright, but by design. In August, 1939, when the Fair is half over, they will have faded to precisely the intensity the artists prescribed.

UNIT SIZES IN LOW COST HOUSING

By Richard L. Reiss

AN ENGLISH AUTHORITY ON HOUSING AND TOWN PLANNING

From an address before the National Public Housing Conference, New York, February 23, 1939

In the course of three housing tours I have now visited all of the fifteen larger cities in the U.S., fifteen of the next thirty, and a number of smaller cities. I have conferred with Mayors and City Councils, local housing authorities, health commissioners, and the architects of projects. I have found considerable progress since my last visit, and much greater interest. For the most part the layout and planning of the projects are very good. There are, however, certain criticisms and suggestions that I would like to make.

The object of the legislation and of the subsidies for low rent housing is to house families with low income and to eliminate slums. In planning and administering the projects three objects should always be had in mind:

1) While Congress has limited the cost per dwelling unit and per room, the administration should also have in mind limiting the cost per person housed. In other words, for a given sum of money the planning should be such as to accommodate the largest number of people in decency.

2) The main concentration should be upon housing families with children who are now living in slums.

3) Relative scale of rents as between units with three, two and one bedroom should be such that families with children are able to take units with adequate bedrooms without having to pay a rent which will leave them with insufficient money for necessary food and clothing.

In order to achieve these three objects careful consideration should be given to

the question of how many dwelling units should be 3-room, 4-room and 5-room. The average number of rooms in a unit should be as high as possible for two reasons: a) the cost per room is less, as additional bedrooms are much less costly than kitchens, living rooms and bathrooms; b) each extra bedroom enables considerably more people to be housed; thus, a unit with a bedroom, living room and kitchen-dining room counts as a 31/2-room unit, but it can only accommodate two persons satisfactorily or three if one is to sleep in the living room. On the other hand, if there are two additional bedrooms, six persons can be comfortably accommodated. The two extra bedrooms will add only about 25 per cent to the cost, but enable at least twice as many people to be accommodated. Thus, projects should consist mainly of units with 4 to 51/2 rooms. (The dinette, including the kitchen, counts as a half.)

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The second result which follows is that the rent of the 5-room unit should be very slightly more than that of the 4 or 3. Thus, supposing it is necessary to collect an average of \$4 per room for rent including utilities, the 3-room unit should be let at \$15.50 a month, the 4-room at \$16 and the 5-room at \$16.50.

In this way it is made possible to reduce the difficulty which always presents itself in low rent housing, that the family with three or four children, if their income is the same as that of a family with no children or with one, can really afford less

rather than more in rent, as there are more mouths to feed and bodies to clothe. On the other hand, the family with three or more children requires a 5-room unit while the other family can be comfortably housed in a 3-room unit.

In the projects which I have seen in course of preparation the distribution of units has been 30 per cent with 31/2 rooms, 50 per cent with $4\frac{1}{2}$ rooms and 20 per cent with 51/2 rooms. Many more people could be accommodated at the same cost if the distribution were 10 per cent, 3 rooms; 30 per cent, 4; 40 per cent, 41/2; and 20 per cent, $5\frac{1}{2}$. With only a very slight increase in cost, a larger number of 51/2room units could be included. On the question of rent in many of the PWA projects, there is too great a difference between the rents of the 3- and 5-room units, thus making it difficult for the family with three children to take the larger units.

There is one further point, which requires careful consideration in planning, namely, the relative sizes of the rooms. For example: if a kitchen is to be regarded as only a workroom and not used for dining it is sufficient for it to have 60-65 sq. ft. If, on the other hand, it is to be

THEY SAY-

"I do not know what the buildings will be made of in the next generation; it may be that they will be built of aluminum or of basic slag. But I suspect that the new material will have to overcome a certain amount of prejudice before it is cordially accepted."—SIDNEY WEBB in 1918.

"The most commonplace utensils of our household service have now a beauty of form and color; the day of insensibility and unconsciousness of art by the people is over."—SEVERN TEACKLE WALLIS. used as a meal room as well it ought to be 120 sq. ft. To arrange a kitchen which contains, say, 95 sq. ft. is uneconomic, because it is larger than necessary for cooking operations and insufficient to be also a meal room.

To take another example, a bedroom of 90 sq. ft. is adequate to sleep two children. A bedroom of 65 sq. ft. is adequate for one person. Therefore, a bedroom of 80 or 85 sq. ft. is uneconomic.

In a 3-bedroom unit the dimensions of the second and third bedroom should either be both 90 sq. ft. or slightly more so as to house two sons and two daughters, or alternatively 120 and 65 sq. ft. so as to house three children of one sex and one of the other. In some of the plans I have seen of 3-bedroom units the second bedroom is about 100 and the third 80. With a slight modification and without increasing the cost, both rooms can be made 90, thereby potentially housing one extra person.

As regards the living room, in the 3room unit 160 sq. ft. is adequate because the family is small. In the 5- or $5\frac{1}{2}$ -room unit the combined dimensions of the living room and kitchen should be at least 220 sq. ft. because the family is larger.

"An engineer is a man who has never forgotten how to use a slide-rule; an architect is a man who has never learnt."— W. H. ANSELL, F.R.I.B.A.

"The production of homes was the prime function of the architect in the earliest days of history and will be, in my belief, the prime function of the architect in the world of tomorrow."—NATHAN STRAUS.

"Architecture gives everybody away. It will give us away to our remote descendants, if any of it is left after the next war."—JOHN GLOAG, HON. A.R.I.B.A.

LOUIS A. SIMON

By Aymar Embury II

Condensed from The Federal Architect, January, 1939

Most architects think of the Office of the Supervising Architect as a kind of combination assembly line and slot machine, into one end of which Congress pours money to be transmuted by internal and invisible processes into designs for buildings, which come out at the other end neatly wrapped in cellophane and untouched by human hands. Most of these architects will agree that this machinemade product is an excellent commercial article, but will also assert that the product lacks imagination, warmth, good taste, and above everything else, the human touch; although perhaps they have never even looked at one of the products, and are talking about what they think must be the case rather than what they know from their own observation.

All this just isn't true. The Office of the Supervising Architect is composed of just such a group of enthusiastic, earnest, excited, capable and hard-working architects as may be found in any other large office, and like any other large office, the quality of its product will depend, and has always depended, upon the quality of the man who heads it, regardless of how much of his time is absorbed in administrative duties and of how little he is able to spend at the drafting table.

It is frequently said of bureaus that they tend to produce "bureaucrats," meaning men who are so absorbed in the petty routine of the job that all creative work tends to become repetitive, and that the rules and regulations assume an entirely false value. Very likely this is true in the cases of small-minded men, but that a really big man can grow within a bureau quite as well as he can in the free soil outside, seems completely proven by Louis Simon. He is no longer young; born in 1867, he was graduated from the Massachusetts Institute of Technology in 1891, entered the Supervising Architect's Office in 1896, and has there continued for 43 years. It is impossible to believe that four or five years' training in independent offices could keep a man fresh for 43 years of work in a bureau; it is the work of the bureau itself which keeps him fresh, if he has initial spark and the courage to persist.

*

Louis Simon has been head of the architectural division of the bureau since 1905, and the fact that the head of any organization is a controlling influence on its design, may nowhere be better proved than by the work of the Office of the Supervising Architect during this period of 43 years. It has varied with the opinions of the chief, and obviously the head of the architectural division has felt it his plain duty to do what his superiors wanted in the best way that he could do it.

When he himself became the sole responsible official, the character of the work changed very materially, became freer, bolder, with a sort of wisely conservative experimental quality (this may be a paradox, but it is also a fact); and under his administration, the Government architecture has ceased to follow, and has taken its rightful place of leadership in the forward movement of this greatest of the American arts.

This is not only because Louis Simon is a fine architect, both as a designer and as an appreciator of the designs of others, but because he is tactful without being yielding, and firm without rudeness. His exquisite courtesy, both to the men who work under him and to his superior officers in the Government-and to the frequent visitors from "The Hill"- does not mask the fact that when he says "no" he means it, and he is able to make a pretty uncompromising decision seem palatable. He works quickly without being abrupt, and there is very little lost motion in his way of working, nor does his design suffer from the rapidity with which he examines a problem, analyzes its elements and makes his decisions. He has a real sense of scale, perhaps the most important of all qualities in architectural design, and an excellent feeling for values; he knows when it is worth while to spend money for effect, and when to spend for utility, at least so far as the narrow limits of the appropriations will permit.

An excellent administrator, a fine gentleman, an admirable architect, when he retires, the U. S. loses a great public servant.

THE DIARY

Thursday, February 16 .- I have an idea that the interior decorators are still looking backward. The last decade certainly has wrought a radical change in the viewpoint of the architect. Whether traditionalist or modernist, he is annoyed by any suggestion that his work is not functional. Apparently the decorator has not reached this point. The other day, for instance, I heard a client pleading for window-length curtains in her living room. Her decorator was horrified at the suggestion of a departure from curtains that swept to the floor-and swept the floor. Another little foible that these decorators seem to cherish is wallpaper in the bathroom, with or without varnish. Out in Chicago a few weeks ago I heard one of them declare emphatically that the thing to do, this year, is to have floors carpeted all the way to the baseboard. That little trick may be functional enough if you have a good easy way of cleaning carpets, and if you have first put down a cheap floor. Has the interior decorator discovered the facts of life in 1939?

Saturday, February 18.—Dr. Leicester B. Holland seems likely to be needing an archives building of his own one of these days. After five years of work on the Historic American Buildings Survey, there is now stacked on the shelves of the Library of Congress 17,371 measured drawings and 18,794 photographs. It is rather a pity, when you come to think of it, that here is this magnificent record of early American architecture which the profession twenty years ago would have fought to see and copy, and now that it is available, the profession's thoughts no longer turn so avidly to the past.

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Tuesday, February 21.—Tonight, under the direction of that great impressario, Wesley S. Bessell, a little group with stage aspirations played before the New York Chapter, developing something of the current attitude toward government's participation in architectural practice— "Who Killed Cock Robin, or The Admiral's Revenge." The Chapter members and their ladies were generous in overlooking many shortcomings of the production, shortcomings which were inevitable from the fact that the cast had not been assembled as a whole until last night at the dress rehearsal. Thursday, February 23.—Guy Gaylor Clark, art director of Cooper Union, says that both easel painting and sculpture are losing their attraction for the student. Answers to a questionnaire circulated among first, second and third year students in Cooper Union's art schools, show that only 15 per cent would elect painting as a major subject next year. Thirty-four per cent, on the other hand, want to go in for advertising design, while slightly over 1 per cent elects sculpture. Architecture was the choice of 10 per cent; but for that fact we could infer that the money beckons.

Saturday, February 25.—Alfred Geiffert has been after me for two weeks to go see Mrs. Lu Duble's sculpture now on exhibition here, for which ministrations I am thankful. It captures—as fully as can be surmised by one who has never seen it the spirit of the Haitian Negroes in their primitive sports and religious rites. The sculptor found plenty to say and said it in a way that carries conviction. Something of a relief after the smooth abstractions to which so much sculpture seems to have risen—or descended.

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Monday, February 27.-Pedac-Permanent Exhibition of Decorative Arts and Crafts-held a housewarming tonight in its new quarters. Having outgrown the space it has occupied for several years on the tenth floor of the RCA Building in Rockefeller Center, it has expanded into larger quarters in the International Building, where through the use of two floor levels and an interior stairway it has simulated the effect of a two-story dwelling. There have been numerous model interiors built in New York, but Pedac's latest effort outdoes them all. It seems likely that before long Pedac's showings will be as much a part of the life of New York's metropolitan area as is the Architects' Samples Corporation in a closely related field.

Incidental exhibitions in the new quarters are excellent photographs of Antonin Raymond's work in Japan and India, and *House Beautiful's* current winners of the annual small house competition.

Tuesday, February 28.—Harrie Lindeberg was entertaining Lennart E. Hellstedt and

Curt Palm today at lunch, both men representing Swedish interests in America. Hellstedt is an engineer sent over here to supervise the erection of the Swedish Pavilion at the World's Fair. He is to speak some time this month at the Engineers' Club on the subject of labor in Sweden's building industry. Our nation's eyes are on Sweden these days in many of her activities, and there is apparently a lot for us to learn from her labor experiences. Mr. Hellstedt sums up his country's attitude and working philosophy in a very few words. "What we develop is highly skilled labor, with the incentive and freedom to use that skill to the full." In other words, union labor in Sweden does not clamp down on its men an average level of production.

Strong Sc! Saylor

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Wednesday, March 1.-Lorimer Rich, John Hatton and I were looking over the successful drawings submitted in the National Theater competition. Successful competition drawings today differ from successful competitions drawings of ten years ago as widely as one language differs from another. In avoiding the architectural traits of the Renaissance and its children, many changes have resulted, of which possibly two stand out with emphasis. First, plans are diagrammatic rather than structural; walls are indicated as a thin ruling-pen line unaided by piers, columns, pilasters or other evidences of concentrated support. There is no furring. The question of where heating and ventilating ducts might find their places in these walls is ignored. Closets, storage space, and other minor elements of this kind, formerly provided for in the thickness of the walls and their furring, are apparently no longer necessary-or at least their disposition is left for further study. Axial planning is not only subordinated to the vanishing point; apparently it is studiously avoided. The second major point of difference between present day competition drawings and their predecessors has to do with the indication of material. Hitherto one could draw a fairly accurate inference as to the materials of which the building was to be constructed. Today's drawings give no such clue-the walls might be of brick, stucco, canvas, stone or glass, but the designer is careful not to say which.

Thursday, March 2 .- Forbes Watson was telling us at a League luncheon today of his belief that mural painting in America is entering upon a new era. He had just been piloting Somerset Maugham on a tour of inspection, looking over what has been done in our post offices, court houses, and other public buildings. Maugham's final comment was that America is laving the foundation for a great period of mural painting. Watson's own appraisal of what has been done is hidden behind his statement that time alone can tell us what will live. His own test of merit is, "Does it portray truth?" which leaves me no better informed than I was before, for what is truth in a mural? There seems to be no doubt, however, as Forbes Watson pointed out, that compared with yesterday when all murals were placed where they would be seen by the few who cared to make the effort, this recent experiment puts them where they will be seen by the many, willy-nilly. Whether it be good, bad, or merely mediocre, the mural in America has a new and greatly enlarged audience.

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Friday, March 3.—Roamed over the 1,200 acres of the New York World's Fair. It is said to be 90 per cent completed, and will be a finished product in 60 days. The achievement of miracles has come to be almost a commonplace with those who are building the Fair. Nevertheless, it would seem to call for a supermiracle to have the Fair ready for the million visitors expected on opening day, April 30. The foundation walls of the art building are just going in —Fair officials were rather late in reversing the original policy of leaving to the New York museums the privilege of showing art to the visitors.

Ely Kahn tells me that a day or so ago the Fair was debating the advisability of adding some 60 additional buildings on the site, as if all that has to be done is to rub Aladdin's lamp to achieve them.

Members of the New York Chapter, A.I.A., were invited to a joint meeting with the American Concrete Institute tonight. Three or four appeared. The others missed a notable symposium on the subject of concrete in architecture. Dean Arnaud of Columbia University and Ely Jacques Kahn read papers outlining the practitioner's attitude toward the use of concrete, and a half dozen experts testified as to the progress being made in research laboratory and in the field. John J. Earley, the Institute's retiring president, developed convincingly his theory that an esthetic for concrete lies in the use of carefully designed, precast, texture slabs which are used as forms and made integral with a monolithic wall.

Monday, March 6.—The Smithsonian competition has lighted two bonfires in the profession, and there is some likelihood, at least, that they will do considerable damage. On the one hand there are those who believe that the provision for partial service of the architect is but another significant milestone on the profession's way

to oblivion. On the other hand, there are many, particularly among the younger men in the profession, who see in this provision of partial service the only means by which they, unfortified by established office organizations, could hope to carry out a large architectural undertaking. Word comes that the officers of one or two A.I.A. chapters have taken a stand urging non-participation on the part of all Institute members. There is a strong likelihood that officers of the New York Chapter may take the same stand. There are in this situation the makings of a serious split in the Institute. It will require some broadminded thinking on both sides, and plenty of open-meeting discussion, to avoid it.

Tuesday, March 7.-Over to the Beaux-Arts Institute of Design to help judge a Class B problem-A Council Chamberthe program for which had been written by Walter Gropius. Two juries worked from opposite ends of a long line of entries, each reviewing the decisions of the other after they met in the middle. The first half of the task occupied us until an adjournment for dinner. Each jury, in reviewing the work of the other could approve or raise a rating but not lower it. Whether jurors demand less after they have dined, or whether continued failure to discover great merit induces greater tolerance, is not clear. Each jury in its review seemed to feel that the other had been unduly hard on the boys and raised ratings all along the line.

I should have enjoyed hearing Professor Gropius if he had been there to see what came out of his program. In the main it seemed to have induced a contest to determine which architectural student could render the most impressive mural back of the dais.

Thursday, March 9.—"Information Please" seems to be attaining the stature of a national indoor sport. The interior decorators arranged a meeting tonight at The League in which two teams of four participated. One was heavily weighted by the decorators, the other by Architectural League members representing the other arts. Not within my recollection has there been such a packed house at The League for dinner and the evening—a gathering in which I am sorry to say the architects formed possibly the smallest representation.

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Friday, March 10.—Fletcher Collins is worried over the fact that we are today building not for eternity, as men in the past usually tried to do, but possibly for a period that may end before our loans for the purpose will have been repaid. Guarding against the latter possibility, the lending institutions of today keep a far closer watch on the builder who is using their funds; it seems rather unlikely that the structure will fall down before it is paid for. Nevertheless, as contrasted with the traditional idea that one builds for eternity, or an approximation of it, there looms up the growing importance of obsolescence. Our buildings are less likely to fall down from structural decrepitude than they are to be torn down because they have ceased to satisfy the needs of a rapidly changing life. Look back even twenty years at a house that was then thought to be the last word in equipment and convenience. In what degree does it measure up to present standards of both?

Monday, March 13.-Edmund R. Purves, over from Philadelphia the other day for the Beaux-Arts judgment, reported Eastern Pennsylvania offices rather discouraged. Great expectations had been aroused over the possibility that drawing boards would burgeon with public works, particularly with an ambitious school building program. Now that public money is not likely to flow with any such beneficence, Purves thinks the architects will turn back to two friends, once wooed but lately neglected-residential and commercial work. While the architect has been dallying elsewhere, the operative builder has stepped in and made considerable progress in the alienation of residential work's affections.

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Tuesday, March 14 .- Those who are directing the activities of Rockefeller Center had the happy idea of planting 50 ft. elms along the Fifth Avenue frontage, bringing back to a street long since denuded, a welcome bit of color and shade. As another instance of the fact that you can't please everybody, a letter of protest appears in The New York Times -"The glory of Fifth Avenue is the architecture of its buildings and, to some extent, the displays in the windows. Great elms on both sides of Fifth Avenue would make any effective view of the buildings impossible from any point of view. No longer could a bus rider get a breath-taking view of this magnificent street." Even the architects whose designs are on parade would, I think agree that most of them would be none the worse for a little shading. Eric Gugler, I believe, has long held the view that most architecture is neither good nor bad in itself to the man in the street, but pleases or displeases him in direct proportion to the quantity of planting that obscures it.

Wednesday, March 15.-The incipient war within the profession over certain provisions of the Smithsonian competition, seems to have been halted hereabouts by a truce. New York Chapter officials, I hear, have reconsidered an early resolution of condemnation, and have substituted one expressing satisfaction over the progress that is being made in the conduct of competitions for public works, with the hope that our progressive experience in these matters will lead to even more satisfactory arrangements by which the architect will contribute the full measure of his skill to the achievement of better public architecture in America.

A SERMON IN STUCCO

At St. Austin's

• Stucco helps to beautify St. Austin's Church and Parish House in Minneapolis. Atlas White was used in the stucco finish coat. Two under coats were portland cement stucco over expanded metal lath attached to frame construction. Architects-Bard and Vanderbilt, Minneapolis. Contractor-Herman Jeub.

A CHURCH can be modern in appearance and still retain its churchly beauty and dignity. That is the sermon preached by the picture of St. Austin's Church and Parish House in Minneapolis.

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FORUM OF EVENTS



Experts Deems Taylor, John Gregory, Harvey Corbett and Jonas Lie; Edwin L. Howard asking questions handed up by Ralph Walker.

LECTURES on archaeology and debates on housing having failed to excite, "Information Please"—engineered chiefly by Miss Nancy McClelland brought to The Architectural League of New York, March 14, a drove of sculptors, paintcrs, craftsmen, landscapers, with a light sprinkling of architects—a gathering to dismay the chef and bulge the walls. One team of four repre-

2) "What quotation from Dryden applies to Stephen Francis Voorhees in his present position?"

Information Please!

(Continued from page 20)

Answers will be found on page 60



Miss Nancy McClelland (left) official scorer. Continuing, l. to r., Oscar O. Whidman, William Kimbel, Mrs. Kimbel, Mrs. Ralph Walker, Melville Price, Mrs. Price. Leonard Brothers answering, Mrs. Gertrude Gheen Robinson and Henry Bultitude. 1) "Define trylon, pylon, python, and nylon."

sented the interior decorators; another was recruited from other League members, including an architect, a sculptor, a painter and Deems Taylor who claims to have been a budding architect before he became a composer. Samples of the questions asked are sprinkled over this page. When the Experts remained mute the audience always answered. Score, fifty-fifty.

3) "Is a chauffeuse a woman car driver, a type of chair, a maid who tends the furnace, or a French show girl?"



Ralph Walker, Mrs. Juliana Force, Jonas Lie, Miss Nancy Mc-Clelland, Edwin L. Howard and Mrs. Walker, at the preliminary dinner. 4) "What happens in an architectural office to a stenographer wearing cotton stockings?"



Mrs. Arthur Crisp, Wheeler Williams, Mrs. Williams, and Deems Taylor. 5) "What architectural term, by the transposition of two letters, becomes a vegetable?"—one of numerous questions that stumped the Experts.

(Forum of Events continued on page 50)





"DADDY'S your client now—but I'm the 'future needs' you talk about. I'm going to want a telephone of my own some day so don't forget me!"

Planning for tomorrow's telephones as well as today's is now more important than ever. For wall insulation, fire-stops, duct work and concrete construction raise effective barriers to "fishing" wires. But telephone conduit, built in during construction, makes additional wiring easy and promises that telephones may be added without exposed wiring on moldings or baseboards, without piercing walls or floors.

Clients will appreciate your forethought in specifying telephone conduit. One or two lengths of small pipe are usually sufficient for the average house—and the cost is very low. Your telephone company's "Architects' Service" will help you plan efficient and economical conduit layouts

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BOOKS



PILLAR TO POST, by Osbert Lancaster. John Murray, London. 80 pp., illustrated. 7 x 9¹/₂. 5s.

AUTHOR'S NOTE: All the architecture in this book is completely imaginary, and no reference is intended to any actual building living or dead.

With this gesture of deference to the libel laws which have so successfully preserved England's least competent architects from censure, Osbert Lancaster opens his panoramic history of architecture. An example of perfect fusion of text and illustrations, this work of 80 pages is notable for its saving of wear and tear on the reader, not to mention paper and printer's ink.

Architecture, says Mr. Lancaster, is important. "We all need shelter, and its provision, save in the case of boy scouts and troglodytes, is the business of the architect." Probably no writer-illustrator has ever summed up the last five thousand years of architects' business with more trenchant brevity.

A certain lack of reverence, particularly in the discussions of antique building, may pain some readers, but one suspects that the comments are not entirely without basis. Egyptian architecture, for instance, "has much to commend it—size, dignity and durability—but nevertheless it must be admitted that it is a triffe monotonous." On the grandeur that was Rome: "Augustus, we are told, found the city brick and left it marble, but several of the recent changes in London do not encourage one to believe that such a metamorphosis is necessarily a change for the better." An observation resulting from meditation on Stonehenge: "Incidentally, it is interesting to note that which has never subsequently wavered, in the doctrine that the best architecture is that which involved the most trouble." Good as his summaries of past achievement may be, it is in the sections on building of the past hundred years that the author really goes to town. Here the student will find Pseudish (generally known in America as Spanish Colonial), Banker's Georgian, Metro-Goldwyn Renaissance, Stockbroker's Tudor, Wimbledon Transitional and other styles commonly ignored by the historians. Not only is "Pillar to Post, or the Pocket-Lamp of Architecture" a bargain (price around \$1.25), but its acquisition will enable the architect to throw out his bulky historical library, leaving space for a bar and ping-pong table with which to pass the time until the next Building Boom.

OUTLINES OF THE HISTORY OF ARCHITECTURE, Part IV, by Rexford Newcomb. John Wiley. 318 pp. 10¹/₂ x 8¹/₄ in. \$4.00.

Last of a series of four books prepared for classroom use, this volume covers architecture in the United States and foreign countries from the Colonial period to the present day. It contains a series of summaries of characteristics of architecture in the various periods, lists of the most important buildings and architects and comprehensive bibliographies. Excellent for classroom or home study.

WHAT ENGINEERS DO, by Walter D. Binger. W. W. Norton, New York. $304 \text{ pp. } 81_4' \text{ x } 5\frac{1}{2}$ in. illustrated. \$2.75.

A revised edition of an earlier work, this book is intended for members of the great confraternity of excavation watchers. It offers the layman and elementary engineering student a lucid and—within the boundaries of a popular style—comprehensive explanation of the theory and practice of civil engineering from the Pyramids to the Theme Building. Chapters, amply illustrated, cover materials, surveying, bridge- and road-building, structural design and sanitation.

GOVERNMENT PUBLICATIONS

Catalogue of the HISTORIC AMERICAN BUILDINGS SURVEY (50 cents), covering work up to the first of January. Accomplishments to date: 2,200 structures measured and drawn, photographs of 3,800 buildings. Even in its present incomplete state, this project represents the best graphic record of our early building. Blueprints, photostats and photographs are available and may be ordered direct from the catalogue. TRAINING FOR THE PAINTING AND DECORATING TRADE (35 cents). Published by the Department of the Interior. Covers the present organization of the trade, recommendations on training of apprentices, standard practice, equipment, safety precautions, and has a bibliography. PLANNING PROFITABLE NEIGHBOR-HOODS (20 cents), Technical Bulletin No. 7 of the FHA. Well-illustrated study of land subdivision. A valuable document whose recommendations, if followed, would lead to a definite improvement in residential neighborhoods. The above publications may be obtained from the U.S. Government Printing Office, Washington, D. C. FOREIGN HOUSING STUDIES. A series of technical reports prepared by the Works Progress Administration of New York City. Publications to date cover housing agencies in France, U.S.S.R., Denmark, Spain, Chile, Argentine and Italy. There is also a report on the Mopin system of housing construction. Other publications on structural technique and general housing practice are now in preparation. Copies may be obtained from Division of Foreign Housing Studies, WPA, New York City.

(Continued on page 70)

Here's where the best paint gets its start

I^{'M} a miner not a painter. The metal I mine out of the earth is lead.

And mister that lead is what gives life and gumption to paint.

You think I'm prejudiced? Ask any painter who's been at it long enough to see how his work stands weather. He'll tell you the same.

You see, *lead* is a metal that just about lasts forever. And the basis of white lead *is* lead.

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Pick a real painter as well as good paint if you want a real paint job. For the painter who knows his craft knows dozens of things which go to make up fine work, such as bringing the paint on a window sash up till it covers the hair line joint between putty and glass, to take just one simple example.





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At left: One of the attractive homes in the J. C. Nichols Country Club District—Square D MultibreakeR equipped.

Below: The Square D MultibreakeR is neat and compact. Notice this installation in the serving pantry of the home shown above.



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the first of

4 COMPETITIONS

incorporating the use of a versatile

building material

INSULUX GLASS BLOCK

\$15,000 IN PRIZES

CONDUCTED BY THE ARCHITECTURAL FORUM

TWENTIETH-CENTURY invention has put into the hands of America's designers a new material of vast potentialities. Even in its infancy its fields of usefulness have gained wide recognition among architects, while the public has welcomed with enthusiasm this newcomer among the elements with which man builds. Nevertheless it is a fact, well documented by historic examples, that any building material reaches the zenith of successful use only in the hands of those who have striven hard to understand both its capabilities and its limitations—those who have used it not only freely but also sympathetically. The stone masonry of France, the mosaic tile of Persia, the brickwork of Holland—these are majestic peaks in the history of the building crafts. America has lifted more than one material to these conspicuous heights; unquestionably, glass block "has what it takes" if our designing skill keeps pace with its phenomenal growth in use. Owens-Illinois Glass Company, makers of Insulux Glass Block, believes that it has a responsibility in connection with the development of this new material and its proper techniques of use. That responsibility must see to it that intelligence and ingenuity are stimulated in the use of this material. This series of four competitions, each with its cash prizes totaling \$2,500, capped by final awards in the amount of \$5,000, is intended to help develop the *proper* use of glass block.

Competitors are encouraged to continuous participation in this series through an offer of **GRAND PRIZES.** These do not call for a final competitive effort but will be awarded automatically on the basis of points scored in the four quarterly competitions.

Competition I will be judged in Chicago; the others will be judged successively in San Francisco, Cleveland, and New York, the Jurors in each case being selected from the areas about these centers.

THE PRIZES: For each of the four competitions there will be awarded eight cash prizes as follows: First Prize, \$1,000; Second Prize, \$750; Third Prize, \$250; Fourth Prize,

COMPETITION No. 1

Six weeks lie ahead of us, as this issue appears, before the illustration boards will be bundled off for the Jury's awards. Plenty of time for you to set forth *your* solution of the most frequent problem set before the architect—the small house for America of today. Provisions of the Program (mailed immediately upon request) allow wide latitude for the expression of your individual powers of design and ingenuity. One 20" x 30" drawing is all that is required. The Jury: George W. Carr, C. Herrick Hammond, George Fred Keck, William Pereira, John W. Root, Paul Schweikher and Alfred Shaw.

COMPETITIONS Nos. 2, 3 and 4

Subjects for these have received extended study. The problems set up are those of everyday practice—not just three more academic clichés. No. 2, the program for which will be published in full in THE ARCHITECTURAL FORUM for May, deals with the remodeling of an obsolete block on Main Street—not the whole of it, but merely two facade units, one-story and two-story, and the inside of a second-floor beauty parlor.

Competition No. 3—a Dairy, and Competition No. 4—a Newspaper Plant, may sound more difficult—involving technical knowledge that is not immediately at hand. When these programs are published it will be found that the necessary research has all been done; its results, ready for use, are handed to the competitor on a salver. Space requirements for each element, with its proper relationship to the whole, are graphically given. This series, it need hardly be \$100; Fifth Prize, \$100; Sixth Prize, \$100; Seventh Prize, \$100; and Eighth Prize, \$100.

Immediately after the awards have been made for the Fourth Competition, Grand Prizes will be awarded on a scored point system and in the following amounts: First Grand Prize, \$1,500; Second Grand Prize, \$1,250; Third Grand Prize, \$1,000; Fourth Grand Prize, \$750; and Fifth Grand Prize, \$500. In the event of ties in the scores for Grand Prizes, duplicate prizes will be awarded. Checks will be mailed to the Grand Prize winners by THE ARCHITECTURAL FORUM immediately after the scores have been computed.

REGISTRATION to enter Competition No. 1 is all that is needed for continuous participation. It ensures your receiving the technical information needed, and title lettering. It does not obligate you to submit drawings.

Write Henry H. Saylor, A.I.A., Professional Adviser, 9 Rockefeller Plaza, New York, N. Y., indicating your entry as architect, architectural designer, or architectural draftsman.

SUBJECT: A SMALL HOUSE **\$2,500 in prizes** Closes Midnight May 22, 1939

This competition has been approved as a Secondary Competition by the Special Committee for Secondary Competitions for the territory of the New York Chapter, American Institute of Architects. Full participation is permitted to all Institute members.

emphasized, is designed to bring out new and better uses for Insulux Glass Block. This major objective will not be clouded by the introduction of extraneous difficulties. In order that the problems set by these Competitions shall be realistic, geared to everyday practice, they must inevitably deal with some of the technicalities that are more and more closely surrounding our life of today. Details of those technicalities and their interrelationships, however, are not permitted to distract the designer's attention from the specific task set for him. As a matter of fact, it will be surprising if the competitor, after a brief study of the predigested research handed to him, does not regard himself as a qualified expert on dairies and newspaper plants.

This series is open to all architects, architectural designers, and architectural draftsmen, except employees of Owens-Illinois Glass Company and THE ARCHITECTURAL FORUM. Canadian participation is welcomed.

OWENS-ILLINOIS GLASS COMPANY

LETTERS

Main Street

Forum:

... But no American town has traffic passing to the *left*, (ARCH. FORUM, Feb., '39, p. 73).

L. WILLIAM FURY

Detroit, Mich.



Faced with the difficult problem of deciding whether to bind the issue on the right or to show traffic on the left, it was decided that the latter would cause the least confusion. Douglas-Nesmith's excellent picture of 5th Ave. and 42d St. (see cut) was reversed to fit the layout.—ED.

Forum:

... I want to compliment you on your very comprehensive article, Main Street, U.S.A., in the February ARCHITECTURAL FORUM, and to express the hope that it is only the first of a series.

Such a mass of data has been collected in this research that its careful analysis could bring out considerable additional interesting information for the merchant, real estate broker, valuator and appraiser, mortgage lender and architect.

Your future articles could discuss the change in rentals that has taken place in the past ten years on Main Street; whether the reduction in rental values from the peak of the 1920's is 30, 40 or 50 per cent; and whether it is increasingly difficult to persuade tenants to take long term, "net" leases. In this connection there could also be an article pertaining to percentage leases and (a) whether the percentage lease has made the placing of mortgages more difficult; (b) whether tenants have been paying much over their minimum rents, and if so, what lines of business have been showing the greatest excess rents—variety stores, shoe chains, millinery shops, motion picture theaters, etc.; and (c) whether the percentage lease is more popular with landlords or with tenants, taking into consideration possible inflation. As many long term leases made in the boom era are now expiring, I am certain that both landlords and prospective tenants would be vitally concerned in the analysis indicated by your study in this regard. . . .

Finally it would be of great interest to your readers to learn whether the average Main Street has a 50 cent side and a dollar side, and whether west, east, north or south streets command higher rentals and why.

In your article MAIN STREET, U.S.A., you have undertaken one of the most interesting studies I have read in THE ARCHITECTURAL FORUM in the many years I have been a subscriber to it, and you deserve much encouragement and commendation to insure a continuation of articles on Main Street in its various ramifications.

J. Solis-Cohen, Jr.

Philadelphia, Pa.

Plus (Continued)

Forum:

. . . May I congratulate you on the idea of *Plus*, and at the same time indulge myself in a few not too good-natured criticisms.

Specifically, on pp. 22-23, February issue, Neutra's stimulating essay offends by its presentation aslant, surely not a functional approach to comfort of the eye? And why, please, the god-awful formalized doodlings that confuse the illustrations and plans on the opposite page? I would as soon see the log of a mail plane flight done on parchment in the style of an illuminated missal.

Calder's mobiles are most interesting and the water ballet comes into the realm of art over childish play with garden hose, but it seems to me there is more than a touch of pose in dignifying the Aesop drawing and the wire sculpture by publication in the same magazine. Primitivistic rather than primative, elementary rather than elemental, more fit for drawing room relaxation than the meaty stimulus I have come to expect from THE FORUM.

I am as much irritated as entertained by M. Fernand Leger's pontifications on truth—as is usually the case with the "enfant terrible," his truths are but half or quarter truths, having a momentary distorted validity bearing no relativity to that summation or distillation of fact within which lurks the real truth.

I should not have expected M. Leger of being so careless of the implications of Einstein (truth is color at its fullest!) nor so obtuse as to imply that that which is decorative is, in painting, a "picture of repose" different entirely from a "beautiful picture." To discuss but one example: the ceiling of the Sistine Chapel is most certainly "decorative" in the sense of fusing and harmonizing with all about it, and it is equally a "major force, the center of action in the room" to quote M. Leger's phrases, and yet it has that balance of focus that becomes architectural repose. Taken in conjunction with the illustrations, it all seems too "arty," too limited in its defiance, lacking entirely that profounder vitality and truth gained by submission in idea to the discipline of function and material triumph in execution, that has marked the greatest work in the arts from the Egyptian to the present day.

Such definitions as M. Leger's are in art the counterpart of such catchy but unsound blasts as emanate in politics from Mr. Ickes. I suspect the bases of both of being the same—pampered, proud, inflexible, stomachs allergic to the discipline of complete digestion.

CHARLES VOORHIES

San Francisco, Calif.

Forum:

May I offer my congratulations on the issues of PLUS that have come to me. I sincerely trust this valid effort will continue and bear fruit in a field where appropriate stimulus is needed, and has been lacking....

New York, N. Y.

BARRY BYRNE

Forum:

Non-PLUS-ed! Indeed I am—by the letters written protesting the very existence of PLUS. It is a sad commentary on the profession to have so many of its members still wallowing in the murky ideology of nineteenth century architecture. What are their objections to PLUS? "We can't understand it!" "It's undemocratic!" "All its followers are foreigners!" "It's unAmerican!"

The eminent members of the PLUS Group write about architecture and its technical and artistic affiliates. Must they reduce their vocabulary to 3,000 nontechnical words so that certain backward members of the profession may understand?

Their amazing objections to PLUS show

(Continued on page 66)

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Hects, Humidifies, Purifies, Circulates Air Here's true winter air conditioning at the cost of automatic heating alone! Small models for the 5- and 6-room house available at low prices. Complete *summer* air conditioning equipment may be added to the Conditionair now or later, whenever convenient to you or your client.

A Boiler Like None You've Ever Seen Before— Raises Steam 20-25% Faster!

For Hot Water, Steam or Vapor-Vacuum Systems

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The outstanding feature of this new type of boiler is the exclusive Quik-Action Heat Transmitter, a scientifically constructed chamber of special alloy steel, which is suspended in the center of the fire box. The oil-and-air mixture is confined and burned within the Heat Transmitter, which becomes glowing hot in *seconds*. There is no slowheating refractory material of any kind in the fire box of this revolutionary boiler. Hot, clean, radiant heat is flashed direct from the Heat Transmitter to the *entire* surrounding interior surfaces of the boiler, raising steam 20 to 25 per cent faster. Heats just as quickly in hot water and vaporvacuum systems. Think what this exclusive feature means in terms of fuel savings in cold weather when the burner starts 30 to 50 times every 24 hours!

Learn about the many other effective features of the Delco Quik-Action Automatic Boiler. And, best of all, learn how little it costs to put this wonder heating machine in your new homes. Look in your classified telephone directory under "Oil Burners" or "stokers" for location of your nearest Delco-Frigidaire dealer. Or, mail coupon now.

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L	


Here in the modern, comprehensive line of Brasco Constructions, complete and unified throughout, you have every means at hand to give *life* to your pet store front ideas and designs.

Baskin's, Jolict, Illinois, showing the transformation from the dreary, old-style front below to the modern, brilliant Brasco Store Front of extruded bronze, at the left, Lieberman & Hein, Chicago, Consulting Eng.



Solid Stainless Steel, Aluminum, Bronze, Copper, Extruded Bronze or Extruded Aluminum, in Any Finish.

Permanent Beauty Modern Smart Lines Assured Glass Safety Sound, Proven Engineering **Newest Metals and Finishes Complete and Unified Throughout**

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Brasco offers you the perfect combination of thoroughly up-to-date construction, patented features for lasting strength, permanent beauty and glass safety in both Rolled and Extruded types. You will find included, in harmonious design, such important complementary items as entrance doors and frames, awning hoods and concealed awning boxes, grilles, metal letters, entrance ceilings, flush metal bulkheads and general ornamental work.

BRASCO MFG. CO.

HARVEY (Suburb of Chicago) - ILL.

National Distribution for Your Convenience



Typical Sash, Jamb, Sill and Bar Assembly of Brasco Patented Rolled Construction, showing the trim, fuished, modern appearance and the wide. safe grip on the glass.

BRASCO MFG. CO. Harvey, Illinois Send Details and Samples of Brasco Modern Store Front Construction.

Individual.

Address

Firm

С.



BRIXMENT Mortar Is PLASTIC!

Probably the one most important characteristic any mortar can possess is *plasticity*. Within certain limits, *plasticity* is the greatest single factor not only in the economy of brickwork, but also in its strength (see page 5)*, its neatness (see page 12)* and its resistance to the passage of water (see page 9)*. For twenty-five years, bricklayers all over the United States have said that Brixment makes the most plastic and workable mortar they know. Its working qualities are comparable to straight lime putty. Because of this unusual plasticity, a bag of Brixment will carry three full cubic feet of sand and still make an ideally workable mortar.

But Brixment's plasticity cannot be proved with *words*. Realizing, as you do, the tremendous importance of this characteristic, we earnestly urge you to *try Brixment* on your next job—and *see* the difference for yourself.

* See further details in the Brixment Handbook.

For DRY WALLS KEEPING damp winds out of a wall is an important, mansized job. But Sisalkraft, the tough, waterproof, windproof

sized job. But Sisalkraft, the tough, waterproof, windproof paper will do it with one hand tied behind its back. It'll do it because its long-lasting asphalt is protected—not exposed to oxidation—and its sisal fibre reenforcement assures intact application. Sisalkraft protection is needed over all types of sheathing to seal up construction cracks, joints, and corners. Inside behind the plaster base it does a perfect job of keeping room vapor from entering the walls and causing condensation damage. Sisalkraft outside and inside is the answer to those sound, dry walls you like to give your clients.

CONCRETE CURING

for Better

AS sure as Sisalkraft keeps moisture out of a house —it keeps it *in* concrete, and that's exactly what is needed for strong, beautiful, dustless concrete floors, walks, and drives. Sisalkraft does a perfect curing job—at the same time it protects the surface from dirt, stains, and debris damage. This modern method of curing and protecting with Sisalkraft is an advantage that's becoming more and more popular use it to build better concrete on everything from sidewalks —small-home basement floors—to skyscrapers.

Write today for 12 Don Graf data sheets, AIA files No. 7 (Copper-Armored Sisalkraft) and No. 4-C-4 (concrete curing) showing applications of "Better Building Products".

THE SISALKRAFT CO. 205 W. Wacker Drive, Chicago NEW YORK · SAN FRANCISCO COPPERsurface his ARMORED SISALKRAFT for LOW COST WATERPROOFING

NOW! pure copper protection at a price you can afford to pay. You can use it for spandrel waterproofing, thruwall flashing, moisture proofing foundations, shower stall pans, flashing walls and windows—every place you can find for the concealed use of copper.

Copper-Armored Sisalkraft is lightweight pure electrodeposit copper bonded to tough Sisalkraft. It offers as much protection in concealed uses as heavy copper, at about 1/5 the cost. Lightweight copper must be reenforced to allow practical handling and intact application—that's why the sisal fibre reenforcement is so important. With this perfect, economical combination, you can have all the copper waterproofing you want—or need on every job. Copper-Armored Sisalkraft is available in weights of 1 oz., 2 oz., and 3 oz. of copper per sq. ft. FOR THE UNIVERSAL FUEL IN THE BASEMENTLESS HOUSE . . .

ROW TO PLAN



One important factor that should never be overlooked in planning economical basementless houses is *operating cost*. Most families who buy such houses must watch every penny. They must have low cost houses They must have small payments on those houses. But all that they can save on fixed charges may quickly be eaten up by operating costs. In no way is this more likely than by expenditures for high-priced fuels, particularly in very cold weather.



The low cost, universal fuels, bituminous coal and coke, fill a very definite need in low cost homes. The extra expense of providing storage space for them is a small initial expenditure. The savings from lower fuel costs soon amortize the cost of the additional space. Then the owner enjoys low cost fuel indefinitely.



Planning basementless homes for the modern use of bituminous coal or coke follows the fundamental principle of planning homes for modern, economical heating. The 1939 Basement Plan Book contains several plans and isometric drawings of basementless homes designed for modern bituminous coal heating. A copy of this helpful book will be sent you on request.



NATIONAL COAL ASSOCIATION The Nation-Wide Organization of Bituminous Coal Producers

HEADQUARTERS: 804 SOUTHERN BLDG., WASHINGTON, D. C. WESTERN OFFICE: 307 N. MICHIGAN AVENUE, CHICAGO, ILLINOIS Please send me a copy of your Free Booklet "The 1939 Basement Plan Book," A. I. A. File 30-G.

Name

Firm

Bituminous Coal-the"Universal Fuel"

FOR HOME HEATING • FIREPLACES • HOT WATER • INDUSTRY • INSTITUTIONS • BUILDINGS • POWER • TRANSPORTATION



FOR STRONGER Reinforcement

Of Light Concrete Floors over Steel Joists, or Plastered Ceilings

USE THIS STIFFER METAL LATH WITH ITS WELDED SOLID RIBS

Steelcrete Bar-X-Lath offers many advantages as a reinforcement for concrete slabs over steel joists and for all kinds of plastered ceilings. Each sheet has solid longitudinal ribs consisting of two No. 11 cold drawn wires, welded together through the meshes of the lath. These are spaced 7" on centers. Its waterproof or Kraft paper backing has sufficient "give" to permit the wet concrete to envelop completely the solid reinforcing ribs. This feature, together with the position of the lath and the ribs near the bottom of the concrete slab, assures maximum reinforcement and protection against cracks. The same modern design effects similar advantages in plaster. Bar-X-Lath is easily tied in place. No stretching. It is easy to plaster. It cannot be damaged readily in handling. Write for latest literature and complete specifications.







- True Reinforcement
- Paper Back
- No Stretching
- Ample Strength for Floor Loads
- Economical Construction "IT'S WHEELING STEEL"

THE CONSOLIDATED EXPANDED METAL COMPANIES WHEELING, WEST VIRGINIA

Branch Offices and Warehouses:





Architect Elmer Gylleck, Elgin, Illinois

1. THE SMITHS HAD A BUDGET

-and they wanted the most in comfort, convenience and fuel saving for their money. When it came to insulation, their architect specified Balsam-Wool—with its *proved* record of providing lasting comfort and savings on the job.

Architects Althouse & Jones, Mansfield, Ohio

2. THE BROWNS COULD AFFORD THE BEST

-so cost was no object in building their house. Choosing insulation on the basis of proved performance, their architect decided that the finest insulation he could specify was Balsam-Wool, available in three thicknesses for every climate, need and pocketbook.



Architect L. I. Janik, Chicago, Illinois

3. THE JONESES WANTED PERMANENCE

-and their architect designed for them a house of exceptional sturdiness. As a fit companion for sturdy walls like these-Balsam-Wool, the insulation of *lasting* efficiency, was specified, for permanent comfort and fuel saving.

WHY is Balsam-Wool the *sure* way to insulate? Because it is completely protected from moisture—sealed in a waterproof covering. Because it has the important moisture barrier that scientists recommend. Because it is firmly fastened in place —will not settle. Because it is highly fireresistant—verminproof—termite-treated. Because for 17 years, it has proved its lasting efficiency in the nation's buildings.

Submit the facts to the test of your judgment —let us give you complete information.

WOOD CONVERSION COMPANY RM. 147-4, FIRST NATIONAL BANK BLDG., ST. PAUL, MINN. NU-WOOD BALSAM-WOOL Weyerhaeuser Products of Wool Balsam INSULATE THE SURE WAY TO



TODAY'S THEATRE MUST BE A "STOPPER"

What a powerful magnet does to small bits of steel, a brilliant, colorful L·O·F Theatrefront does to show-going crowds.

Smart theatre men demand these sparkling, colorful, easily cleaned, glass and metal theatre fronts. You can meet this demand by designing fronts to be constructed of L-O·F Vitrolite, colorful structural glass, L·O·F Vitrolux, for luminous color, and L·O·F Extrudalite, the new storefront metal.

These materials are produced exclusively by Libbey-Owens-Ford. They offer you almost unlimited scope for modern designs—both opaque and luminous colors—plus outstanding weather resistance, easy cleaning and low maintenance cost.

Consider, too, that Vitrolite Structural Glass is widely favored as a swanky, colorful facing for ticket booths—also for walls and wainscots in entrances, foyers, corridors, washrooms and toilets in today's popular theatre buildings.

We will gladly cooperate with you on unusual design problems. Any information desired will be furnished upon request. Libbey-Owens-Ford Glass Co., 1308 Nicholas Building, Toledo, Ohio. (Member Producers' Council)

Make certain your Vitrolite installation is made by a Franchised L·O·F dealer.

For mirrors, L·O·F Polished Plate Glass, clear or in colors. For display windows, L·O·F Quality Plate Glass.



Visit the Libbey-Owens-Ford GLASS Exhibit, 1939 Golden Gate International Exposition, on San Francisco Bay.





SPECIFY PITTSBURGH PAINTS AND GET FIELD-TESTED FINISHES OF PROVED UNIFORMITY AND DURABILITY!

PITTSBURGH PROVING GROUNDS are located in widely separated sections of the country. Here exterior finishes are exposed to nature's merciless punishment—every type of severe climatic condition.

Pittsburgh Research Assures Better Paint Jobs—Greater Client Satisfaction Always!

R IGID factory control-constant, careful testing all along the line-concentration of all manufacturing processes within one 80-year-old company -all these are definite, positive reasons why the architect who specifies "Pittsburgh" is assured of better paints, better paint jobs.

At Pittsburgh's chain of Proving Grounds, exterior finishes are subjected to the actual destructive forces of nature under conditions much more rigorous than any paint would be called upon to withstand in ordinary use. *All* finishes are checked and rechecked—made to measure up to exacting standards of uniformity and durability.

See Sweet's Catalogue!

For complete information and addresses of all Pittsburgh Branches, see Sweet's Catalogue. Call our Pittsburgh representative and ask him for further information. Pittsburgh Plate Glass Company, Paint Division, Pittsburgh, Pennsylvania.



UN PROO

THESE TREMENDOUS TANKS are used for thinning and tinting the pigment paste. Oil, varnish, turpentine, naptha—or any required combination of these—is added in exact amounts according to tested formulas.

POWERFUL SCRUBBING MACHINES test the wear resistance of different finishes in Pittsburgh Laboratories. Each step in the manufacture of Pittsburgh Paints is carefully checked to insure high, uniform quality and long-lasting satisfaction.

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Copr. 1939 Pittsburgh Plate Glass Co.



FLOORING NEWS!



A FACTORY-FINISHED FLOORING AT AN AMAZING LOW COST

• Now you can give homeowners all the advantages of a factory-finished flooring—at an installed cost usually less than that of ordinary flooring finished on the job. And you can do so with the assurance that every floor job will bring complete satisfaction to you and your clients.

Bruce **STREAMLINE** Flooring is 25/32'' oak flooring with a $3\frac{1}{4}''$ face. Bevels on the ends and sides produce

a distinctive patterned appearance. This new-type hardwood flooring is completely finished at the Bruce Plant, with the same superior materials and scientific methods which have been used so successfully on millions of feet of Bruce Finished Blocks.

Yet the installed cost of *STREAM-LINE* Flooring is usually less than that of ordinary hardwood flooring. Why? Because our modern finishing meth-

ods allow a substantial saving over "on the job" finishing, and because there is less "matching waste" with $3\frac{1}{4}$ " face flooring.

The low cost, distinctive appearance, and superior finish of *STREAM-LINE* Flooring make it adaptable for use in homes in any price class. Ask your lumber dealer, or use the coupon to secure full details on Bruce *STREAM-LINE* Flooring direct from Bruce.

BRUCE STREAMLINE FLOOR

Another reason why THERE IS NO SUBSTITUTE FOR HARDWOOD FLOORS

LARGEST MAKER OF HARDWOOD LOORINGS	E. L. BRUCE CO., Dept. AF-4, Memphis, Tenn. Please send me complete information on your new BRUCE STREAMLINE FLOORING.
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Addres	\$
City	State



HOME-BUILDING CLIENTS are like those of any other professional man. They want to know how the wheels go round, how the blue-prints are going to look, and how much your program is going to cost.

And they can be sold air conditioning, if you have the facts and figures to back up your recommendations.

Particularly if it's Kelvinator Simplified Air Conditioning. For here's a line that not only has everything any client needs, but specializes in practical applications based on his ability to buy. Kelvinator's wide experience with almost every kind of installation means that its equipment is right to meet any customer's requirements and purse.

For complete year-'round air conditioning you can recommend a Kelvinator conditioner, comfort damper and condensing unit teamed up with Kelvinator heating equipment—either oil, gas or coal fired. Automatically controlled from one central panel, this equipment filters and circulates air that is properly cooled or heated, humidified or dehumidified, depending on weather conditions. This is year-'round comfort at the flip of a switch.

Or, if only winter air conditioning is specified, there is a wide range of Kelvinator automatic heating equipment designed to use oil, gas or coal for fuel.

From a simple conversion unit in a home already built to a complete year-'round air conditioning installation in a new home, Kelvinator has the equipment to do the job.

Let us supply you with complete details.

Kel-O-Flame Unit Boiler for hot water or steam heating. Automatic heating at its finest. 8 models available.



Kelvinator Gas-Fired Conditioner for warm air heating, with filter, blower, special fire box and humidifier. 3 lines of 12 sizes.





Kelvinator Conditioner that controls temperature, humidity, filtration and circulation of airfor year-'round air conditioning.



Kelvinator Room Cooler for Summer Comfort Cooling. Complete range of models including 2 air-cooled and one water-cooled. 6 floor type models for installation with remote condensing unit.



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Street	
City	State





The economical answer

to an



in the home

Everywhere, at this time of year, people are beginning to worry about the spring and summer supply of hot water. When the time to close down the winter heating plant arrives, "What to do about hot water" is a real serious question.

It's no problem in the home with complete modern Anthracite equipment. The modern Anthracite water heater with regulator, provides a constant supply of hot water, 24 hours a day, in ample quantities for every purpose-at 1/3 to 1/2 the cost of gas or electricity.

Modern Anthracite tank heaters are equipped with regulators that keep the water always hot-never too hot. They regulate drafts, eliminating all hand regulation. They save steps-save running up and down the basement stairs to light, adjust, and turn the heat on and off.

All of this convenience, plus the luxury of a constant, ample supply of hot water, costs as little as 1/3 as much as the same service with any other fuel.

ANTHRACITE INDUSTRIES, Inc. **Chrysler Building** New York, N. Y.



THE **7** ESSENTIALS OF COMPLETE **HEATING SATISFACTION**

★ COMFORT **★** CONVENIENCE \star SAFETY

***** CLEANLINESS **★** HEALTHFULNESS **★** DEPENDABILITY 🗡 ECONOMY



CERTAIN-TEED Announces

...a complete line worthy of the slogan QUALITY MADE <u>Certain</u> SATISFACTION GUARAN-<u>teed</u>

Made by the NEW SATISFACTION GUARAN-Ieed CERTAIN-TEED CANE-WEAVE PROCESS

Combining permanent insulating value, high structural strength and good working qualities, Certain-teed C-S-I gives architects greater freedom in design . . . gives home owners extra savings, too.

Specify C-S-I Structural Insulation because the C-S-I line covers every requirement in new work and remodeling—sheathing, lath, wallboard and interior finish. Specify C-S-I Structural Insulation because C-S-I provides efficient insulation plus structural strength.

Every square inch of C-S-I Structural Insulation is a network of long, tough, strong cane fibers —thousands of them—interlocked, bracing each other like the framework of a bridge to provide greater strength and rigidity. Interwoven by the Cane-Weave Process, the fibers of C-S-I combine this high structural strength with an even greater insulating value. To the millions of insulating air cells in each fiber, interweaving adds still more dead-air space to block the passage of heat or cold. At the same time, the Cane-Weave Process adds life . . . provides the structural strength to prevent C-S-I from settling or pulling away from the framework.

STILL ANOTHER EXTRA VALUE

C-S-I Structural Insulation is licensed under Ferox Process patents. Under this process every square foot is dry-rot proofed and termite-proofed.

DAMP PROOF WITH C-S-I ASPHALTED SHEATHING

For structural strength plus moisture proofed insulation, replace wood sheathing and building





paper with C-S-I Asphalted Sheathing. Over fibers which are themselves waterproofed in manufacturing, asphalting provides an additional weather and moisture proofing which seals both the sides and edges of the board—a bright aluminum powder coats one side, providing further protection. Asphalted C-S-I Sheathing provides a moisture and vapor resisting barrier *plus* structural strength and insulation.

COLOR — TEXTURE — WORKABILITY

C-S-I Insulating Board, Plank and Tile for interior finish is available in three colors and three textures —making many decorative treatments possible. The workability of C-S-I and its ease of application make it look good on the time sheets, too.

NATIONALLY ADVERTISED TO YOUR CLIENTS

The powerful story of structurally stronger, insulated, damp-proofed houses, made smartly modern in interior treatment with C-S-I is being told to home owners in national magazines. C-S-I is available everywhere. The nearest Certain-teed dealer can make prompt deliveries from local stocks.

THE C-S-I LINE MEETS EVERY INSULATION PROBLEM Fills Every Insulation Board Requirement

C-S-I INSULATING BOARD—Used as sheathing, as interior finish in color and texture or as a base for painting or other decorative treatments. Available in 3 colors and 3 textures. Licensed under Ferox Process patents, every square foot is dry-rot proofed and termite-proofed.

C-S-I ASPHALTED SHEATHING—Used under brick veneer, siding, shingles or stucco; also as a roof sheathing on pitched roofs. Licensed under Ferox Process patents, every square foot is dry-rot proofed and termite-proofed.

C-S-I KEY-LAP LATH — Textured plastering surface insures a stronger plaster bond. Long edges shiplapped; all edges beveled to reinforce plaster against cracking. Licensed under Ferox Process patents, every square foot is dry-rot proofed and termite-proofed.

 $\ensuremath{\mathsf{C-S-I}}$ ASPHALTED KEY-LAP LATH—Same as above but asphalted.

C-S-I ROOF INSULATION — Cane fiber roof insulation board for use on pitched roofs under certain types of roofing and under built-up roofing on flat roofs, also as a protection course for membrane waterproofing. Licensed under Ferox Process patents, every square foot is dry-rot proofed and termiteproofed.

EARLIER SALES FOR THE HOUSES YOU BUILD

The qualities C-S-I add to your house are so definite, so evident, that there will be immediate acceptance from clients when your specifications read "Insulated with C-S-I".

COMPLETE DETAILS, NO OBLIGATION

Let us send you samples of C-S-I Insulation. Also let us put your name on our list to receive our profusely illustrated 24-page Insulation Manual now being prepared. Use the coupon below.

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CERTAIN-TEED PRODUCTS CORPORATION . GENERAL OFFICES, NEW YORK, N. Y.

Name _____ Address

CERTAIN-TEED PRODUCTS CORP., 100 East 42nd St., New York, N. Y.

Gentlemen: Please send samples of C-S-I Insulation Board and put my name on your list to receive your 24-page Insulation Manual, when issued.

Send this Council

THE MODERN FACING MATERIAL

K-Z-S ARCHITECTURAL PORCELAIN ENAMEL

For both exterior and interior use in store fronts and buildings of all types and sizes.

Great variety of appealing, modern colors — with 25 standard satin finish colors plus black and white in gloss finish.

A smooth, non-porous, easily cleaned surface with unusually tough, acid-resisting finish.

Sturdy panel construction of 16gauge extra-flat enameling steel with strongly welded corners.

Safe, secure, individual suspension on Rustless Metal Spring Clips — individually removable. • K.Z.S. panels offer the most modern and up-to-date development of porcelain enamel for architectural use—offer great freedom for the designer, ease of erection, economy of upkeep, and fresh, modern appearance.

Panels are fabricated from heavy, 16gauge, extra-flat enameling steel, with strongly welded corners — porcelain enameled on both sides under tremendous heat (1550 degrees F.), thoroughly fusing steel and glass. Three coats of desired color are fired on face, producing a smooth, non-porous and unusually tough surface. Choice of 27 standard colors, plus availability of special shapes and designs, makes this a most versatile material. Designed for use with ZOURI Rustless Metal Store Front Construction, Doors and Metal Work in the complete front.

COUPON BRINGS ILLUSTRATED BOOKLET

Zouri Store Fronts, Niles, Mich Send new booklet and data o tural Porcelain Enamel.	nigan n K.Z.S. Architec-
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Address	
City	State

STORE FRONTS



There is no satisfaction in a water system which lacks adequate capacity. A single faucet requires from 2 to $3\frac{1}{2}$ gallons of water a minute for a good full flow. Confusing price with economy, some suburban and country home owners have mistakenly purchased water systems with sustained capacity barely sufficient to supply one faucet at a time. These seem all right until two or more persons attempt to draw water simultaneously from different faucets. Then the flow quickly sinks to an aggravating dribble because adequate reserve capacity is lacking.

IS

ADEQUATE CAPACITY

for HOME or FARM

It always pays to recommend and install a reliable Myers Water System of the style and size suited to both present and future requirements then there will always be a full flow of water any time a faucet is opened—in kitchen, bathroom or laundry—at outside hose taps for sprinkling and fire protection —in barnyard, stables and outbuildings.

There are MYERS Water Systems for all needs. Deep and shallow well models for operation by electricity, gasoline engine, windmill or hand, power. If electric power is not available, Myers Engine Powered Systems give excellent satisfaction. Myers Deep Well Systems are ideal for summer cooling and airconditioning.

Important to architects and builders. If you recommend and install water systems, our Engineering Department will be glad to send you detailed information and a copy of our new complete catalog. For prompt attention write Department AF100.

THE F.E. MYERS & BRO.CO. ASHLAND, OHIO.

<image><image>

APRIL 1939

Not a Trícklíng Stream from

An Adequate Supply for Every Need •

the faucet



 Moncrief makes a complete line of winter air conditioners especially adaptable for houses costing \$5,000 or less. All that has proved desirable in winter air conditioning is made available by these improved units at low cost. They are modern in design and finish, carefully built of quality materials, and include features specially developed by Moncrief that produce high efficiency and great fuel economy. Beautifully finished cabinets make them suitable for the modern basement. Moderately priced, they present builders and home owners plus values.

Send for folders and data sheets giving complete information.

Moncrief Engineering Service is maintained to cooperate with architects and builders in estimating and laying out plans. No obligation.

3485 EAST 49th STREET

THE HENRY FURNACE & FOUNDRY CO.

FORUM OF EVENTS

(Continued from page 22)

AWARDS

TO JOHN D. ROCKEFELLER, JR. For conspicuous services in the advancement of the arts in the U.S., the Friedsam Gold Medal, given annually under the auspices of The Architectural League of New York.

TO PERCY EDWARD THOMAS, past president, R.I.B.A. In recognition of the merit of his work as an architect, the Royal Gold Medal.

SOUTHERN CALIFORNIA CHAPTER, A.I.A., resuming its annual Honor Awards, names fifteen entries by ten architects:

- Columbia Square; by William Lescaze; Earl T. Heitschmidt, associate
- Los Angeles Branch, Federal Reserve Bank of San Francisco; by John and Donald B. Parkinson
- American Red Cross Building, Pasadena; by William S. McCay
- La Vina Sanitorium, La Vina; by Myron Hunt and H. C. Chambers
- Miles Ave. School, Huntington Park; by Ralph C. Flewelling
- Twenty-fifth Church of Christ Scientist, Los Angeles; by H. Roy Kelley
- U. S. Post Office, Beverly Hills; by Ralph C. Flewelling
- Science Building, Hollywood High School; by Norman F. Marsh, David D. Smith and Herbert J. Powell
- W. and J. Sloane Co. Building, Beverly Hills; by John and Donald B. Parkinson
- Los Angeles County Medical Assn. Library; by Gordon B. Kaufmann
- Los Angeles Times Building; by Gordon B. Kaufmann
- Strathmore Dwellings, Los Angeles; by Richard J. Neutra
- Thomas Jackson Library, Webb School for Boys, Claremont; by Myron Hunt and H. C. Chambers
- Fannie E. Morrison Horticultural Center, Pasadena; by Fitch H. Haskell
- Library, First Church of Christ Scientist, Pasadena; by Sylvanus B. Marston and Edgar W. Maybury

Twenty-eight additional entries have been awarded Certificates of Merit and with the above will be exhibited to the public as work bearing the stamp of professional approval.

TO BUREAU OF YARDS AND DOCKS, NAVY DEPARTMENT OF THE U.S. The Bronze Medal of the Association of Federal Architects for excellence in departmental exhibit at the annual exhibition of the association in Washington, D. C. Rear Admiral Ben Moreell, chief of the Bureau, accepted the medal. It had been held previously by the Procurement Division, Treasury Department.

(Continued on page 52)



CLEVELAND, OHIO

THE

ATTACT MANA

"Special" OIL-FIRED

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(diffeetiment)

"Special" GAS-FIRED

ARCHITECTURAL ORU



Let local savings finance local building and NAIL DOWN HOME DOLLARS AT HOME!

• When you put neighbors' savings out to work financing neighbors' homes, you keep home dollars at home! You give jobs to local people; you help local business.

Local Savings or Building and Loan Associations take an active part in community development. For they are founded on thrift principles which foster savings and lending to encourage home-ownership. They have done much to make sound and sensible home financing possible. That is why they handled 55.82% of America's institutional small home financing in 1937!

What this service means to you

When you recommend this local service you will help to improve and prolong your business in your community. Here are four advantages that the home financing service of your *local* Savings or Building and Loan Association offers:

- 1. You get fast service without red tape.
- 2. You get convenient service that is easy to understand.
- 3. You get friendly service because you deal with neighbors.
- 4. You get protection for your own high construction standards, with long-term amortized loans.

In our offices loans mean friends, not just numbers. That is why we earnestly solicit your recommendation not only because we are close at hand, not only because we represent a large part of the financial worth of hundreds of your neighbors, but also because we can provide a fast, simple home financing service that leaves out red tape!

See members of the United States Building and Loan League in your community for *red-tapeless* home financing!

ARCHITECTS—with this easy, friendly local service you can assist your neighbors to finance new construction and modernization or to refinance or purchase residential property.

Your Local SAVINGS OR BUILDING AND LOAN ASSOCIATION

When you support Your Local Savings or Building and Loan Association—You help local business!

For a kitchen floor with SALES PERSONALITY



This distinctive modern kitchen floor was achieved with Armstrong's Marbelle Linoleum and feature strips of Armstrong's Plain Linoleum, Floors like this help you sell your houses.

Install modern, colorful Armstrong's Linoleum

W HEN the name "Armstrong's Linoleum" is mentioned to a prospect, you will find that there is a pleased smile of recognition. Years of national advertising in the popular magazines have sold the beauty, long wear, and easy-cleaning qualities of Armstrong's Linoleum to the people who buy or rent your houses.

And there seems to be no end to the scope of this modern flooring. Every day, someone finds a new way to use it in creating distinctive floors that are a real aid to faster sales and rentals. Your prospects will like it because it is easy to clean and never requires costly refinishing.

Armstrong's Linoleum fits into any plan or budget—not merely for the kitchen, but for every room in the house. It is reasonable in cost, inexpensive to install, and available in five thicknesses and 200 patterns. We publish a color-illustrated book of sales-building suggestions

we publish a color-inustrated book of sales building begg for residential floors. A free copy is yours for the asking if you will write now to the Armstrong Cork Company, Building Materials Division, 1203 State Street, Lancaster, Pennsylvania.



RUBBER TILE · LINOTILE (OIL-BONDED) · ASPHALT TILE

FORUM OF EVENTS

(Continued from page 50)

EDUCATIONAL

COOPER UNION, NEW YORK, N. Y.: The whole Arts School is being reorganized under the leadership of Guy Gayler Clark. Dr. Paul Zucher, former dean of the faculty of Fine Arts in the University of Lessing, Berlin, has joined the faculty.

LABORATORY SCHOOL OF INDUSTRIAL DE-SIGN, NEW YORK, N. Y. Recent additions to the Product Design Department are John W. Lincoln, formerly associated with Russel Wright, now on the editorial staff of THE ARCHITECTURAL FORUM; Arno Scheiding of Murray & Scheiding, industrial designers; Peter Schladermundt, formerly with Henry Dreyfuss, now with Norman Bel Geddes & Co. Chartered by the Board of Regents, State of New York, the Laboratory School devotes its entire curriculum to courses in the various fields of industrial design-product, textile, interior, display and advertising design. All instructors must be active in their various professions while teaching at the Laboratory.

OHIO STATE UNIVERSITY, COLUMBUS, OHIO. Dr. Albert Ray Olpin has been appointed director of industrial research and field director of the Engineering Experiment Station.

PRATT INSTITUTE, BROOKLYN, N. Y. Cecil C. Briggs of Columbia University has been appointed to head the Department of Architecture, succeeding the late Lester B. Pope. At present Professor Briggs is on sabbatical leave making a survey of American architectural schools to study the practical relationship of architectural courses to professional practice.

SYRACUSE UNIVERSITY, SYRACUSE, N. Y. Summer sessions for 1939 in the Department of Architecture include the following, covering a six weeks period of study beginning July 5: Elements of Design and Theory of Architecture, Introduction to Construction, Materials of Construction, Freehand Drawing, Architectural Design. A bulletin of information may be obtained upon request to the Director of Summer Sessions.

DEATHS

LAURENCE A. BALL, 56, engineer, died in New York. Mr. Ball was a graduate of the College of the City of New York. He represented New Jersey as a consulting engineer on the Philadelphia-Camden bridge, and designed the structural steel work for many New York skyscrapers. He had recently been at work on the design of the French Building for the New York World's Fair. Mr. Ball was a member of (Continued on page 54)



NOTABLE APPLICATIONS OF WESTINGHOUSE LIGHTING EQUIPMENT Totally Indirect, Bipost Lighting Installation



The Westinghouse MB Luminaire, with aluminum basin finished by the Alzak process, is available in a 500-watt size and a 750-1000-watt size.

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For further details ask your local Westinghouse Distributor for the handsome MB gravure sheet with specifications, CL-4004; or address Westinghouse Electric & Mfg. Company, Lighting Division, Edgewater Park, Cleveland, Ohio.



(Continued from page 52)

the American Society of Civil Engineers, the Brooklyn Society of Engineers, and also a past president of the Engineers Club of New York.

WILLIAM P. BANNISTER, 70, architect, in Brooklyn. Mr. Bannister was born in Manhattan, acquired his professional education in the offices of local architects, and at one time practiced as a member of the firm of Bannister & Schell. More recently he had practiced alone, giving a considerable part of his time to the work required of him as secretary of the New York Board of Examiners of Architects. Mr. Bannister was a Fellow of the American Institute of Architects.

GEORGE OAKLEY TOTTEN, JR., 72, architect, in Washington, D. C. Major Totten had been an active student of and, for many years, an authority on Mayan architecture, and had also given much of his time in furthering the interests of international conferences of architects. Born in New York, his professional education was gained at Columbia University, which conferred upon him the degree of Ph.D. in 1891. In 1895 he moved to Washington where he practiced thereafter. During the World War he served as a major in the Engineer Corps.

Major Totten was a member of the A.I.A. and a former president of its Washington Chapter. He served as American delegate to international conferences at Brussels, Paris, Madrid, London, Vienna and Rome, and had been appointed by President Roosevelt as secretary general for the congress to be held here this year.

THOMAS D. BEST, 49, architect, in Toledo. For several years he was associated with George S. Mills and Harry Wachter, architects, before forming a partnership with Timothy Y. Hewlett under the firm name of Hewlett & Best. Mr. Best was a member of the A.I.A., and a vice president of the Ohio Society of Architects.

JOHN C. BOLLENBACHER, 54, architect, in Highland Park, Ill. After being graduated from the Massachusetts Institute of Technology in 1909, Mr. Bollenbacher began practice in Chicago, and has for some years been a member of the firm of Granger & Bollenbacher. From 1933 to 1936 he acted as a consulting architect in the Treasury Department at Washington. Mr. Bollenbacher was a Fellow of the A.I.A.

ARTHUR WARE, 62, architect, in Ossining, N. Y. Born in New York City, Arthur Ware attended the School of Architecture, Columbia University, and spent three years at the Ecole des Beaux-Arts in Paris. On his return to New York, he became a partner in the firm of James E. Ware & Sons, and since 1918 has practiced under the firm name of F. B. and A. Ware. Mr. Ware was an associate professor of architecture at Columbia, 1914-1922, and was a member of the A.I.A.

DR. ELLSWORTH WOODWARD, 78, director emeritus of the Newcomb College of Art, at New Orleans. Born in Bristol County, Mass., Dr. Woodward studied at the Rhode Island School of Design, and in the studios of Carl Marr, Richards & Fehr in Munich. He began his career in art education in 1885 as assistant professor of art at Tulane University. Two years later he became professor of art at Newcomb College. Tulane conferred upon him the degree of LL.D. in 1933.

(Continued on page 56)





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ARCHITECTS AND THE TREASURY DEPARTMENT

For several years past, architects have looked with growing concern at the growth of the bureau idea in Federal Government, State, county and municipality. The architect in private practice seemed destined to fade rapidly out of the picture in so far as public buildings were concerned.

A.I.A.'s Committee on Public Works has labored strenuously in the effort to bring to the task of designing America's public buildings the nation's best architectural brains. Agreeing in principle, Secretary Morgenthau asked for a workable plan for finding those brains. The Institute's answer, none too specific, has been, "By direct selection and perhaps by competition." In direct selection the Institute could not be of much help, could neither



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pick from its own membership nor from outside it. Pressure for a trial of some form of competition has been increasing, from within the A.I.A. and also from outside, and it seems to be setting some fruit.

Secretary Morgenthau on March 19 issued a Treasury Department news release announcing a series of regional competitions for designs for Federal buildings. Recognizing the importance of this indication of a new policy, we print the body of the release untouched by our editorial pencil:—

In a nation-wide experimental competition last year, the successful architect was appointed in a consulting capacity in connection with the preparation of working drawings, in addition to receiving the design prize. As a result, officials of the Treasury Department and its Procurement Division were satisfied that architects in private practice could thus be utilized to greater advantage in the Government's construction program.

"I hope," said Secretary Morgenthau, "that these new regional competitions will develop a method that can be employed for all Federal buildings where the importance of the project is sufficient to warrant the necessary expenditure of time by topnotch competitors."

The competitions approved for this experiment by the Secretary, and total limits of costs available for the respective projects, are as follows:

Evansville, Ind. - Post Office,

Court House and Customs

and Court House 300,000 Burlingame, Calif.—Post Office. 215,000

Participation in these competitions will be limited to architects in the districts in which the projects are located. Should the current method prove successful, future competitions along similar lines in other districts will be announced by the Procurement Division as projects become available. The regional boundaries set up by the Division are as follows:

District No. 1—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

District No. 2—New York City and Long Island, southern half of Ulster County, southern half of Dutchess County, Westchester, Rockland, Putnam, Orange and Sullivan Counties.

District No. 3-The remaining counties of New York State.

District No. 4—Pennsylvania, New Jersey and Delaware.

District No. 5—Maryland, West Virgina, Virgina, Kentucky, North Carolina, South Carolina and Tennessee. (Continued on page 58)



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FORUM OF EVENTS

(Continued from page 56)

District No. 6—Georgia, Florida, Alabama, Mississippi and Louisiana.

District No. 7-Ohio, Indiana, Michigan, Wisconsin and Illinois.

District No. 8—Minnesota, North Dakota, South Dakota, Kansas, Iowa, Missouri and Nebraska.

District No. 9—Arkansas, Oklahoma, Texas and New Mexico.

District No. 10—Washington, Oregon, Idaho, Montana, Wyoming, Colorado and Utah.

District No. 11—California, Nevada and Arizona.

Terms of the competitions announced require that the actual working drawings of the winning designs be prepared in the Procurement Division, with the automatic provision that their authors be retained as consultants to insure that the work is carried out in accordance with their conceptions of the designs.

The Treasury Department already has an extensive background of experience on projects such as post offices, court houses, customs houses, Federal office buildings, marine hospitals, airports and immigration stations. Occasionally, however, appropriations are made for buildings of particularized design which require highly specialized treatment. In these cases, Secretary Morgenthau said he intends to arrange, wherever practicable, for the working drawings to be prepared in the office of the successful competitor.

In keeping with that policy, the Secretary has advised the Smithsonian Gallery of Art Commission that he recommends that the winner of the competition for the Gallery design be permitted to prepare the working drawings in his office, subject to the supervision of the Director of the Procurement Division. He said he felt such procedure would carry out the requirements in the legislation authorizing construction of the Art Gallery.

MORE COMPETITIONS

PRODUCTIVE HOME COMPETITION. First stage closed February 20. The Jury: Frederick L. Ackerman, F.A.I.A.; Baker Brownell, Ph.D.; Eloise Davison; Burn-ham Hoyt, A.I.A.; Rt. Rev. Luigi G. Ligutti. Competitors were given the choice of five sections of the U.S. as locations for the site for which their designs were made: Northeast, South, Middle West, Northwest and Southwest. Eleven final competitors were to be selected from each section, with the provision that the Jury might withhold any or all awards in a section if the entries were not of sufficient merit, and could distribute a like number of awards among the other sections. Second stage, closing April 3, is confined

(Continued on page 60)



Cabot-stained house in Connecticut. Architect, Willis N. Mills, N.Y.C.



Cabot-stained house, Chatham, Mass. Architect, Edward Sears Read, Boston.

You get economy, without sacrificing beauty, when you use Cabot's Creosote Shingle Stains. Their soft texture-revealing colors enhance the rich-grained beauty of the wood. They are moderate in price per gallon; inexpensive to apply; long lasting and economical in upkeep. Furthermore, they add years to the life of the house because they are made with a vehicle of pure creosote, the best wood preservative known. Write today for color samples and new booklet, *Stained Houses*. Samuel Cabot, Inc., 1272 Oliver Bldg., Boston, Mass.



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Memorial Pool, Springfield, Minn. Architect—L. L. Daubert, Ames, Iowa

C. T. Bridgeman, Engineer, of the Clay Products Institute, commenting upon the Memorial Pool — first all-brick swimming pool ever built says, "Omicron Mortarproofing was used in the mortar according to your specifications . . . There were no shrinkage cracks during construction nor had they appeared after the pool had come through a severe Minnesota winter . . . not one bit of leakage occured."

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FORUM OF EVENTS

(Continued from page 58)

to winners of the first stage of whom there were seventeen in the Northeast section, twelve in the South, fourteen in the Middle West, six in the Southwest and six in the Northwest.

SCULPTURE IN PLEXIGLAS. First-stage judging of 250 entries, February 20, selected five artists to execute their preliminary sketches in the material for a final judgment. The five: Alexander Calder, New York, N. Y.; C. K. Castaing, Stony Brook, N. Y.; Werner Drewes, New York, N. Y.; Herbert Matter, New York, N. Y.; Xanti Schawinsky, Edgewater, N. J. Honorable Mentions to Harold Barnett, New York, N. Y. and Lawrence E. Roberts, Pasadena, Calif. Judges: Katherine S. Dreier, Robert Laurent, James Johnson Sweeney, all of New York, N. Y. Gilbert Rohde, technical adviser.

INFORMATION PLEASE

Answers to the questions given at The Architectural League party illustrated on page 22 are as follows.

1) Trylon—three-cornered shaft in the theme symbol of the New York World's Fair 1939; Pylon—a truncated pyramidal form usually one of two forming a gateway; Python—a serpent; Nylon—a recently invented product used in the making of fabric.

- 2) "Only the brave deserve the Fair."
- 3) A type of chair.

4) According to Mrs. Juliana Force, "Nothing"; to which Deems Taylor adds "No runs, no errors."

5) Lintel—lentil.

MISCELLANEOUS

AMERICAN CONCRETE INSTITUTE at its 35th Annual Convention in New York, N. Y., last month elected as president Frank E. Richart of the University of Illinois, succeeding John J. Earley, architectural sculptor of Washington, D. C. Vice presidents: Rear Admiral Ben Moreell, chief of the Bureau of Yards and Docks, U. S. Navy; R. B. Young of the Hydro Electric Power Commission, Toronto, reelected. Secretary-treasurer, Harvey Whipple, Detroit, reelected. New directors: W. F. Thomson, St. Louis, Mo.; R. W. Crum, Washington, D. C.; A. S. Douglass, Detroit; Lion Gardiner, Cincinnati.

G. E. HOME BUILDING CONTEST. Twenty prizes of \$1,000 each have been awarded as a result of a contest which closed on December 24, last. Awards were made for homes built or modernized during the last eighteen months. Winners—(The architect in each case follows in parentheses): Mrs. M. L. K. Alford, Buffalo (S. Harold (Continued on page 62)



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Kitchen equipment, unless correctly designed and placed, and all heat producing units are properly insulated, will cause an unnecessary load on the air conditioning system. Provision must also be made to keep food hot when exposed to the cooling effect of the circulated air. These are new problems in the food service departments which our experience has overcome. Can we assist you?



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Builden "As a builder of apartment houses, and having had experience with various kinds of automatic refrigeration, I have become convinced that Servel Electrolux gas refrigerators are best. Tenants like their silent dependability." Mr. S. E. Henderson, 742 S. W. Vista Ave., Portland, Ore.







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• Note (1) large warm air chamber, (2) warm air ducts that equalize heat, (3) heavy, lasting smoke shelf, (4) integral damper, with poker control, (5) convection sheets that keep outer shell at low temperature, (6) large area of cold air inlet that gives freedom in placing inlet grilles.

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FORUM OF EVENTS

(Continued from page 60)

Fenno); H. C. Bender, Spokane (Whitehouse & Price); E. L. Confer, Detroit (Earl L. Confer): J. F. Eppenstein, Chicago (James F. Eppenstein); Mrs. J. S. Feldhusen, Kimberly, Idaho (Hans Hul-be); G. K. Frisbie, Rancho Santa Fe, Calif. (Harold Abrams); R. D. Guthrie, Gates Mills, Ohio (F. M. Thompson); J. P. Illges, Columbus, Ga. (James J. W. Bigger); J. C. Lyons, Marblehead, Mass. (John C. Lyons); J. S. McKenzie, Elkins Park, Pa. (J. Linerd Conarroe); Mrs. D. Moffett, Indianapolis (Burns & James); O. G. Moon, Highland Park, Ill. (White & Weber); Y. W. Nibecker, Huntington Park, Calif. (Y. W. Nibecker); J. S. Osterstock, Shrewsbury, N. J. (A. Kellenyi); A. P. Terryberry, Grand Rapids (Benjamin W. Hertel); Texas Master Builders, Houston (Talbot Wilson and Irwin Morris); Waldo & Weller, Inc., Detroit (Waldo & Weller, Inc.); Philip Will, Jr., Chicago (Perkins, Wheeler & Will); W. R. Williams, Boulder, Colo. (G. H. Huntington); D. E. Winkworth, Monroe, Mich. (David E. Winkworth).

PERSONALS

Samuel Sperlin Abramson has opened an office for the practice of architecture and for consultation for store and business installations at 62 West 45th St., New York, N. Y. Manufacturers' data are solicited.

Architectural Library, University of Manitoba, Winnipeg, Canada, would welcome samples of building materials and accessories related to architecture and interior decoration.

Turpin C. Bannister, assistant professor of architecture at Rensselaer Polytechnic Institute and winner in 1937 of the first Henry Adams fellowship of the American Institute of Architects, has been appointed architectural consultant to the Federal Writers Project of the WPA for the State of New York. Professor Bannister will edit architectural material in the New York State Guide.

Harry H. Bentley, architect, has moved his office from 1613 Riggs Place, N. W., Washington, D. C., to 21 Woodmont Road, Belle Haven, Alexandria, Va.

Harrison W. Gill and Wellington J. H. Wallace announce the formation of a partnership for the general practice of architecture at Hamilton National Bank Building, Chattanooga, Tenn., and would like to receive manufacturers' catalogues for their files. Mr. Gill's former office was 101 Park Ave., New York, N. Y., and Mr. Wallace's, Shop Springs, Tenn.



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Look at the cross-section, notice the density of the pile, how close the tufts are. Notice the uniformity of surface, despite the magnification. Notice that most of the wool is in the pile, where carpet gets the wear, and not embedded in the back. Yet see how magnification of the back brings out the symmetry with which the carpet is woven more strength than that carpet will ever need. These are the reasons why Crestwood is one of the longestwearing carpets you can buy at any price and the largest-selling carpet in America.

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Cross-section of Alexander Smith Crestwood Carpet. Unretouched photograph magnified 16 times.



Surface of Alexander Smith Crestwood Carpet.

Back of Alexander Smith Crestwood Carpet.





(Continued from page 32)

all the more conclusively how valuable this publication is to the growth and development of contemporary architectural ideology. THE FORUM owes it to itself, to its subscribers, and to the profession to continue PLUS.

Cambridge, Mass. WILLIAM V. LINDE

Forum:

I want to add my word to others who hope to see PLUS eliminated. I agree entirely with Ackerman's letter in the March number. Information given in an architectural magazine should be written by clear-headed people who have something to say of interest to architects and the editors should go back to sensible typography. CHARLES KILLAM

Cambridge, Mass.

Forum:

Your Surrealist section PLUS is probably intended to be an expression of the subconscious minds of its editors. However, the subconscious minds of a portion at least of your readers is not so confused, some of us would prefer to read the magazine without that "morning after" sensation that PLUS gives us.

Why not a MINUS section—minus all the junk! ARTHUR LOVELESS Seattle, Wash.

Portland Forum:

As an architect, I regret certain inferences in the success story concerning Realtor Allison Dean, of this city, which appeared in the January ARCHITECTURAL FORUM, p. 65....

The story leads one to believe that we architects are not functioning in the usual manner; such is not the case. We number among our colleagues men who stand rather high nationally, with like ethics and standards of practice. . . .

Like so many things in life, honest home building *does* involve more than a "one stop" operation and though we approve of the elimination of superfluous detail and confusion, we feel that more than one stop must be made in the realization of a home. Experience has proved too, we believe, that the "stopping" can best be done under the direction of a disinterested party—the architect.

GLENN STANTON

Portland, Ore.

Although consistently advocating full architectural service in the small as well as large house field, THE FORUM failed to give the Dean "success story" the architectural emphasis it deserved. To Architects Glenn Stanton and Hollis Johnston goes belated credit for designing certain houses pictured in the article. To the local profession, in general, go apologies for apparently creating a wrong impression of its function. THE FORUM is well acquainted with the commendable work of Portland's architects, purposed in no way to detract from their prowess.—ED.

DynaTone Forum:

... On page 127 of THE ARCHITECTURAL FORUM for February 1939, you show a picture which is supposed to be of the Ansley DynaTone. The illustration used, however, shows a small piano made by the Baldwin Co.

We are sending you herewith (see cut), a photograph showing the Ansley Dyna-



Tone and we should appreciate it very much if you could run one of these photographs in your next issue. . . .

ARTHUR C. ANSLEY

Ansley Radio Corp. New York, N. Y.

Credit for heating, Wiener residence (ARCH. FORUM, Feb. '39) should have read: Niagara air heating unit with ducts, Forest City Foundries Co.—ED.



Designed by "Richard Koch, noted New Orleans architect, this "traditional" home was voted the most popular of eight Life Houses sponsored by Life and Architectural Forum. Palmer and Sawtell built the home at Oak Knoll, Atlanta, Georgia.

The Life House*Program, presented last Fall as an impetus to a greater volume of *planned* building, is now sweeping across the country. One of the most recent homes finished is the Richard Koch design for families in the \$2000 to \$3000 income group, built in a suburb of Atlanta.

And it was to be expected that the demand for up-tothe-minute, trouble-free, *economical* heating led, once more, to a Payne Gas Furnace installation.

For more than a quarter of a century Payne has been developing gas fired appliances that do credit to the man who specifies them. When Payneheat goes into a home, both architect and homeowner may rest assured that their heating worries are over for good.

There is a scientifically designed, precision constructed Payne Gas Furnace for *every* heating need. Whether the plans call for basement or non-basement heating—gravity furnaces, circulators or winter air conditioners—Payne is right on the job.

See your local dealer or write for further information. Payne's engineering department is always at your service.





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A charming, inexpensive bathroom for the small home

Automatic heat assures winter comfort

IN planning low cost homes—where every penny must do double duty, providing equipment low in first cost and yet capable of long, efficient service as well-it will pay you to consider Crane Quality Plumbing and Heating. In plumbing fixtures for the bathroom or kitchen, the Crane line includes inexpensive equipment exactly designed to meet the requirements of the low cost market and to assure years of trouble-free service. Yet, despite the low cost, it is Crane quality throughout.

In heating, too, Crane offers complete systems -boilers, radiators, valves and fittings-just designed for the compact, low-cost home. It will pay you to consider Crane plumbing and heating in the low cost homes you design as well as in those in the higher cost brackets-where budgets are limited as well as when expense is no

object. Before you write the specifications get in touch with your Plumbing Contractor or call the nearest Crane Branch.



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Flexibility is another outstanding characteristic of York's new Sectional Air Conditioning Units. The fan section is reversible in any direction, greatly simplifying duct design. Individual units . . . which range from 5 to 35 tons capacity . . . may

be mounted on the floor, backed up to any wall ... or suspended from the ceiling.

All York Sectional Air Conditioning Units can have "Auditorium by-pass" control. Motors and air by-pass equipment are completely contained within the casing...yet they are readily accessible. Scientific insulation and a special sound absorbing outlet result in amazingly quiet operation. The dark gray enamel frames of these streamlined units . . . and their medium gray crinkle panels . . . harmonize perfectly with finished interiors. Brass thumb knobs allow removal of panels

> without tools . . . servicing can take place from any side of unit.

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Raymond Rigby · Burlingame, Cal. Architect.







(Continued from page 26)

OLD HISTORIC CHURCHES OF AMERICA, by Edward F. Rines. The Macmillan Company. 373 pp., illustrated. $6\frac{1}{2} \times 9\frac{1}{2}$. \$6.00.

An historical rather than an architectural survey, this book presents a wealth of fact and legend on the churches of the early days of the republic. The examples, which cover virtually all of the important buildings of the seventeenth and eighteenth centuries, and a few in the nineteenth, are grouped by regions, furnishing a convenient method of reference for anyone interested in a specific locality. There are some fifty illustrations which are not particularly well selected or reproduced. The book furnishes excellent background material for the architect, however, and is an admirable supplement to the numerous archaeological studies of early ecclesiastical buildings.

HISTORIC SALEM, by Samuel Chamberlain. Hastings House, New York. 76 pages of photographs. $6\frac{1}{2} \ge 7\frac{1}{2}$. \$1.25.

A very attractive small book of photographs, well laid out and with excellent illustrative material. As in Mr. Chamberlain's previous books on New England, the contents are



House in Salem, 1800

primarily architectural, with a sprinkling of pictures of shipyards and other miscellaneous views. Text is limited to a brief foreword and an occasional caption.

LETTERING OF TODAY, edited by C. G. Holme. Studio Publications Inc., New York. 144 pp., 8¹/₄ x 11³/₄. Paper, \$3.50; cloth, \$4.50.

Produced with characteristic completeness, this new Studio publication covers the field of lettering—as distinct from type—in its application to book production, architecture, and advertising. With hundreds of illustrations, covering an extensive variety of applications, the book is a useful reference for architects and designers, and should be of particular value in the design of displays, educational exhibits, etc. Textual matter includes an essay on the principles of hand-lettering, articles on calligraphy, and the use of lettering in specialized fields, such as architecture.

(Continued on page 74)



D SEE HOW SNUGLY IT FITS! Kimsul is made the proper width to fit snugly between standard spaced studs. No cutting or fitting . . . NOTE HOW CONVENIENTLY it can be worked around wires, pipes, etc.! As flexible as a blanker, obstructions in a wall cause no difficulties when insulating with Kimsul...

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(Continued from page 70)

A HISTORY OF ARCHITECTURE ON THE COMPARATIVE METHOD, by Sir Banister Fletcher. Charles Scribner's Sons. Tenth Ed.tion, revised and enlarged. 1,033 pp., 4,000 illustrations. $6\frac{1}{2} \ge 9\frac{1}{2}$. \$12.00.

It is forty-two years since this book first appeared, and immediately established itself as a unique reference work on architectural history. In the time that has followed nothing has appeared even remotely comparable to it, and its position today seems more unassailable than ever. This new edition has changed the contents but little: some of the photographic illustrations have been reproduced at a larger scale, and there are brief sections on recent architecture in England and the United States. Essentially, however, the value of the book continues to be what it has always been, the presentation of beautifully drawn plans, interiors, exteriors, and details, and the wealth of factual material in the text.

STANDARD PLUMBING DETAILS, by Louis J. Day. John Wiley & Sons, Inc., New York. 119 plates. $9\frac{1}{2} \times 11\frac{1}{2}$. \$6.00. This collection of plumbing details is a valuable addition to the architect's working library. Designed for engineers, contractors, plumbers and students as well as architects, it contains a large number of plates, of which a sample is



shown here, covering most of the problems commonly met in residential and commercial buildings. For ease of reference the book is divided into four sections: fixtures, equipment, systems and layouts. Drawings are complete and clear, and have the additional advantage of being reproduced to scale. Use of these standards by the architect in the preparation of working drawings should do much to eliminate confusion and expense on the job.

As a service to interested readers, THE ARCHITECTURAL FORUM will undertake to order copies of foreign books or others not conveniently obtainable locally, which have been reviewed in this department. Checks and money orders to be made payable to THE ARCHITECTURAL FORUM.





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ARMCO Ingot Iron has been widely used in air-conditioning work, and has an impressive record of service. It is a consistently uniform, commercially pure iron with a full-weight protective zinc coating.

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For exposed ducts, and other sheet-metal work that must be painted, Armco Galvanized PAINT-GRIP sheets are recommended. PAINTGRIP not only preserves the life of the paint, but saves time and money in installation. The painter can set to work as soon as the sheet-metal contractor is done.

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79

OUR NEW HOME must have ... FRIENDLY, INVITING INTERIORS COLORFUL, ATTRACTIVE ROOMS QUIET, RESTFUL ROOMS Yes, and SUBSTANTIAL, MODERN WALLS YEAR AROUND COMFORT and INSULATION

ALL OF THESE DEMANDS ARE MET WITH THE INSULITE WALL OF PROTECTION

Many are cashing in on this demand by showing how the different Insulite building materials go together to make Walls of Protection.

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CAST STONE with 11,000 lb. compressive strength

CAST-STONE offers a wide range of possibilities in color and texture, with marked economy. On Oceanside, L. I., High School, for example, cast-stone is a warm gray-colored artificial granite, rosetinted to harmonize with brick. Texture, obtained with crushed marble and small proportions of black slag fully exposed by rubbing, is clear and uniform, accenting ornamental detail. Architect: Frederic P. Wiedersum, Valley Stream, N. Y. Cast-stone produced by National Cast Stone Corporation, New York, N. Y.

As to structural quality, tests of this cast-stone, which was made with 'Incor' 24-Hour Cement, show a compressive strength of more than 11,000 lb. per sq. in.—result of careful workmanship and the quality of this improved Portland cement. 'Incor' also helps to assure durability—important in cast-stone, which is used principally for exterior work. By curing thoroughly in 24 to 48 hours (6 to 8 days sooner), 'Incor'* helps to produce strong, dense, watertight concrete which withstands exposure to the elements. Lone Star Cement Corporation, 342 Madison Avenue, New York. *Reg. U.S. Pat. Off.

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General Electric Announces Complete New Line of All-Steel Kitchen Cabinets. New Design Short-Cuts Installation Time and Expense. Replete with New Exclusive Features, Yet They Cost No More Than Ordinary Cabinets. Read the Facts!

THE modern all-electric kitchen gets another big boost from General Electric! For now G-E presents the finest and most complete



line of all-steel kitchen cabinets or storage appliances ever introduced. Embodied are many exclusive convenience features never before available in kitchen cabinets—yet the new G-E line is competitively priced!

Flexible to the Fraction of an Inch!

The new G-E cabinets will fit any size and style of kitchen in homes of any price class. Wall and base cabinets come in 15, 18, 21, 24 and 30 inch widths. Wall cabinets are 18 or $30\frac{1}{2}$ inches in height. Base cabinets are furnished with doors or drawers. Every type

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Simple and strikingly beautiful in design, the new General Electric cabinets are of sturdy welded all-steel construction with gleaming white Glyptal-baked enamel finish. Flush-type construction, work surface illumination, roller bearing drawer guides and styled, chrome-plated hardware.

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27 TIME-SAVING, LABOR-SAVING FEATURES AND ACCESSORIES TO DELIGHT THE HEARTS OF MODERN HOMEMAKERS. LOOK THEM OVER!



Adjustable sliding shelves of steel wire. Refrigerator type. A revolutionary feature. Makes contents of all shelves easy to see, easy to remove.

Drawers in base cabinets equipped with adjustable roller bearing drawer slides. Quiet, "finger-tip" operation. By adding or interchanging slides and drawers, 11 different draw



drawers, 11 different drawer combinations are possible.



Automatic interior lighting in both wall and base cabinets.Wall cabinet fixtures serve dual purpose of illuminating work surfaces. Fixtures are equipped

with convenience outlet for plug-in appliances.

Easy to clean and keep clean because of flushtype construction with minimum of dividing lines. Completely concealed spring-action hinges eliminate door



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Accessories include cutlery tray, cutting board, bulk storage bin, cup racks, telescoping condiment shelves, pan cover file rack, bread and cake box, waste





basket, detergent rack, corner decorative shelfsections, grilled doors, broom cabinets, linen cabinets, plate warmer, planning desk and chair, and recipe cabinet.



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ANOTHER PROFITABLE FLEXWOOD TRANSFORMATION



East Wall, Cocktail Lounge, Detroit-Leland Hotel, Detroit, Mich. Walnut Flexwood treatment by Marie E. Stosskopf, A.I.D. (3100 sq. ft. required.)

The Grenadier motif is carried out by the gold glass mural, brass "headdress" lighting fixtures and floor inserts against a flush wall treatment in Flat Cut Walnut Flexwood for mellowness and warmth. Designed by Marie E. Stosskopf, A.I.D., the Grenadier Room is another example of the modern method of creating fine wood interiors...quickly and at moderate cost...in either new or existing structures. Flexwood meets every design requirement and its possibilities are limited only by the skill of the designer. Samples and data are yours for the asking.



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Manufacturers of Flexwood, Plywood, Armorply, Weldwood, and kindred products



Entrance to Grenadier Cocktail Lounge showing Walnut Flexwood in flush treatment on curved entrance wall.



Flexwood is thin wood in natural form and figure, mounted on cloth and made flexible for direct wall application. Being real wood, it takes any wood finish.

PATRICIAN



Bore hole in edge of door





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Write today for the new Anchor Weld Catalogue showing the many styles and designs available in Anchor Weld fences and gates and for Technical Bulletin No. 97 giving complete specifications. Anchor Post Fence Co., 6635 Eastern Ave., Baltimore, Md.



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SPECIFICATION AND BUYING INDEX

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PERMANENT BEAUTY TREATMENT FOR 115

THIS actual color photograph illustrates better than words why Nairn Wall Linoleum is enjoying such wide-spread acclaim from architects and builders.

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KEARNY, NEW JERSEY

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THE LOW COST HOUSE

The usefulness of this issue of THE FORUM is measured by the fact that it completely revises the definition of the house market and shows precisely how the market can be served and, in 50 recently built houses, is being served.

What has Building to offer the families who can afford \$30 to \$40 a month for a house? That question, comparatively unimportant in the Twenties, is all-important now. Reason: depression has squeezed incomes to the point where over 70 per cent of U. S. families now earn less than \$2,000 a year. Ten years ago well over half the U. S. was above that figure. From that enormously important fact stems this entire issue of THE FORUM. Obviously, if Building is to go places it will have to concentrate its production on the house which carries \$4,000 or less on its price tag.

THE FORUM anticipates more than one raised eyebrow over the esthetic quality of some of the houses presented in this issue. To such we point out that here is a problem not only in architecture but equally one in arithmetic. Improve the pattern as much as you like but when you are done be sure the figures add down correctly.

More often than not these small houses are designed without benefit of architect. More often than not architects will say they cannot afford to do small houses. But there is little comfort in that answer to the architect who believes his profession can no longer ignore the housing requirements of nearly three-quarters of the people in the U. S. There is no better citizen than the one who wants to own his own home. It is the great duty and opportunity of the architectural profession to see that he gets a good one.—The Editors.
Machine power and man power notwithstanding, an industry is no bigger than its market. Home Building as an industry has a big market, but it is doing a comparatively small business. It is missing (and, to a great extent, not even aiming at) the biggest part of its market—that for the muchtalked-of but seldom-built low cost house. In the Twenties, Building's market was for higher priced homes. It met that market well, sailed through that decade with an average annual production of 561,000 dwelling units. But, despite a decided change in market, Building has continued to produce high priced homes during the Thirties, and production has dropped to an annual average of 143,000 dwelling units. Only recently has Building stepped down to the low cost market, accounting in some measure for the bolstering 1938 volume of 245,000 dwelling units.

DWELLING UNITS PROVIDED 1920-38



Indisputable reason for Building's sagging production curve is Business Depression and its liquidation of the \$2,000-and-up income bracket. In prosperous 1929 more than 56 per cent of all U. S. non-farm families were earning \$2,000 or more per year. In the depths of Depression (1933) this income group shrank to 17 per cent, and, according to latest available



figures (1935-36), Recovery has only meagerly replenished the ranks of this group until today it holds 25 per cent of the total. These are the families who can afford to own or rent houses costing more than \$4,000—houses on which Building has stubbornly concentrated at least 65 per cent of its efforts during the past nine years. (Note how the profile of building operations coin-

DWELLING UNITS CONSTRUCTED



Each symbol equals 100,000 dwelling units

cides with that of the upper income group in Prosperity, Depression and Recovery—left—indicating why Building, as currently managed, is so vulnerable to business depression.) Result: the \$2,000-and-up group is over supplied with housing.

Below this relatively prosperous but small group is the large, stable, untapped market for the low cost house—families with an annual income ranging between \$1,000 and \$2,000 per year. Large because it accounts for about one-third of all U. S. non-farm families; stable because its size does not expand and



Plotted above are indices (1921 base) depicting the trend of 1) the average cost per dwelling unit of all types of dwellings built in 257 identical cities and 2) the cost of construction as measured by wholesale prices of building materials and union wage rates per hour in the building trades. Note that in the last two years the average cost per dwelling unit has decreased despite an upward trend in construction costs—indication that Home Building has at least extended a feeler into the low cost market. Never before in Building's recent history have the trends been so markedly divergent. contract with the ups and downs of general business; untapped because Building has not been particularly mindful of its existence. It embraces 35 per cent of all non-farm families, is today the most potent market for new homes. It is outranked in size only by the 39 per cent who earn less than \$1,000 per year and cannot, therefore, be housed by unsubsidized private enterprise with its present tools and techniques.

Unlike Building, the automobile industry has a product for this most important of income groups-one reason for the fact that the annual average of passenger cars sold to the domestic market during Recovery years has closely paralleled annual average sales during the Twenties. (Figure for 1937 was 3,643,386, surpassed only by the 4,140,512 volume of 1929.) A glance at the breakdown of factory sales in the U.S. and Canada by wholesale price classes shows that the automobile industry keys its production to the market: in 1927, when the \$2,000-and-up group climbed well up the family income ladder, sales of automobiles costing more than \$1,000 wholesale accounted for 20.7 per cent of the total, and sales entailing \$750 and less accounted for 64.8 per cent. Throughout Depression sales of low price cars increased percentagewise until in 1933 they accounted for 95.5 per cent of the total; the \$1,000-and-up cars polled but 2.5 per cent. By 1937 sales in both classes had declined to 92.4 per cent and 1.2 per cent respectively. And today the automobile industry continues to follow the market, puts mainstay reliance on the low cost car.



If Home Building thirsts for pre-Depression volume, it must consider the low cost market, build houses to meet it. Such houses must sell for well under \$4,000 complete with land. They must cost less than \$40 per month including mortgage interest, amortization and insurance, maintenance, heat, fire insurance, etc. They may be built for rent or for sale. In brief, they must compete with the present dwelling facilities of some 12,-000,000 U. S. non-farm families—those whose monthly carrying charges

FAMILY DISTRIBUTION BY MONTHLY RENTAL GROUPS

range between \$20 and \$40 (rent equivalent of an owner-occupied house is assumed to be 1 per cent of valuation). As shown in the chart (on preceding page), these families account for about half of the Nation's 25,000,-000 non-farm families, five times outnumber those paying \$50 and more on whom Building has long been concentrating.



But, not all these families are in the market for housing. According to latest available statistics (1930) 45 per cent of them already own their own homes, and to be ultra-conservative THE FORUM excludes them for its calculation, despite the fact that many of these owner-occupants are currently seeking new, better and perhaps bigger houses. Also excluded may be the families in the rental brackets below \$20 who are currently in the public or subsidized housing market. The balance is about 9,500,000 families, and 2,850,000 of them are in the \$30-\$40 rental group-nicely able to carry a low cost house. In addition, there are 4,830,000 families in the \$20-\$30 group-a buffer market to be met when Building has had more experience with cost reduction and low cost housing. Thus, some 7,680,000 families are renting quarters on financial terms which can now or eventually be met by the low cost house. But, from this market must be excluded those families which could not move from their present, perhaps substandard, homes even if the monthly cost of new houses were identical with that which they are now paying. Many families in these \$20-\$40 rental brackets are so large that the four-room low cost house would not accommodate them; location of the new low cost house might preclude others. Then, there are many families in this group who lack the ready cash for the necessary down payment.

Even with these families eliminated, however, the current potential market for the low cost house may be conservatively estimated at 3,000,000 units —a colossal figure beside the 245,000 dwelling units built in 1938. If these



Plotted above is the estimated number of private families in the U. S. at ten-year intervals between 1900 and 1980. Estimates for 1940 and thereafter are conservatively based upon the hypothesis of low fertility, medium mortality and no immigration. Medium fertility and net immigration of 100,000 per year after 1940 would elevate the curve until its 1980 terminal reached 50,000,000 families.

3,000,000 families would all buy or rent new houses, Building would be kept busy for twelve years at its present production rate—or for more than four years at its all-time high rate of 1925. Measured in dollars, this potential market holds some \$9,000,000,000 of residential construction—eight times as much as was done last year.

So much for the dollar dimensions of the low cost house market. Its linear dimensions are equally important. To meet the market the low cost house must be in no sense a "minimum" house, for at least two bedrooms, a living room, a kitchen, a bath and a utility or basement room are prerequisites to salability. A one bedroom house may meet the requirements of a particular type of family, but, if that family moves out, the house cannot be resold to the average family in the \$1,000-\$2,000 income group. Two bedrooms will readily serve a family with a son and two daughters with sleeping accomodations for the son in the living room. (If attic space may be made livable, the house will serve still larger families.) Those builders who have been touching the low cost market are evidently cognizant of the downward trend in the size of the average U. S. family: 1890—4.93 persons; 1920—4.34 persons; 1930—4.10 persons. Their two bedroom houses are adequate for the average family.

FAMILY SIZE IN \$1,000-\$2,000 INCOME GROUP



Each symbol represents 1 million families

The problem of family size, however, is not particularly pressing as far as supplying housing for the \$1,000-\$2,000 income group is concerned—only about 16 per cent of these families have four or more children. To be exact, 25 per cent of the families are comprised of only two persons; 47 per cent, of three or four persons; 20 per cent, of five or six persons; and the remaining 8 per cent, of seven or more persons.

But there are other qualifications which enter into a study of the market. While there is plenty of room for the low cost house, it is not adaptable in equal measure to all parts of the country. In the first place, since the building of low cost houses is somewhat more difficult in the larger cities where land is scarce and high priced, the distribution of \$1,000-\$2,000 according to city-size must enter into any market analysis. Such a breakdown of nonfarm families spotlights the fact that more than 60 per cent of them are living in communities of less than 100,000 population:

	Families in \$1	000-\$2000 income gr	Families in \$2000-and-up income group			
CITY SIZE	NUMBER	PER CE	NT	NUMBER	PER CENT	
1,500,000 and more*	1,190,273	15.0		1,107,222	21.2	
100,000-1,500,000	1,960,610	24.8		1,561,012	29.8	
25,000-100,000	1,137,675	14.3		662,083	12.6	
2,500-25,000	1,751,213	22.1	60.2	957,243	18.3 49.0	
Rural non-farm	1,887,286	23.8		948,325	18.1	

* Only four cities fall into this classification: New York, Chicago, Philadelphia and Detroit.

Secondly, extent of the low cost house market varies from one geographical section to another. Thus, as seen on the map (below), the ratio of families in the \$1,000-\$2,000 income bracket to the total number of families is greatest (48 per cent) in the New England region, smallest (30 per cent) in the Southern region where about half of the non-relief family population earns less than \$1,000 per year.



A third qualifying factor which must be considered in this market analysis is the variation in need for low cost housing from city to city, despite the fact that these cities may be in the same geographical region and population bracket. Example: Columbia, S. C. and Wheeling, W. Va. are both in the Southern region, and both are in the same population bracket-the former's population was 51,581 in 1930; the latter's, 61,659. But, according to a 1933 survey, 17 per cent of Columbia's tenant families were in the \$1,000-\$2,000 income group while 33 per cent of Wheeling's were so classified. Also typical of inter-city variations is a comparison of average annual rent bills: \$185 in Columbia, \$227 in Wheeling-a 22 per cent difference.

Such is the low cost house market. It is big even without considering the inestimable amount of required housing replacement, a hazy view of which is seen in the fact that about one-quarter of all residential structures in urban U. S. were built prior to 1894. Furthermore, no attempt has been made to project the low cost house market in terms of the country's continually increasing family population. Today it numbers some 34,000,000; by 1980, conservatively assuming no immigration, low fertility and medium mortality, it will total some 46,000,000*. If past experience is any guide, however, it is reasonable to expect that the market for the low cost house, as measured by families in the \$1,000-\$2,000 income group, will continue at or above one-third of the total. In tune with general business conditions, families will enter and leave this market, but the net change will be small from year to year. Result: a market that is not vulnerable to economic depression. And, since stability is its keynote, there will always be a market for the few low cost houses that were built yesterday, for the increasing number that are being built today and for the many more that must be built tomorrow.

* See chart, page 236.

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PLAN & DESIGN

BASIC CROSS-SECTIONS for one-story and storyand-a-half low cost houses, as determined by joist length, maximum spans, and 16 in. framing-center modules. Second section also applies to minimum two-story type. Modular units are taken as inside exterior walls.



11 ft. 4 in.=maximum span for 12 ft. joist (2x8 in.) 11 ft. 4 in.=maximum span for 12 ft. joist (2x8 in.) 1 ft. 0 in.=thickness of walls and bearing partition 23 ft. 8 in.=maximum depth—2 12 ft. joists 23 ft. 4 in.=nearest modular size, 16 in. modules (Joists lap 12 in. with box sill).



13 ft. 0 in.=maximum span for 14 ft. joist (2x8 in.) 11 ft. 4 in.=maximum span for 12 ft. joist (2x8 in.) 1 ft. 0 in.=thickness of walls and bearing partition 25 ft. 4 in.=maximum depth—14 ft. and 12 ft. joists 24 ft. 8 in.=nearest modular size, 16 in. modules (Joists lap 16 in. with box sill). Wherever builders are reaching and satisfying the market for low cost homes, their approach has been first and foremost by way of design. One of the easiest ways to make a house cheaper is to make it smaller, but this by itself is not enough. In order to sell or rent, the low cost house must be both adequate and attractive. What the public wants is a home with as many of the features of the higher-priced house as possible, which fits its needs and present furniture.

An almost universal solution of this problem has been the 4 or $4\frac{1}{2}$ room, one story cottage. Sound because such a unit is inclined to be much more attractive than a two story house of the same size, as well as because its savings on stairs and plumbing are sizable, this solution has one pitfall; sheer space is at a double premium. Every additional foot calls for an equal increase in foundation and roof area and perhaps in lot-size, all three already excessive as compared to the two story type.

Besides making the cost of these items proportionately more important in relation to the total, this has the further effect of setting rigid size-limitations beyond which the designer cannot go if he wants to produce the most house for the money—an imperative in the low cost field. Thus the carefully made cost estimates on the pages following—computed on the basis of the same unit prices—indicate that the maximum economic size for the one story unit is five rooms. The practice (usually held to be one of the greatest advantages of the one story plan) of adding a finished attic bedroom is shown to be fallacious, since six rooms can be built cheaper on two full floors than on one-and-a-half. Apparently the extra cost of a larger roof and foundation for the story-and-a-half type, which up to this point have been counter-balanced by the saving on the stairway and second floor hall, are enough to tip the scales in favor of the two story unit when these are eliminated, despite the latter's larger exterior wall area.

On the other hand, these same cost estimates indicate that the law of diminishing returns sets in just as surely if the one story house is made too small. Because every house must have the same minimum number of kitchen and bathroom fixtures, about the same heating plant, the same cellar stairway, chimney and exterior doors, and—room for room and closet for closet—the same number of interior doors and the same number of windows, it is clearly a mistake to make the structural shell which accommodates these important cost-items too small, or even to reduce the number of rooms beyond a certain point.

Undoubtedly the strict upper and lower limits which these factors place on size have much to do with the remarkable similarity of plan and design which characterizes the low cost field. Equally important contributing factors are standard joist lengths and—of increasing importance—standard sizes of sheet materials. These combine to produce the two standard economical cross-sections shown in the diagrams at the left, which—suitably modified in accordance with the kind of construction contemplated—should be the point of departure in planning this class of work.

Shown on the following pages are several plans for low cost one-, one-andone-half-, and two-story units. These represent a consensus of best current practice in terms of the 16 in. modular unit which simplifies framing and saves money on sheet materials inside and out. That they by no means exhaust the possibilities for ingenious rearrangement is indicated by the case studies. Rather, they are intended to show the framework of costlimitations within which the designer must work and to provide an index of the costs involved in additions of various kinds to the basic minimal unit.

THE LOW COST HOUSE . MARKET . PLAN & DESIGN . CONSTRUCTION . LABOR COST



LARGE SQUARES indicate 4 ft. 0 in. modules (planning units which facil tate use of standardsized sheet materials); small squares indicate 16 in. modules (corresponding to standard center-to-center dimension for framing).

EXTERIOR TREATMENT: ONE STORY HOUSE



240

ESTIMATED NET COST

See note on page 242

4 ROOMS

\$ 860

\$2,360

4 ROOMS

\$ 915

1,585

\$2,500

\$ 945

1,630

\$2,575

4 ROOMS

\$ 930

1,595

\$2,525

4 ROOMS

\$ 940

1,620

\$2,560

5 ROOMS

\$ 980

1,670

\$2,650

variation.

lot

41/2 ROOMS

1,500

QUANTITY PRODUCTION . LAND & SERVICES . CARRYING CHARGES . CASE STUDIES



1 STORY PLANS are most commonly used in the low cost field, both because they usually produce a more attractive, salable house than the two story variety and because building costs in many communities can only be met with this type of unit. That the basic plan should not be made too small, however, is indicated by the various plans and cost estimates at the left, which show that the difference in net construction cost between the 4-room unit at the top of the page and the more generous 5-room plan at the bottom is but \$150, or only 6 per cent.

Three-quarter inch scale plan-models built from demountable modular units developed by Raymond V. Parsons, New York, N. Y. Photos by John Beinert. C1.

B.





ESTIMATED NET COSTS are based on frame construction with average rates for labor and materials-both of which vary considerably in different parts of the country-and are intended principally for use in comparing the various plans. They have been figured in accordance with prices charged an operative builder who erects 25 or more such houses a year, do not include overhead and profit, fees and permits, equipment, service connections, land, or landscaping. To get an approximate idea of the whole cost of any of the units in your locality, multiply the estimated labor cost by the local hourly rate for carpenters, increase the materials cost by one-third unless you are planning a large scale development, and add contractor's overhead and profit, fees and permits, equipment, service connections, land, and landscaping. In the South and Northwest, where lumber costs are low, one-fifth may be deducted from materials. Where no heating plant or basement are required, deduct \$350 from the total.

The cost-differential created by these variations is tremendous. House "C," for example, would probably sell for two-thirds more

EXTERIOR TREATMENT: 1 1/2 STORY HOUSE

as an individually built unit in Butte, Montana (where carpenters get \$1.50 per hour) as in a developer's project in Tampa, Florida (where they make 75 cents), despite the fact that both are in low materials-cost zones:

Labor \$940 x .75=	\$ 705	Labor \$940 x 1.50=	\$1,410
Materials \$1,620—1/5 =	1,315	Materials \$1,315 $+$ 1/3 $=$	1,750
	())		
	\$2,020		
Less Basem't and Heating	350		
Net	\$1,670	Net	\$3,160
Overhead and Profit (10%)	170	Overhead and Profit (10%)	315
Fees and Permits	50	Fees and Permits	50
Equipment	125	Equipment	150
Land and Service Connect'	ns 400	Land and Service Connect'r	ns 450
			-
Total (Selling Price)	\$2,415	Total (Selling Price)	\$4,125



ESTIMATED NET COST

HOUSE D	4 ROOMS
Requires a	reaway;
provides stai	r to attic.
Labor	\$ 975
Materials	1,675
Net Total	\$2,650
Garage:	
Labor	90
Materials	145
Net Total	\$2,885
HOUSE DI	5 ROOMS
Labor	\$1,065
Materials	1,975
Net Total	\$3,040

FINISHED 2ND FLOOR

Labor		\$	150
Materials			240
Net Total		\$	390
Total for	6	rooms	and
Garage		\$3	3,410

1/2 STORY PLANS, a common method of providing an extra bedroom, are shown by the estimates to be relatively costly as compared with the two story plan. They will probably continue to be much used, however, because of their better outside appearance and the opportunity they afford to do a portion of the work after initial construction has been partially paid for.

HOUSE E	4 ROOM	S
Fireplace;	space fo	r
stair to at	tic.	
Labor	\$ 99	5
Materials	1,73	5
Net Total	\$2,73	0
Garage:		
Labor	9	0
Materials	14	5
Net Total	\$2,96	5

HOUSE DI	5 ROOMS
Entrance from	n porch.
Labor	\$1,165
Materials	2,040
Net Total	\$3,205

FINISHED 2ND FLOOR

Labor	\$	300
Materials		450
Net Total	\$	750
Total for 7 roo	ms	and
2 baths	\$3	3,955



D. SECOND FLOOR

S



THE LOW COST HOUSE . MARKET . PLAN & DESIGN . CONSTRUCTION . LABOR COST



The main fact revealed by a cost analysis of the small house is that it is made up of a number of items, no one of which is very large. Such important elements, for instance, as the foundation, framing, exterior covering, heating, millwork, interior finish and plumbing, all run between \$200 and \$350. In consequence, any appreciable saving on the total cost of the house (omitting from consideration land and financing charges) will be the result of a series of many small reductions rather than a few large ones.

The section which follows illustrates a number of ways in which costs are being cut by architects and builders, not to produce a minimum house, but a minimum *salable* house.



CONSTRUCTION

NET CONSTRUCTION COST 100%

POSSIBLE SAVING 5%



FOUNDATION

Every builder knows that the cheapest way to put a house on the ground is to set it on posts. But every builder also knows that this practice is accepted in some localities and not in others. The salability of the house on piers or posts varies pretty definitely with the climate, buyers in the northern States objecting to it on the basis of cold floors. Appearance is another important factor. Illustration *i* shows a simple device for taking care of both objections. Sheets of flexible cement asbestos board are applied to the piers, and run down below grade. Not only does this look like a concrete foundation wall, but it reduces the heat loss to a point which compares with that of a house with a basement.

Where some kind of basement must be provided, drawing 2 shows a treatment which has been found successful. Only one half of the basement is excavated, concrete piers on the inside wall serving as an inexpensive way of supporting the floor joists. Leaving the unexcavated space open reduces sales resistance, as the buyer can see that warm air from the cellar can circulate freely under all floors. Sloping the grade from front to rear permits the combination of an attractive street elevation and cellar windows above grade in the rear. Should areaways be necessary, curved sheets of cement asbestos (illustration 4) provided a relatively inexpensive solution. A method of reducing excavation costs which has not been used widely enough to produce any reliable consumer reaction is shown in figure 3.

An ingenious method of constructing a concrete floor slab is shown in **5** and **6**. Used in California, it would not be suitable for colder regions without modification. A trench is dug to a depth of eight inches or a foot, and the earth within the foundations is scraped down a few inches. A bed of sand is put down, the simplest of formwork is erected, and foundations and slab are poured in one operation.













NET CONSTRUCTION COST 100% -



STRUCTURE

For the standard framework of studs placed 16 in. on centers various systems of pre-cutting have been devised, and put into operation in a number of localities, particularly on the West Coast. The idea is not new, but as used today it makes savings possible through the re-grading of lumber and elimination of waste (ARCH. FORUM, Dec., 1938, p. 475-6). The drawing (No. 7) illustrates the method: the shaded pieces are cut to length and shipped to the job as a package which fits all average-sized windows, reducing both labor and material costs. A similar system is used for all other framing members.

With the increasing use of dry finishes, a two-foot spacing for stude becomes practical, although the savings on a two bedroom house would not be much over ten dollars.

The use of wood or metal spacers for facilitating the location of framing members has been adopted by a number of builders, not only because it reduces labor costs but also because the dry finishes require accuracy in stud spacing. A good example of the metal spacer (here also used as a sill) is shown in photograph **8**.

Figure 9 indicates a framing arrangement which saves 10 in. to a foot of wall around the entire house. As this includes exterior covering, sheathing, insulation and interior finish, it should be possible to save forty dollars or more on a house $25 \ge 30$. In addition, this framing produces the attractive low eaves associated with the Cape Cod type of house.

The framing system shown in 10, 11 and 12 is claimed to produce impressive savings by its sponsors, the National Lumber Manufacturers' Association. Using 2 in. plank over girders spaced six feet apart, instead of the conventional double floor on joists, a cost saving of about 20 per cent for labor and materials is said to be made. Another ingenious development is the siding, also made of 2 in. tongue-and-groove plank, which serves as both siding and sheathing.

Cost reduction in sheathing has followed the same lines as in other parts of the house structure: substitution of large units for small; attempts to make one element serve for two or more; and efforts to eliminate it entirely. The introduction of plywood and composition boards illustrates the first, the saving being made on labor rather than materials. Use of insulating board as sheathing combines two functions in one material; in some cases it has replaced the exterior covering as well. In the case of vertical plank siding it is the exterior material which replaces the sheathing. Savings in









the case of sheathing are difficult to estimate, partly because of the necessity of budgeting insulation costs, etc., partly because the economical use of sheet materials depends on the simplicity and accuracy of framing.

Drawing 13 shows a 2 x 10 girt notched into the studs, suggested as a means of eliminating lintels on the first floor windows.

Where brick is used the Rolok wall (figure 14) offers possibilities of saving labor and material. A wall which has a better appearance is shown at the left: it consists of two four-inch walls with a small air space in between, bonded together at intervals by Z-shaped metal clips which are laid in the horizontal joints. Further advantages of this wall, compared to the less expensive Rolok type, are better insulating value and greater protection against leaks.

Poured concrete walls have the disadvantage of requiring expensive forms, and in consequence this material has been largely restricted to operations which permit repeated use of the forms. A method now being recommended by the Portland Cement Association, known as the "tilt-up" method of building rectangular reenforced concrete walls, has the great advantage of requiring practically no formwork (15, 16, 17). The basis of this method is the use of the first floor on which to cast the side walls. One thickness of asphalt-coated paper laid on the floor is the main "form"; the others are boards whose width is slightly greater than the wall thickness. Window and door frames, ornament, etc., can be cast in place, and any desired texture given the exterior face of the wall while it is still flat. When ready the wall is tilted up into position. Corners are poured after the walls are in position.



15-17.



EXTERIOR FINISH 12% POSSIBLE SAVING 6%



EXTERIOR FINISH

Since it is well known that the best way to save money on any element is to omit it, there have been attempts to use heavy weatherproof insulation board as sheathing and siding. Two factors which have tended to build up sales resistance against this method as applied to year-round homes are the danger of mechanical injury to the surface, and lack of texture. A most successful example of its use is shown on page 278.

Cost-saving devices applied to the conventional exterior coverings are few. A manufacturer of wood shingles, for example, recommends a method known as "double coursing" for sidewalls, which uses an unstained shingle of inferior quality under an outer course of stained shingles, permitting from $62\frac{1}{2}$ to 70 per cent greater exposure with proper protection.

Increased exposure has also been attained with a new cement asbestos shingle, shown in figure 18. Unusual in shape, these shingles are laid 90

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to the square, and consequently reduce labor as well as material costs. Asphalt shingles and siding are also made in strips which reduce application costs.

A technique which seems worth closer examination deals with the use of large sheets of plywood, asbestos cement, or other composition materials, laid up with lapped joints. This method takes advantage of the labor-saving qualities of sheet materials while avoiding the weatherproofing problems which arise when the sheets are laid with flush joints.

An interesting treatment for concrete block (19) has recently been devised. Known as "shingle concrete block" it has one face scored and slanted to suggest shingles, producing a wall richer than the flat-faced type.

> NET CONSTRUCTION COST 100% — WINDOWS, DOORS ETC. 13% — POSSIBLE SAVING 2% —



WINDOWS, DOORS, ETC.

Windows constitute a sizable expense item in the house, and one difficult to reduce. Heating studies have demonstrated repeatedly the importance of windows as a factor in heat loss, and house buyers have learned that tight, weatherstripped windows mean an essential long-term saving. Builders have learned that the cheapest way to get windows with the required qualities is to buy them prefitted—as a packaged unit, whether in wood or metal (figures **20**, **22**, **23**, **25**).

Illustrations 23 and 24 show casements in wood and metal which attempt to effect savings by the use of sliding screens to eliminate operator hardware. Prices on the latter, however, have been reduced to such an extent that savings are practically canceled by the increased cost of the movable screens. A separation of the two functions of the windows, lighting and ventilation, gives a better approach to the problem of savings. Glass fixed in place is cheaper than movable sash, and if used in combination with casement or double-hung windows, as indicated in figure 21A, will definitely result in economies. An extreme example is the use of only fixed glass, with louvers or some other device for ventilation (figure 21). This approach, of which an executed example is shown on page 318, has two serious objections: sales resistance and the expense of the ventilating apparatus. Probably the practical solution in most cases will be a combination of fixed and movable windows.

The labor savings made possible by the use of complete window assemblies







16"

16" 16" 16" 16" 16"

20.

21.

21A.

-Fixed Sash-

Fixed

T

16"_16"_16'



1

22.







is indicated by the photograph (figure 25) showing an installation, which consists of only inserting and attaching the window, a matter of a few minutes. Illustration 20 indicates an extension of this approach, applied to a fairly common type of wood double-hung window. Studs are used for the window frame, and the whole section is assembled in the local mill, being delivered to the job as a unit. Using a continuous $4 \ge 6$ plate, there is still an appreciable saving in lumber as well as carpenter labor. Both the conventional and proposed framing, as shown, take 2 ft. 6 in. sash.

The story on doors is chiefly concerned with hardware. Builders know that batten doors are cheaper than panel doors; sales resistance makes their use unprofitable in spite of the fact that their use on closets, etc., is not objectionable. At the other extreme are the various types of inexpensive flush doors, consisting of a frame with surfaces of plywood or composition board. These can be made cheaply, it is true, but they cannot be considered cost-saving devices because their use is dictated by reasons of appearance, and their price can generally be met or beaten by conventional panel doors. As in the case of windows, the trend is toward furnishing a complete assembly, and within a reasonable time it should be possible to buy doors complete with frame, hardware and other fittings. A number of manufacturers are now selling doors prefitted to standard openings, and savings of 75 cents to \$1.50 are claimed. It seems probable that complete shop assembly would result in greater savings.

The two items of hardware (figures 26 and 27) are of interest. The lock eliminates mortising, except for a shallow sinkage for the latch face, and is said to reduce setting time by better than half. The hinge is similarly designed to cut down on labor; with one leaf exposed, no gauging is required, and only the jamb leaf is mortised.

The same methods applied to windows are now being extended to larger elements. Prefabricated steel stairs (figure 30) have been used on at least one large project, and will shortly be sold as stock items. Plywood models will probably also be manufactured. Such stairs represent a tremendous saving in labor time. The main effect of their introduction, in addition to immediate savings, will be a further incentive toward standardization of house plans.

A number of manufacturers are producing complete kitchen units aimed at the low cost market. Figure 29 shows an assembly containing sink, laundry tray, open shelves, cupboards, and an ice refrigerator. The sink cabinet above (figure 28) is provided with a round sink, linoleum work top, drawers for cutlery, silver, bread, etc.

The three drawings of closets (figure 31) indicate clearly the savings in space made possible by the elimination of heavy enclosing walls. A simple and obvious device is the replacement of partitions between closets by



Contractory

30

Johnson & Johnson

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sheets of plywood. The next step, entirely feasible where dry finish is used, would be the substitution of standard shop-assembled units, here shown as double-shell plywood construction. Metal, on a quantity production basis, would be equally suitable. A fact worth noting in passing is that the prefabricated closet saves some 8 sq. ft. of space over the stud-enclosed type, and with construction cost running around \$3.50 per square foot, progressive builders will find such economies worth consideration. Also worth mentioning is that pre-assembly of closet units, and their sale in any quantity, will again encourage the acceptance of standard plans.



INTERIOR FINISHES

The acceptance of dry finishes has necessitated the development of a number of new details, some of which are shown here. Figure 32, for instance, illustrates an attempt to reduce labor and materials cost by the elimination of trim, and the use of the door (or window) frame for this purpose. It consists of nothing more than two slots in the frame, an operation easily performed by any mill.

While it is not possible to simplify all trim to this extent, obviously, the use of dry finishes will do much to reduce the cost of this item. For example, the replacement of a high baseboard by some such molding as illustrated (figure 34) becomes feasible. The interior by Oscar Fisher shown in illustration 36 is a good example of simplified trim for sheet materials.

Suitable for use with dry finishes are two types of wall coverings, one (figure 35) being furnished in wall-height rolls, and used for a wallpaper base. the other including the washable coated fabrics, used as wallpaper or as a substitute for paint. Where invisible joints are used on sheet materials, paint will produce an appearance indistinguishable from that of a plaster surface. A framing suggestion is incorporated in drawing 33. Here the 4-inch corner post has been extended beyond the face of the stude to receive the edge of the sheet material. Using the post to take up the four inches in this way it becomes possible to arrange the four by eight sheets both inside and out without waste. In some cases the corner post is used as the finished trim.







34

32

QUANTITY PRODUCTION . LAND & SERVICES . CARRYING CHARGES . CASE STUDIES

NET CONSTRUCTION COST 100% .

ELECTRICAL 3% -





ELECTRICAL

In the wiring diagram at the left, prepared by the National Adequate Wiring Bureau, it has been assumed that the house will be supplied from overhead wires run along the property line at the rear of the lot, and that it is feasible to bring the service drop to the eaves line of the house just to the right of the rear door.

The wiring layout is based on present standards of minimum adequacy certainly a minimum for salability. Future increases in power consumption have been provided for.

It will be noted that only one lighting outlet has been provided in the bathroom. As it is now possible to buy medicine cabinets containing two lights, convenience outlet and switch, this seemed a reasonable way to reduce the expense of the wiring installation.

As indicated on the plan, two 15-ampere branch circuits should be provided to serve the lighting outlets and all convenience outlets except those in the kitchen.

The convenience outlets in the kitchen should be served by a 20-ampere branch circuit (of at least No. 12 wire) to which no other outlets should be connected.

Spare terminals should be provided in the fuse box or circuit breaker panel to serve an additional branch circuit in the future.

Service entrance equipment should consist of three No. 8 wires, and a 30-ampere switch fused at 30 amperes, or a 35-ampere circuit breaker. This will take care of an addition to present lighting and appliance needs. If plans call for an electric range, the service entrance should be increased to three No. 6 wires, and a 60-ampere switch fused at 50 amperes or a 50 ampere circuit breaker.

Where electric range, oil burner, electric water heater, space heaters or water pump are to be installed, special circuits should be provided.

NET CONSTRUCTION COST 100%

HEATING 9% -



38.



Investigation of heat losses in the small house leads to the conclusion that the orly way to save money on heating is to spend it first. A study of Plan C (page 240) shows that under average winter conditions for New York, hourly heat losses from this house can vary from 28,800 Btu's. to 63,000. This difference, in terms of coal consumption, would be well over four tons per season. The potential saving (or waste) in the initial cost of the heating plant is equally impressive. In consequence, it seems worth while to go the limit on insulation, weatherstripping and storm sash.

The insulation story is sufficiently familiar to most builders. New types which may be of interest are cotton quilt, entered as a competitor in the low cost field, and a bat which is sufficiently rigid to stand without fasteners when placed between studs. Double glazing and storm sash were adequately covered in the September, 1938 issue of THE ARCHITECTURAL FORUM.

With a heating budget at about \$225 maximum, it is unlikely that the buyer of the minimum house will be able to demand or get automatic heat. The

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exception is gas, in those localities where rates permit its use.

Again, cost considerations tend to favor warm air heating as opposed to steam or hot water, regardless of the type of fuel used. A remarkably economical arrangement is shown in figure 38, where the heater is placed adjacent to the hall, whose ceiling becomes a plenum chamber. Ductwork is reduced to practically zero, and installation cost is little more than the cost of the heater. By locating grilles in the floor and using the unexcavated space for a return, the "cold floors" argument loses its force. Two heaters suitable for such installations are shown in figures 39 and 40. Using such heating units with the system indicated will bring the cost of the heating plant well under the budget.

Floor and wall heaters, gas-fired, are available in a number of models. Standard in many of the warmer sections of the country, where used in colder localities they show the advantage of low initial cost and the disadvantages of any system which relies on one warm air supply for the whole house.

Hot water as well as steam plants will come within the budget where onepipe systems are used. A most ingenious arrangement is the one-pipe venturi system for hot water. Working on the old injector principle, these venturi fittings are actually suction pumps (figure 41) in which the only thing that moves is the water. Any type of fuel can be used, and the boiler can be located on the first floor as well as in the basement.

A hot water supply and heating system recently installed in the large development at Clairton, Pa.* has a number of interesting features. Small in size, the gas-fired heating unit works on a minimum size tank, circulates hot water to radiators under pressure, and uses flexible copper tubing instead of rigid pipe for supply and return lines.

*Аксн. Forum, Dec. 1938, р. 477.

PLUMBING 11%

PLUMBING

Cost saving on plumbing is generally a matter of planning or buying rather than technique. Fixtures, for instance, are more or less standard in price, and any builder knows what the minimum for his locality will be. The various prefabricated set-ups, for either piping or entire bathrooms, have failed to materialize as yet. Cost breakdowns on this important item show that overhead and profit form 20 per cent or more of the total, and operative builders have learned that the employment of a licensed plumber instead of a plumbing contractor will consequently reduce this item materially. Small builders attempt to do the same by setting what seems to be a minimum acceptable figure, and then shopping around until they find someone who will take the job. This is cost reduction, to be sure, but hardly the soundest type of reduction. A survey of one of the Purdue houses shows a fixture cost of \$110 against a total of \$290. Labor and rough plumbing amount to \$113.15. As we have seen, operative builders eliminate most of the overhead and profit on plumbing, and even assuming that fixture costs cannot be reduced, there is still an item of \$113 which could be drastically cut by the use of simplified, pre-assembled piping.

The builder can save some money by planning. He can save about fifteen dollars, for instance, by placing kitchen and bath back to back. The tankless heater installation (figure 42) shows how hot water piping can be reduced to a minimum, and the same, of course, could be done with other types.





LABOR COST Commonest gripe in the building business is high labor cost. High hourly inently in every discussion of housing. In terms of the suburban operative builder, however, labor costs vary so greatly as to defy generalization. Under conditions favorable to the builder labor costs run 20 to 30* per cent of selling price and such work is almost entirely non-union, mostly based on relatively steady employment at a weekly wage which seldom exceeds \$40 a week for skilled trades. There are exceptional communities, of course, but practically nowhere does the operative builder have to contend with the jurisdictional problem, prime trouble-spot for his city cousin.

> Labor costs, nonetheless, vary and vary widely on a country-wide basis, as the table below dramatically shows. Even ignoring the extremes like New York (figured on the union basis of \$1.75 for carpenters, highest in the country and probably much above the wage actually paid by nearby Long Island builders) and the Savannah non-union rate (50 cents an hour, or \$22 per full week for skilled carpenters), the variation is considerable: \$380or more than half again the low figure of \$735. Greatest importance of this is its effect on the use of labor-saving materials and techniques, obviously most called for in communities where labor cost is high.

> *For nine of the houses published in this issue on which a breakdown separating labor from material costs was available, the ratio of labor to selling price was 26.9 per cent.

ESTIMATED LABOR COSTS IN VARIOUS CITIES: HOUSE C-4 ROOMS (p. 240)

Trade	Hours	New York	Dayton	Duluth	Norfolk	Savannah (non-union)		
CARPENTER	ARPENTER 500 \$875 \$690		\$565	\$450	\$250			
COMMON	100	95	55	60	35	25		
PAINTER	70 105 85 7		70	55	35			
MASON	40 75 65		65	50	55	30		
PLUMBER	35 70 50		50 45 40		40	25		
ELECTRICIAN	20	40	35	25	20	15		
HELPERS	40	50	40	35	25	20		
OTHER SKILLED	65	100	80	65	55	50		
TOTAL	870	\$1,410	\$1,150	\$915	\$735	\$450		



NOTE: In the table at the right and chart below, estimates are based on frame construction and dry finshes. Plasterer's time for plaster-finished jobs and mason's time for masonry construction are approximately deductible from that shown for carpenters.

PER CENT OF LABOR COST

L



PRECAST CONCRETE HOUSE SECTIONS



INSULATING BOARD PANELS IN STEEL FRAME



ASSEMBLY OF PLYWOOD WALL SECTIONS



WELDED STEEL MOBILE HOUSE Wood Mobile Houses on production line



QUANTITY PRODUCTION

In his paper on this subject, read at the Yale-Life Conference on House Building Techniques, R. H. Shreve very reasonably pointed out that there was little or no experience in this field in the U. S. that would permit the formulation of accurate estimates of cost savings. Moreover, a question suggests itself: quantity production—of what?

If a materials breakdown is made on any conventional house, one discovers that the following items are already mass-produced: framing lumber, concrete block, cement, bricks, plywood, insulation, wallboard, shingles, piping, wires, furnaces, windows, doors, hardware, plumbing fixtures, kitchen cabinets. These, added up, are most of the house, and there are others. The mass production of virtually all house parts, which are later assembled into walls, roofs, floors, etc., is an accomplished fact.

If the idea of quantity production is applied to complete houses rather than to their component parts, the question of distribution costs becomes the main factor. But here too, the answer is ready. Those few large scale builders of houses in the U. S. whose operations permit quantity buying of mass-produced parts know that they can save money by ordering in large lots. But they also know that the major part of this reduction comes to the builder with a steady volume of 25 houses per year.

It is here that the prefabricated house emerges in clearer perspective. The prefabricated house represents an attempt to replace walls, floor and roof as now constructed in the field with sections constructed in the shop. We have already seen, however, that the cost of the small house is not concentrated in any single element, but is divided into eight or nine construction items, most of which amount to two or three hundred dollars, and any attack which does not take all of them into account will not produce savings of any size. The fact that the successful prefabricators of today are competing with conventional builders, but not drastically undercutting them, tends to reenforce this contention.

Some phases of the experience of Gilbert-Varker, builders of the Clairton development^{*}, tend to clarify the entire question of quantity production. In the first place, these houses were produced neither as conventional nor prefabricated units: they were "engineered," or integrated, far beyond the point reached by the average builder. Three hundred of these houses were built in a month—a record any prefabricator might envy. What attracted a great deal of attention on this project was the use of certain prefabricated items, such as steel stairs, closets, windows, etc., which, because they were ordered in quantities, were bought at low prices. When these prefabricated units become stock items such savings will be general.

The conclusion, therefore, is that quantity production of houses—whether prefabricated or not—requires in the first place a carefully standardized model. Attempts to reduce erection time and losses due to weather are leading to the pre-assembly of as many elements as possible in the shop. To get prefabricated parts cheaply requires a large initial order, which in turn means the erection of a large number of standardized houses in which these parts will fit. Afterwards, if their use makes sense, these parts will be produced as stock items by manufacturers, ultimately to be sold to the small builder for less than was paid on the initial large order. And again quantity production will mean what it means today, which is the mass fabrication of house parts, with new savings for the little and big builders alike. This, of course, is progress in building techniques. But it is not the "solution" to the problem of the low cost house.

^{*} See Arch. Forum, Dec. 1938, p. 477

LAND & SERVICES

If the builder of low cost houses is to provide low priced houses, he must first of all find low cost land. The price of the land is, however, only the first consideration. No matter how well houses are designed and built, or how low their price, they will not sell if located too far from schools and the places people work, shop and find their entertainment. Yet it is accessibility to just those things that raises the value of subdivisible land. It is obviously the subdivider's job to find land close enough to the focus of interest to make sales, but at the same time far enough out to fit a low cost budget.

In most medium-sized American cities that job should not be a hard one. Many a low cost house is built on rural land costing only one cent a square foot, but upping the price to three cents means an increase of only 2 per cent in the cost of a 33,500 house and minimum-sized lot. For purposes of analysis, two cents a square foot will be used, although many a builder in the neighborhood of our biggest cities is glad to get land for twice that much. At two cents, a 30 x 100 ft. unimproved lot will cost 880, which includes the lot's share of land in the streets.

If the cost of a house site depended only upon the cost of the land, several hundred dollars could be chopped from its selling price. For land cost is only a small part of improved lot cost. A house needs services such as streets and utilities, and improvements such as grading, seeding, walks, and drives as much as it needs a site. The 30 x 100 ft. lot and the cost of its most necessary improvements are shown below. Although the lot is provided with four utility services—gas, electricity, water and sewage disposal—an assessment



	Lot v	width
	30'	40'
House connection	. \$70	\$70
Grading	. 20	25
Walks	. 9	9
Driveway	. 60	60
	\$159	\$164

	Lot v	vidth
	30'	40'
Land	\$80	\$106
Street improvements	259	345
Lot improvements	159	164
	\$498	\$615

										Lot v	vidth
										30'	40'
Grading	g									\$5	\$7
Paving										72	96
Curbs										24	32
Sidewa	lk								•	30	40
Sewer							4	4		90	120
Street	lig	g ł	۱t	i.				•	•	38	50
										\$259	\$345

SAVINGS

	Lot v	width
	30′	40'
Cesspool for sewer	\$68	\$98
Street oiled instead of paved		\$126
Street light eliminated	\$38	\$50
Attached garage cuts 50 ft.		
from driveway	\$40	-\$40

has been made only for the last named, following general practice. Because the cost of land and improvements depends much upon local conditions, these data give relative rather than actual costs.

Each lot has to assume half the cost of the utility lines, street and sidewalks directly in front of it, the other half being chargeable to the lot across the street. Such services are listed as *street improvements*. Their cost varies with lot width. Each lot also has to bear the cost of bringing the street improvements up to the house. These house connections fall under the heading of *lot improvements*. They include utility connections (which are sometimes not assessed), a walk and driveway and are dependent upon the distance between the house and street. The only lot improvement costs that are not dependent upon that distance are grading and landscaping, which under any specific conditions vary with lot area.

> FRONT YARD costs are affected by the length of house connections. Adding 10 ft. to the distance between house and street adds \$40 to the lot cost.

INCREASING LOT WIDTH by 10 ft. means adding \$120 to the cost, principally because each lot must stand the expense of the street improvements in front of it. A handy rule for figuring the cost of a completely improved lot is: the first ten feet cost \$24 a ft., and each additional foot costs \$12.

MINIMUM IMPROVEMENTS

By cutting corners a builder can chop the expense of lot improvements almost in half, thus more than compensate for doubled land costs. In the table below land costs of four cents a foot and a very minimum of improvements has been assumed.

	Lot width	
	30′	40'
LAND		\$212
Grading	5	7
Oiling	2	2
Sidewalk	30	40
		1 <u></u>
	\$ 37	\$ 49
LOT IMPROVEMENTS:		
House connect	47	47
Grading	20	25
Walks Garage drive	9	9
(50 ft. shorter)	20	20
Cesspool	45	45
		
	\$141	\$146
Total	\$338	\$407

Adding the cost of land, street improvements, and lot improvements together gives the basic cost of an improved lot. If that lot measures 30 x 100 ft. it will cost \$498 with all necessary improvements; if it measures 40 x 100 ft. the cost will rise to \$615. As the illustration shows, it costs \$12 to add one foot to the width of a lot, and \$1.20 to add a foot to the back length. The fact that width is some ten times as expensive as depth explains but does not justify the narrow and deep lots that are the norm of U.S. subdivisions, for the returns in sunlight and privacy from a few additional feet between houses far outweighs the extra cost. In addition, each foot of land between the house and street costs \$4 for a lot 30 feet wide. It is this cost in relation to the \$1.20 cost of a foot at the back that makes front vards small and back vards large. Such unit costs are, of course, predicated upon all basic improvements to both the street and lot. If assessments are not levied for utilities, and if the builder cuts his improvement costs, the shape of the lot is much less important. The fact that a builder provides wide and shallow lots is not necessarily a reflection on his planning technique. It may well be that he is giving the buyer the most for his money. Not included in the basic lot costs charted on the previous page is each lot's share of the cost of side streets, which depends upon the number of lots in the block that have to share that cost. In an 815 ft. block with two rows of 21 lots, the cost per lot would be \$58, while in a 1,200 ft. block with 20 additional lots the cost would drop to \$39 per lot. Many a subdivider reduces side street costs by building super blocks, many another eliminates them by platting but not improving the sidestreets.

ADDING TEN FEET to the back of a lot costs \$6 for land and \$6 for side-street improvements—only one tenth as much as for 10 ft. at the side.

Unfortunately, an easy way to reduce lot costs is to cut quality. Such cuts usually mean the elimination of services the home owner needs and will have to pay for later through special assessments. Nonetheless, special circumstances often permit variations from general practice without much loss in comfort or convenience. Cesspools make subdivisions possible where there are no sewage lines, and for the 30 ft. lot are some \$68 cheaper. By oiling streets rather than paving them, and eliminating curbs, the cost of a 30 ft. lot can be cut \$94, but if paving is put in and an assessment made, that saving bounces back on the home owner. Attaching the garage to the house instead of putting it at the back of the lot cuts 50 ft. from the length of the driveway and \$40 from lot costs.



A. 30 x 100 ft. lot with all improvements—the house 25 ft. from the property line.
 B.—Same sized lot, but house 10 ft. closer to the

B.—Same sized lot, but house 10 ft. close the property line.

C.__Ten feet added to lot width of A.

- **D.**—Row houses on lots 22 ft. wide. No provision for car storage cuts out the \$60 driveway cost.
- E.__Row houses same as D except one utility connection serves two houses.
- F.—Row houses same as D except one utility connection serves three houses.

ROW HOUSES

From the point of view of land economy, the best free-standing house is the two-story one (plan F, page 244). Only 18 ft. wide, it will fit a 30 ft. lot with room for a driveway at the side, whereas the minimum one-story house needs at least a 35 ft. lot if a driveway is provided. But maximum land economy results from building houses in rows. If six of the 2-story houses were built in a row, and 12 ft. of yard left at either end, the average lot width would be 22 ft., and the total lot cost per house \$344. This is a saving of some \$150 per lot, over the \$498 cost of the 30 ft. lot. However, that row house cost does not include a driveway—a \$60 charge carried by the free-standing house. If, by increasing its size, one utility connection is made to serve two row houses, the lot cost drops again from \$344 to \$311. Such a connection can be run along the property line between the two houses if provision for an easement is made.

Builders who provide paved streets and have to pay for utility installation can save some 10 per cent on their lot improvement costs by proper planning. For the use of culs-de-sac and loops rather than the conventional gridiron plan of block arrangement permits narrower paving and simplified utility installations, which more than compensates for the increase in land area needed. But the builder who grades and oils his streets, installs cesspools, and is not assessed for utilities has already cut his street improvement costs to the bone and will realize no such saving.

CARRYING CHARGES

To fill the need for homes in the \$1,000 to \$2,000 income group, it is not enough to cut the price of the house down to a level that income group will accept. For though the initial price—in terms of monthly financing charges—might well be within the purchaser's means, that price is only a part of the total monthly cost of home ownership. The buyer has to provide heat, pay taxes, repair and maintain his house. Even under favorable circumstances, these costs may equal monthly financing costs. It is such monthly costs that constitute the real burden of home ownership.

On the following pages the carrying charges and maintenance costs of houses which sell for between \$3,000 and \$4,000 have been analyzed. They are shown in terms of monthly costs. Excluded are the two utility services, gas and electricity, in order that the total monthly payment resulting from these compilations will compare directly with rent.

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MONTHLY CARRYING CHARGES are represented by the vertical scale in both charts, and include interest and the repayment of loan principal. In the amortization chart, the interest rate is 51/4 per cent (5 per cent plus 1/4 per cent FHA insurance premium): in the interest rate chart the period of amortization is 20 years.



Black dollars refer to minimum costs: shaded dollars to the difference between minimum and maximum costs. Nearly everyone must borrow money to buy a house, and the lower the income the greater the proportion of the total cost that must of necessity be borrowed if home purchase is to be possible. A basic condition, then, of selling houses to the \$1,000 to \$2,000 income group is that the down payment be limited to 10 to 20 per cent of the total cost, or from \$300 to \$600 on a \$3,000 house. Larger down payments than these cannot generally be counted on to aid in lowering monthly carrying charges.

That leaves the two other variables in financing—period of loan repayment and interest rate—as the only means of reducing monthly costs. And the effects of both have definite limits.

As the first chart shows, successive increases in the period of amortization do not produce uniform reductions in monthly payments. Thus, when the ten-year mortgage of the 1920's was increased to a fifteen-year mortgage, monthly payments on a \$2,700 principal sum at 51/4 per cent interest dropped from \$28.97 to \$21.68—a difference of \$7.29, but when the period was increased from twenty to twenty-five years, the monthly payment dropped from \$18.14 to \$16.15, or only \$1.99. The returns from further extensions in terms of reduced financing charges are not commensurate with the risks of prolonged debt.

In contrast to amortization periods, changes in interest rates have a relatively constant effect on monthly payments. Lowering the rate on a twenty-year, \$2,700 mortgage from 8 to 7 per cent cuts \$1.65 from the monthly payment; lowering it from 6 to 5 per cent cuts the payment \$1.52 to \$17.82.*

Combining the three variables of down payment, interest, and period of amortization, the range of probable monthly payments produces a variation of \$6.55 on a \$3,000 house and of \$8.74 on a \$4,000 house: An 80 per cent FHA-insured loan for 25 years will cost \$14.35 for the former home and \$19.14 for the latter, while a less favorable loan (in terms of monthly payment) for 80 per cent of value written at $6\frac{1}{2}$ per cent for fifteen years will cost \$20.90 and \$27.88 per month respectively. These two loan types have been used as minimum and maximum in the dollar chart in the margin. Not included as a direct cost to the borrower, but one which nevertheless should be reckoned with, is the loss of income from the lump sum invested as a down payment.

If houses are built for rent they can be financed, under FHA rental housing insurance, on even more liberal terms than the above minimum. A borrower willing to limit the return on his equity in a project to 6 per cent can get a $41/_2$ per cent loan to 80 per cent of value, and written for more than 25 years. The monthly cost of such a loan is shown in the summary on page 261.

* Several New York banks have just announced that they will lend at $4\frac{1}{4}$ per cent on FHA insured mortgages (page 4). Such a rate plus a $\frac{1}{4}$ per cent insurance premium means a monthly payment of \$17.09 on the above 20 year, \$2,700 mortgage, or \$15.01 if amortization is increased to 25 years.

MAINTENANCE AND DEPRECIATION

The sum that should be allocated to *maintenance* of the low cost house is largely imponderable, for it depends not so much upon the quality of work done as upon the amount of it the home owner does himself and how often he does it. Thus, by painting his own house the owner can save as much as two-thirds of the total cost of painting.

Assuming that any frame house needs to be painted and decorated at least once every five years, costs (exclusive of maintaining mechanical equipment) could be kept within \$1 a month on a \$3,000 house and \$1.35 a month on a \$4,000 house.

QUANTITY PRODUCTION . LAND & SERVICES . CARRYING CHARGES . CASE STUDIES





HEAT is needed when the outside temperature falls below the comfort level. Therefore, the best index of heating needs and costs is the amount that the daily mean temperature is below the comfort level. Known to heating engineers as degree days, that index is the basis of the map above. The heavy line has been taken as unity; all other lines are proportional to it.



Maintenance costs are also affected by the way the house is built and the materials used. A jerry-built house may fit easily into arbitrary \$3,000 to \$4,000 cost limits, but by the time it is ten years old its maintenance costs would bankrupt the upper third of the nation. The upkeep costs of various types of materials and equipment need as careful consideration as the initial cost, if maximum purchaser value is to be provided.

Depreciation is an item that holds an important place on the books of corporations, but is seldom considered by the home owner. And yet it is of equal importance to both. For though the life of the structural shell of the building is a good 33 years, and if well built and maintained considerably longer, the mechanical parts within the shell can boast no such longevity. Depreciation data prepared by the Bureau of Internal Revenue lists the life of a furnace as twenty years, of plumbing as twenty years, of lighting fixtures fifteen years. Mechanical equipment such as refrigerators, ranges, etc., if not worn out are likely to be obsolete at the end of fifteen years through the introduction of newer, more efficient equipment.

The depreciation of the three major mechanical items—furnace, refrigerator and cook-stove—would cost \$1.63 a month. This sum and the estimate of maintenance costs given above make up the dollar charts for both the \$3,000 and \$4,000 houses.

HEATING AND HOT WATER

Shelter in Dome Lake, Wyoming, differs from shelter in Key West, Florida, principally in terms of heating. In the former, a basic function of a house is to keep its occupants warm, while in the latter that function does not even exist. Between these two extremes lies the whole range of heating needs and consequently of heating costs. The map to the left shows how heating costs vary the country over.

The heating cost along the heavy line has been taken as unity; at any point on that line a small five-room frame house, uninsulated but with a full cellar could be heated during one winter with seven tons of coal. The light lines indicate variations above and below that amount. Thus, along the line marked one-half, three and one-half tons would be needed; along the line one and one-fourth, the total would be eight and three-fourths tons. Heating costs are affected most by the weather outside, but none the less important is the type of structure. If the small house mentioned above (which is Plan C on page 240) is insulated in roof and walls, and storm sash is added to all windows, the coal consumption in the No. 1 area on the map drops from 7 tons to 3.9 tons. If coal costs \$10 a ton, the monthly fuel bill for the uninsulated house would be \$5.85 and for the insulated one, \$3.25, and if the \$2.60 difference were capitalized over the term of the mortgage it would be more than enough to pay for the cost of the insulation. The value of insulation as a fuel saver increases, of course, toward the North. It is the two costs above that make up the minimum and maximum on the dollar chart on the left (together with the cost of heating hot water) for the \$3,000 house. Heating costs for the \$4,000 house are based on Plan D on page 242, and vary from \$3.90 to \$7 on the same basis. If the cellar is taken out from under the uninsulated frame house and piers substituted, the temperature under the house drops nearly to the level of the outside, and fuel consumption rises in proportion: from 7 to 8.5 tons a year. Obviously, where heating demands are high, such types of construction should not be used.

The owner of a \$4,000 house will not use any more hot water than if he

INSURANCE AND TAXES

Black dollars refer to minimum costs: shaded dollars to the difference between minimum and maximum costs. owned a \$3,000 house. Consequently, the cost of heating water has been considered the same for both. Using a cheaper grade of coal than for the furnace, a bucket-a-day coal stove will do the job on two tons a year, will cost the owner \$1.33 a month. This sum has been added to the monthly cost of house heating in the dollar chart.

TAXES AND INSURANCE

The biggest variable in the monthly costs of home ownership is taxes. A yearly survey of some 274 cities made by the Detroit Bureau of Governmental Research shows that *adjusted* tax rates range from \$9.35 per \$1,000 of total value—as contrasted to assessed value—in Wheeling, West Virginia to \$56.37 per \$1,000 in Atlantic City, New Jersey. In monthly costs, that means a range of from \$2 to \$14 on a \$3,000 house and from \$3 to \$19 on a \$4,000 house. Obviously, it is the difference between reaching the proposed market and missing it by a mile.

A secondary effect of taxes on home ownership, and one that can have a definitely retarding effect on the sale of houses, is the ever present possibility that the burden will be increased through changes in assessed valuations or an increase in the tax rate. Between 1937 and 1938 the average adjusted tax rate for 248 cities increased 65 cents per \$1,000 and between 1932 and 1938 the average for 220 cities increased \$1.50.

Because of the effect of high taxes on the small home owner, a movement has been spreading rapidly to exempt him from at least a part of real estate taxes. Such homestead tax exemption* has been adopted in various forms in some twelve States and is up for consideration in several others. Wheeling, West Virginia, has partial exemption, which is one reason why it boasts so low a rate.

Fire insurance adds little to the monthly cost of home ownership. In the New York metropolitan area the rate on a house and lot costing \$3,000 would be about 30 cents per month if a fire hydrant were located within 500 ft., and twice as much if one were not. For a \$4,000 house the rates would be 45 and 90 cents. The higher figure has been used in the dollar charts as most low cost houses are built in outlying subdivisions, are not fully protected. This is a conservative estimate as in some States the rate is twice that in New York. The addition of windstorm insurance ups the rate another 40 to 50 cents.

* Although the word "homestead" connotes the small farm, homestead tax exemption usually applies to urban as well as rural owner-occupied homes costing \$5,000 or less. The amount of such tax exemption varies widely from State to State, covering from \$1,000 to \$5,000 of total assessed value. In many cases it is limited to specific local and State taxes.

TOTAL CARRYING CHARGES PER MONTH

.... amount to 1 per cent of the price of a house, according to a much used rule of thumb. If those charges are average the rule is just about right. But on the other hand, a variation from the average by any single part of monthly costs will make the total miss its mark, and a combination of such variations could make it fly wide indeed.

In the table on the next page, the effect on total monthly costs of variations in each one of the three major items of monthly costs is shown. To illustrate this effect each variant is added to *averages* of all the other costs. So that the reader can combine variants and averages at will, the averages used (they are defined in each one of the headings on the next page) are as follows:

- \$3,000 HOUSE: financing, \$16.15; taxes, \$6.70; insurance,
 \$.60; heating, \$4.75; hot water, \$1.33; maintenance and depreciation, \$2.00.
- **\$4,000 HOUSE:** financing, \$21.53; taxes, \$9; insurance, \$.90; heating, \$5.70; hot water, \$1.33; maintenance and depreciation, \$2.25.

For example, a local tax of \$10 per month on a \$3,000 house could be substituted easily for the average tax of \$6.70 to give an approximation of local conditions, while reference to the heating map on page 259 will permit a similar adjustment for heating costs.

QUANTITY PRODUCTION . LAND & SERVICES . CARRYING CHARGES . CASE STUDIES

\$3,0	00	ОН	0	JSE	\$4,0	оо не	DUSE
A		В		C	С	В	A
\$31.53	-	\$15.38	+	\$16.15 ← 10% down payment, 25 year amortization, 5% interest, 1⁄4% FHA p	oremium →\$21.53 +	\$19.18 =	\$40.71
				\$14.35 - 20% down payment, 25 year amortization, 5¼% interest -			\$38.32
				\$18.14 IO% down payment, 20 year amortization, 51/4% interest -			\$43.37
\$36.28	==	\$15.38	+	\$20.90 ← 20% down payment, 15 year amortization, 6½% interest -	──── > \$27.88 +	\$19.18 =	\$47.06
\$29.38	_	\$15.38	+	\$14.00 ← FHA rental, 20% down pay't, 26% year amortization, 4½% interest, ½%	, premium →\$18.66 +	• \$19.18 =	\$37.84

The goal of most builders of low cost homes will be to squeeze their product within the restrictions set by the Federal Housing Administration, for the attractive lending terms required by it are of real aid in reaching the low income market. The first two lines above show the difference between a 10 per cent and a 20 per cent down payment on a FHA loan. The last line represents a house in an FHA-insured rental project, under Section 207 of the National Housing Act. The first type of financing in the table has been chosen as "average" because in all probability it will be used most in financing the \$3,000 to \$4,000 house.

\$4,000 HOUSE

\$3,000 HOUSE

\$3,000 HOUSE			HEATING		\$4,0	00	HOUSE		
A		B		С	С		B		A
\$32.63	-	\$26.78	+	\$5.85 ←	Philadelphia (number one area), uninsulated construction> \$7.00	+	\$35.01	=	\$43.01
\$35.55	==	\$26.78	+	\$8.77 ←	Northern States (11/2 times Phila.), uninsulated construction>\$10.50	+	\$35.01	=	\$45.51
\$29.70	=	\$26.78	+	\$2.92		+	\$35.01	==	\$38.51
\$26.78	=	\$26.78	+	\$0.00 ←	─────────────────────────────────────	+	\$35.01	=	\$35.01
\$31.53	=	\$26.78	+	\$4.75◀	Philadelphia (number one area), insulated roof	+	\$35.01	==	\$40.71
\$32.28	=	\$26.78	+	\$5.50 🗲 🗕	─────Northern States, insulated roof and walls─────> \$6.60	+	\$35.01	=	\$41.61
\$29.70	_	\$26.78	+	\$2.92 🗲	Southern States, uninsulated construction —————— \$3.50	+	\$35.01	=	\$38.51

The first four lines above show the effect of location on heating costs. indicating variations of \$8.77 and \$10.50 between the far South and the far North. The remaining lines shows the effect of insulation on heating costs-increasing the insulation toward the North tends to level such costs. All figures refer to coal heat at \$10 a ton. The cost of heating hot water has been taken out of the monthly total and included with the average. The fifth type of heating has been considered average, being in the number one area of the map, page 259.

\$3,000	HOU	JSE			TAXE	S			\$	4,000	HOUSE
Α		B		С				С	l	3	A
\$31.53 \$27.17 \$38.93	= :	\$24.83 \$24.83 \$24.83	÷	\$2.34 ←	- Average 1938 adjusted tax in 274 citie ———— Minimum rate: \$9.35 per \$1,0 ——— Maximum rate: \$56.37 per \$1,0	000 in Wheeling, W.	Va. ————	→ \$3.10	+ \$31	71 =	= \$34.81
per cent ment of	of tr local	ue val tax ra	lue (ites	in a sample is necessary l	es vary from 25 per cent to 100 of 294 cities), a careful adjust- before substituting them for the se figures do not correspond to	those in the dollar location for fire ins age of all other cos justed for homestea	surance, which hists. The average	as been in tax rate i	ncluded in n Wheeli	n "B", ng ha	, the aver- s been ad-

A. Total monthly carrying charge. B. Average of all monthly costs, excluding "C." C. Monthly cost of item under discussion.

SUMMATION ... \$3,300 is what the low cost house must sell for if it is to meet the \$35-a-month budget of the average U.S. citizen in the average U.S. community who is in the market for a new home. Or, if in a FHA rental project, its cost with land must not exceed \$3,500.

In the case of the house-for-sale, the price given is based on 10 per cent cash and 25 year amortization. Decrease the amortization period five years, and monthly costs jump to \$37.20-or, if the \$35-a-month figure is maintained, price must drop to \$3,162.

These are averages, and-like all averages-merely a useful statistical myth. In every actual U.S. community housing costs are subject to two important variables, climate and taxes, either of which may raise the monthly cost of such a unit to the top of the low cost market-\$40-or lower it by an equal amount. Thus, such a house in the Northern part of the country, even if fully insulated and equipped with storm sash, will cost a dollar more a month to live in because of increased fuel bills, and almost \$5 more if these precautions are neglected. In the far South, where little or no heat is necessary, it will cost \$5 less. Similarly, a tax rate near the maximum will raise monthly cost to \$40, a low rate, combined with Homestead tax exemption, lower it to \$30. And in their least favorable coincidence, both factors may up monthly costs to more than \$45, force a price reduction to \$2,800 to bring the house within shouting distance of the big market.

SUMMATION

Thus, to meet the \$35-a-month market, the low cost house must be priced in accordance with local conditions. But the amount of house which can be built and sold—even at a fixed price of \$3,300—is subject to wide variations. Allowing \$700 for land, service connections, equipment, fees, and profit—a minimum figure—the net construction cost of such a unit must be \$2,600. That this goal is not impossible to reach under average conditions is indicated by the estimated cost of the 5-room unit on page 240, documented by many an example in the case studies which follow. Exceptional factors, however, may combine to make this much more difficult. Any increase over average land or land improvement costs must be balanced by a corresponding decrease in the construction budget. Any increase over average construction costs calls for a decrease in the size of house and lot.

High land-improvement costs are a more important problem than high-priced land. Assuming a normal cost for raw land of \$1,000 per gross acre, a 100 per cent increase to \$2,000 an acre would account for a rise of but \$100 on a 35 ft. lot, add only 60 cents to monthly cost. High land improvement costs, on the other hand, make a difference of as much as \$300 on a lot of the same size, combine with high land cost to raise housing cost as much as \$2.40 a month.

Similarly, net construction cost may vary by more than \$500, increase monthly cost \$3 or more above the average or decrease it by a corresponding figure. This, however, will happen only where the maximum materials cost of the individually built house combines with maximum rates for labor; except in rare instances neither of these factors by itself accounts for such a large differential. Of equal importance, where climate or custom permits, is the elimination of the basement and simplification or elimination of heating equipment. Together, these may result in a saving of as much as \$350, combine with the elimination of heating to reduce housing cost by almost \$7 a month.

FIVE factors control the feasibility of low cost housing in any community, determine the cost and type of unit which can be furnished. In order of importance, these are:

. Climate, which affects construction cost (elimination of basement) and monthly cost (reduced fuel bills).

2. Tax rates, which have an important influence on monthly cost, affect the balance available for other charges.

3. Land and land-improvement costs, which—if excessive—may force changes all along the line.

4. Labor cost, which accounts for a sizable difference in construction cost.

5. Builder's volume, which controls prices paid for materials.

Variations below the norm occur mostly in the South and Southwest, are only partially counterbalanced by a somewhat lower level of the mass market. The problem of the Southern builder is therefore less exacting, and—as a study of the examples which follow will demonstrate—he is able to deliver substantially more house while remaining comfortably within the maximum cost limit.

In the Northern part of the country, every precaution must be taken to keep heating costs to a minimum if housing is to be genuinely low in cost, actually within the reach of a substantial market.

Around the larger cities, transportation difficulties constitute the major deterrent to the construction of free standing houses for sale, since these must be built on low priced land. Even here, however, a few alert developers have already succeeded in attracting buyers, and large scale rental projects are contributing sizable volume to the total number of homes being built for the mass income group.

With this exception, average conditions obtain throughout the central part of the U.S. from coast to coast. Over this large area, low cost housing is an exacting, but thoroughly soluble problem. Moreover, it constitutes the home-building industry's major—if not its only—hope of achieving substantial volume under present conditions.



S NLOW COST HOUSES

On the following pages THE FORUM presents 50 recently built houses, houses which cost their occupants between \$25 and \$40 per month in rent equivalent. The criterion of any collection depends upon its purpose, and the purpose here is to pool the measurable progress which America is now making toward satisfactory low cost houses. The editors have assumed that there are no universally perfect solutions and accordingly they have sought to show a great variety of current lines of attack on a common objective. An essential measure of success in reaching this objective is cost. Costs have therefore been included to show: 1. Where the provide the progress of possible, construction cost as furnished by the architect or builder plus an itemized allowance for land, fees, and equipment; 3. in a few instances, construction cost only. These cost breakdowns provide a basis for comparing the various figures.

N

HOUSES IN FORT LAUDERDALE, FLA. ROBERT M. LITTLE, ARCHITECT







Standardization has played an important part in the success of this 40-unit development, in which all of the houses have the same excellent floor plan, vary only in respect to roof lines, carport treatment, and exterior details. Exteriors, especially those shown at the top of the page, are commendably simple, while the plan provides the compact kitchen and generous closets commonly featured in Florida homes, and an excellent arrangement of the dining alcove seldom found in one story houses in this price class. Note also provision of fireplace, and the use of tile in bathrooms and as a counter-top and splash-back in the kitchen, undoubtedly resulting in increased sales appeal.

ROBERT E. HANSEN, ASSOCIATE

1 CAR

HOOK CONSTRUCTION CO., BUILDERS





COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Clearing lot	\$10.00
Excavation	22.00
Concrete footings	78.00
Steel and bolts	39.00
Floor slabs	51.00
Foundation walls	56.00
Termite shields	22.00
Chimney and fireplace	105.00
Tile floors (quarry)	60.00
Wall tile, bath and kitchen	130.00
Hardware	28.00
Roofing	155.00
Sheet metal work	90.00
Plaster and stucco	145.00
Lath and lathing	110.00
Finish floors and linoleum	155.00
Painting	200.00
Lighting fixtures	20.00
Electric wiring	97.00
Plumbing	225.00
Septic tank	30.00
Concrete walk and drive	38.00
Framing and rough carpentry	864.00
Sash doors and millwork	305.00
Miscellaneous	25.00
TOTAL CONSTRUCTION	\$3,060.00
LAND AND IMPROVEMENTS	500.00
TOTAL COST HOUSE AND LAND	\$3,560.00



CONSTRUCTION OUTLINE

FOUNDATION: Walls-reenforced concrete, and concrete blocks. STRUCTURE: Exterior walls-2 x 4 in.

studs, 8 in. sq. edge sheathing, diagonal, 15 Ib. felt, 8 in. bevel cypress siding. Interior partitions— 2×4 in. studs, plaster on rock lath, U. S. Gypsum Co. Floor construction— yellow pine joists and sub-floor, 13/16 in. select red oak finish flooring. ROOF: Yellow pine rafters, 16 in. o.c., 1 x 4 in. shingle lath and cedar shingles. CHIMNEY: Cement brick, terra cotta flue lining; fire box and back hearth fire brick, front quarry tile, Murray Tile Co. SHEET METAL WORK: Flashing and termite shields—28 gauge galvanized metal. WINDOWS: Sash—Narroline No. 600, Silverseal aluminum alloy weatherstripped, Andersen Frame Corp. Screens-Andersen 18 mesh bronze. Glass-single strength, quality A. FLOOR COVERINGS: Main rooms-oak. Kitchen-linoleum. Bathrooms-matt glazed wall tile, Architectural Tiling Co.

WALL COVERINGS: All rooms-plaster, U.

S. Gypsum Co. Bathrooms-4 in. glazed ceramic tile wainscot, smooth plaster above. WOODWORK: Trim—cypress, white pine and magnolia. Interior doors—5X panel fir. HARDWARE: Interior-National Brass Co. Exterior—Welch Bros. Co.

FAINTING: Interior: Sash, baths and kitchen—enamel. Floors—2 coats shellac, 1 coat wax. Exterior: Walls—2 coats lead and oil. Roof-shingle stain. All paints by Sherwin-Williams Co.

ELECTRICAL INSTALLATION: Wiring system—Romex cable, General Cable Corp. Cir-cuit breaker and switches—Westinghouse Electric & Mfg. Co. Fixtures-Beach Lighting Fixture Co.

KITCHEN EQUIPMENT: Sink-flat rim, glazed tile drain board, Kohler Co. BATHROOM EQUIPMENT: All fixtures by

Kohler Co. Cabinets-Miami built-in, Miami Cabinet Div., Philip Carey Co. PLUMBING: Soil, waste and vent pipes-

standard weight cast iron. Hot and cold water-galvanized. Hot water heater-General Electric Co.

HOUSE IN DOYLESTOWN, PA. A. C. ELFMAN & SONS, DESIGNERS







NOON NEXT DAY



The chief interest of this house lies in the construction system used. All sections are built at the mill and delivered to the job ready for assembly. The exterior, it will be noted, differs in no way from that of conventionally built houses. The plan indicates the size and location of the prefabricated sections, follows one of the standard room arrangements. First of a proposed development of ten, the house was built for sale; the builders have since discovered that this type of house could be easily rented at \$35 per month. Cubage: 11,560. Size of lot: 50 x 175.



COST BREAKDOWN

CONSTRUCTION	MATERIALS
	AND LABOR
Foundation	284.21
First floor	207.50
Exterior walls	521.20
Partition walls	178.37
Second floor	51.20
Roof	160.00
Interior finish	72.50
Millwork and trim	205.20
Kitchen and bathroom cabinets and accessories	65.00
Painting	175.00
Plumbing	355.00
Heating (warm air)	115.00
Sheet metal work	22.70
Electrical work	94.85
Range	85.00
TOTAL CONSTRUCTION COST	\$2,592.73
LAND AND IMPROVEMENTS	526.17
PROFIT AND OVERHEAD	300.00
REALTOR'S COMMISSION	181.50
FEES, STAMPS, ETC.	29.50
TOTAL COST HOUSE AND LAND	\$3,629.90

CONSTRUCTION OUTLINE

FOUNDATION: Walls—concrete footing, 10 in. Nycecrete concrete blocks. Cellar floor— 4 in. concrete mix over gravel fill.

STRUCTURE: Exterior walls—Homasote Co. Precision-Built wall sections prefabricated and erected by A. C. Elfman & Sons. Floor construction—2 x 8 in. rough fir joists, yellow pine sub-flocr, Sisalkraft Co. paper between floors, random widths Southern yellow pine finished flooring.

ROOF: Construction— 2×6 in. fir rafters, 1×6 in. yellow pine roofer sheathing, covered with Flintkote Co. asphalt strip shingles. CHIMNEY: Nycecrete concrete blocks.

SHEET METAL WORK: Flashing, gutters and leaders 5 in. galvanized iron, painted. INSULATION: Outside walls—1 thickness inside and outside of 1/2 in. Homasote weatherproof board, Homasote Co. Attic floor—1/4 in. Homasote wallboard

floor— $\frac{1}{2}$ in. Homasote wallboard. WINDOWS: Sash—white pine, double hung, J. R. Quigley Co. Glass—double strength, Libbey-Owens-Ford Glass Co. Screens bronze copper mesh, white pine frames.

WALL COVERINGS: Wallpaper throughout, S. Shultz, Inc. Bathrooms—Presdwood in tile effect, Masonite Corp.

WOODWORK: Trim—fir. Cabinets—white pine. Interior doors—2-panel fir. Exterior door—glazed. Garage doors—built on job. HARDWARE: Interior—brass plated, glass door knobs. Exterior—solid brass on doors, painted steel hinges on shutters. Material

by Penn Hardware Co. PAINTING: Interior: Woodwork—prime and 2 coats paint. Bathroom walls—prime coat and 2 coats Barreled Sunlight, U. S. Gutta Percha Paint Co. Ceilings—2 coats Luminall, National Chemical & Mfg. Co. Floor—filled, shellac and Old English wax, The A. S. Boyle Co. Sash—prime and 2 coats Dulamel, Benjamin Moore & Co. Exterior walls—prime and 2 coats Dutch Boy white lead and linseed oil, National Lead Co.

ELECTRICAL INSTALLATION: Wiring system—BX cable. Switches—Arrow-Hart & Hegeman Electric Co. Fixtures—John C. Virden Co.

KITCHEN EQUIPMENT: Range—Westinghouse Electric & Mfg. Co. Sink—Kohler Co. LAUNDRY EQUIPMENT: Movable tubs by Wheeling Corrugating Co. BATHROOM EQUIPMENT: All fixtures by

BATHROOM EQUIPMENT: All fixtures by Kohler Co. Cabinet—Metzger Glass & Mirror Co.

PLUMBING: Soil pipes—4 in. cast iron. Hot and cold water—galvanized iron, Fritz Moon Tube Co.

HEATING: Warm air duct system, Endicott Co. Boiler—Marvel, Abram Cox Mfg. Co. Grilles—wall type. Hot water heater—Peerless Bucket-a-day, Peerless Heater Co.

Milton Rutherford

THE ARCHITECTURAL FORUM

HOUSE IN SPRINGFIELD, MASS. JAMES J. FITZSIMMONS, ARCHITECT JOHN V. BOYLE, BUILDER







SCALE - Horr-or

The plan for the one story house shown above is excellent. Kitchen and bathroom plumbing are placed back to back; bedrooms have the needed privacy; and space taken up by the hall is a minimum. The size of the living room is adequate and doors into it have been so located as to facilitate furnishing. The plan at the right shows the first floor arrangement if bedrooms are to be placed upstairs. A traditional exterior well above the usual development standard completes a very competent job. The builder estimates that by building a group of eleven houses he was able to save 15 per cent on construction costs. The lot size is about one acre.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Lumber	\$725.00
Carpentry	475.00
Masonry	395.00
Plumbing	285.00
Heating system (steam)	225.00
Septic tank	60.00
Paint and paper	175.00
Electric wiring	85.00
Hardware	50.00
Screens, shades, lathing	79.00
Incidentals	100.00
TOTAL CONSTRUCTION COST	\$2,654.00
LAND AND IMPROVEMENTS	805.00
TITLE AND LEGAL PAPERS	100.00
PROFIT AND OVERHEAD	431.00
TOTAL COST HOUSE AND LAND	\$3,990.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls—cement blocks. Cellar floor—4 in. cinders under 3 in. concrete.

STRUCTURE: Exterior walls—No. 1 red cedar shingles, Weyerhaeuser Sales Co., building paper, 2 x 4 in. studs, U. S. Gypsum Co.'s rock lath, aluminum base, plaster.

ROOF: Construction— 2×5 in. rafters, 18 in. o. c., 1 x 3 in. roof strips, 18 in. Perfection cedar shingles.

SHEET METAL: Flashing and gutters—18 oz. Anaconda copper, American Brass Co. INSULATION: U. S. Gypsum Co.'s rock lat:, aluminum foil base.

WINDOWS: Sash-double hung. Glass-Libbey-Owens-Ford Glass Co. Copper wood frames-C. H. Cushing.

FLOOR COVERINGS: Bathrooms—linoleum. WOODWORK: Trim—white pine. Interior doors—white pine. Exterior doors—Colonial 4-panel white pine. Shelving and cabinets— Curtis Companies, Inc.

HARDWARE: Interior and exterior—Schlage Lock Co.

ELECTRICAL INSTALLATION: Wiring-BX cables. Switches-tumbler. Fixtures-direct, Lightolier Co. and Chase Brass & Copper Co.

KITCHEN EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co.

BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co., except metal Lawco cabinet, The G. H. Lawson Co.

PLUMBING: Pipes: Soil, waste and ventcast iron extra heavy Krapp-Hajoca Corp. Water supply—brass, Anaconda, American Brass Co.

HEATING AND AIR CONDITIONING: Steam. Boiler—coal fired, H. B. Smith Mfg. Co. Radiators—Arco, American Radiator Co. Valves—Dole Valve Co.

HOUSE IN OAKLAND, CALIFORNIA ALFRED C. WILLIAMS, ARCHITECT





LIVING ROOM



CONSTRUCTION OUTLINE

STRUCTURE: Exterior walls-fir siding. Interior partitions-fir plywood panels, Pacific Portland Cement Co. hardwall plaster, Peerless Stucco Co. finish plaster. Ceiling (living room)-Temlok, Armstrong Cork Products Co. ROOF: Cedar shingles.

INSULATION: Ceiling-Temlok, Armstrong Cork Products Co.

WINDOWS: All equipment by Western Sash & Door Co.

PAINTING: All material by Paraffine Cos. ELECTRICAL INSTALLATION: Made by General Electric Co.

BATHROOM EQUIPMENT: All fixtures by

Standard Sanitary Mfg. Co. PLUMBING: Soil pipes—cast iron, Rich Mfg. Co. Hot and cold water pipes—galvanized steel, Wheeling Steel Corp.

MATCOLALO

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Concrete and cement	\$205.00
Lumber and wallboard	505.00
Millwork	240.00
Carpentry labor	920.00
Sheet metal work	80.00
Brickwork	125.00
Plumbing	340.00
Heating	140.00
Electric work	100.00
Lathing and plastering	315.00
Linoleum	60.00
Tilework	30.00
Painting	335.00
Finish hardware	35.00
Electric fixtures	25.00
Miscellaneous	45.00
TOTAL CONSTRUCTION COST	\$3,500.00
LAND COST	500.00
TOTAL COST HOUSE AND LAND	\$4,000.00

Unusual in plan and design, this house provides facilities for pleasant living exceptional for the low cost group, once again proving that the services of a competent architect are often worth immeasurably more than their nominal cost. Location of the living room, kitchen and porch at the rear of the house, overlooking a magnificent view through generous windows, plus plenty of closets and a well-planned kitchen are only a few of the design's many advantages, while placement of the garage and laundry on a lower level fits the contour of a steeply sloping site. Cost saving devices include exposed rafters in the living room and the simple treatment of the attractive porch. House faces southeast on a plot 60 x 105 ft.

HOUSE IN LOS ANGELES, CALIF. J. B. LYMAN, R. E. COLLINS, ASSOC. ARCHITECTS





Built of plywood sections two inches in thickness, this house presents a very good case for prefabrication. Well laid out, with generous rooms and an unusually attractive exterior, it suggests none of the disadvantages which have aroused sales resistance to this type. Closets are of good size, and the division of the service unit into kitchen and utility space is an excellent feature. The use of a covered passage between house and garage is an inexpensive way of eliminating the customary box-like appearance. Due to the experimental nature of the construction, it is difficult to arrive at an accurate cost breakdown; the builders, however, claim that such houses, produced in reasonable quantities, should save 10 per cent over conventional construction, and at least a month in erection time. Sales price: \$4,000.

CONSTRUCTION OUTLINE

FOUNDATION: Walls—concrete slab. Waterproofing—3 in. pea gravel fill and waterproof under slab.

STRUCTURE: Exterior walls and interior partitions—Lyco units, Floor construction sub-floor in mastic on slab, covered with finished oak floor. Ceiling—plywood, Harbor Plywood Corp., painted.

ROOF: Construction—2 x 4 in. rafters covered with shingles, Hammond Lumber Co. SHEET METAL WORK: Gutters and down-

spouts-galvanized iron. INSULATION: Ground floor-air space, 1/2

in., not filled. WINDOWS: Sash—Douglas fir. casement.

Northwest Door Co. Glass—single strength. FLOOR COVERINGS: Main rooms—oak. Kitchen, bathrooms and service porch asphalt tile.

WOODWORK: Garage doors-Wread Overhead Door Hardware.

HARDWARE: Interior and exterior-solid brass.

PAINTING: Walls and ceilings—2 coats paint, Pittsburgh Plate Glass Co. Bedrooms —wallpaper. Exterior walls—Resitex, I. F. Laucks Co. Roof—stained.

WIRING SYSTEM: Rigid conduit.

KITCHEN EQUIPMENT: Kitchen and laundry sink—Briggs Mfg. Co. Cabinet wood.

BATHROOM EQUIPMENT: All equipment by Briggs Mfg. Co. Shower over tub-glass, 3 leaf enclosure.

PLUMBING: Soil, waste and vent pipescast and wrought iron. Hot and cold water pipes-steel tube.

HEATING: Wall type heaters, Hart Manufacturing Co.; electric heater in bathroom. Hot water heater—Pioneer Water Heater Co.
HOUSE IN AUSTIN, TEXAS DAVID C. BAER, ARCHITECT







The rear of this house looks as good as the front, something of an achievement in a field where the "design" is generally confined to the street elevation. In addition, the owner has received a good deal for his money. The large living-dining combination, the entrance vestibule with coat closet, private access from kitchen to front door and two-car garage are all features more commonly reserved for houses in the \$5,000 class. The unostentatious exterior shows no waste of money for needless decoration, and the handling of the service entrance and garage is very good. Cubage: 13,790.

COST BREAKDOWN

General construction	\$2,572.00
Plumbing	300.00
Electrical work	128.00
Architect's fee	150.00
TOTAL COST OF HOUSE	\$3,150.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls—concrete pier and footings.

STRUCTURE: Exterior walls — wood sill, 1 x 5 in. sheathing on inside, 2 x 4 in. studs, 20 in. o.c., wood siding outside.

ROOF: Covered with wood shingles. SHEET METAL WORK: Flashing, gutters and leaders—galvanized steel.

INSULATION: Roof-2 in. rock wool.

WINDOWS: Sash-wood, double hung. Glass

-single strength, quality B, Libbey-Owens-Ford Glass Co. FLOOR COVERINGS: Main rooms-select

oak. Kitchen and bathrooms—linoleum. Porches—limestone flags.

WALL COVERINGS: Living room, bedrooms and halls—canvas and wallpaper. Kitchen hardwood and wainscot.

WOODWORK: Trim—wood. Cabinets—wood, Farley & Loetscher. Interior and exterior doors—1-panel.

HARDWARE: Interior and exterior—Welch. BATHROOM EQUIPMENT: All fixtures by Kohler Co.

PLUMBING: Soil, waste and vent pipes cast iron. Hot and cold water pipes—galvanized steel. Septic tank.

HEATING: Hot water heater — 20 gal. Demon, Lawson Mfg. Co.

HOUSE IN AUSTIN, TEXAS DAVID C. BAER, ARCHITECT



University Studio



A one bedroom house, with a small den suitable for use as an additional bedroom. The plan is typical of many in this class, differs only in the relatively greater amount of space given the living room. A conservative treatment of modern forms, the house uses wood siding and windows of uniform size effectively. Cubage: 6,821. Lot size: 50 x 150.

COST BREAKDOWN

TOTAL COST HOUSE AND LAND	\$2,650.00
PROFIT AND OVERHEAD	150.00
LAND AND IMPROVEMENTS	300.00
ARCHITECT'S FEE	110.00
TOTAL CONSTRUCTION COST	\$2,090.00
Electrical work	95.00
Plumbing	245.00
General construction	\$1,750.00
CONSTRUCTION	AND LABOR
	MATERIALS

CONSTRUCTION OUTLINE

FOUNDATION: Walls-concrete piers and footings.

STRUCTURE: Exterior walls-wood sill, 1 x 6 in. c.m. sheathings on inside, 2×4 in. studs, 20 in. o.c., wood siding on outside. ROOF: Wood joist covered with woo wood sheathing built-up roofing. Decks-built-up roof covered with wood slat material.

SHEET METAL WORK: Flashing, gutters and leaders—galvanized steel.

INSULATION: Roof-2 in. rock wool.

WINDOWS: Sash-wood, double hung. Glass -single strength, quality B, Pittsburgh Plate Glass Co. FLOOR COVERINGS: Main rooms-No. 1

oak. Bathrooms-oak with base. Porcheslimestone flags.

WALL COVERINGS: Main rooms-canvas and wallpaper. Kitchen and bathroomshardwood wainscot.

WOODWORK: Trim and cabinets-wood, stock. Interior and exterior doors-one panel. HARDWARE: Interior and exterior-Welch Bros. Co.

BATHROOM EQUIPMENT: All fixtures by Kohler Co.

PLUMBING: Soil, waste and vent pipescast iron. Hot and cold water pipes-galvanized steel. Tank—septic. HEATING: Hot water

heater-20 gal. Demon, Lawson Mfg. Co.

HOUSES IN MEMPHIS, TENN. J. FRAZER SMITH, INC., ARCHITECTS





An excellent development from many points of view. The houses have been given variety in both layout and exterior treatment, but the group as a whole has unusual consistency due to the limited number of materials and design elements used. Both plans shown are compact and efficient; particularly noteworthy is the replacement of the hall between bedrooms by closets, a perfectly reasonable means of saving space in the small house. The manner in which living and dining spaces have been related allows considerable flexibility of interior arrangement. Plot sizes are 65 x 150 for the most part; some are 80 x 150.

HOUSE A.

COST BREAKDOWN

	HOUSE A.	HOUSE B.	HOUSE C.	HOUSE D.
Excavating & filling	\$15.25	\$15.25	\$15.25	\$15.25
Foundation	32.50	32.50	32.50	32.50
Flat work	48.40	47.50	47.00	51.50
Brick work	12.50	12.50	12.50	12.50
Hard materials	133.15	143.70	134.62	134.62
Forms	42.50	42.50	42.50	42.50
Framing	250.00	265.00	255.00	255.00
Outside trim	90.00	85.46	90.00	90.00
Inside trim	125.00	140.00	125.00	125.00
Floors	22.74	22.11	22.31	21.65
Roofing	15.95	15.05	15.95	16.85
Framing	410.26	411.03	421.88	422.60
Mill work	421.68	421.68	421.68	421.68
Labor	66.00	64.60	80.00	76.03
Material	89.00	86.90	87.50	84.80
Wiring	54.05	59.75	53.90	51.95
Fixtures	35.00	35.00	35.00	35.00
Plumbing	294.00	294.00	294.00	294.00
Heating	134.00	95.00	95.00	95.00
Hardware, Rough	21.00	21.00	21.00	21.00
Finish	35.00	35.00	35.00	35.00
Outside labor (Painting)	37.50	37.50	37.50	37.50
Inside labor "	75.00	75.00	75.00	75.00
Material	71.00	71.00	71.00	71.00
Papering (Labor)	7.50	7.50	7.50	7.50
Material (Material papering)	7.00	7.00	7.00	7.00
Linoleum	29.00	29,00	29.00	29.00
Tile	21.00	23.00	20.00	23.00
Shades	11.00	11.00	11.00	11.00
Drives	30.00	30.00	30.00	30.00
Sodding and grading	37.50	37.50	37.50	37.50
Steppingstones	6.50	6.50	6.50	6.50
Planting	15.00	15.00	15.00	15.00
Permit	8.00	8.00	8.00	8.00
	\$2,703.98	\$2,703.53	\$2,692.59	\$2,692.43
Contractor's Profit	270.00	270.00	268.00	269.00
" Overhead	140.00	140.00	134.00	134.50
(Insurance & Social Security)				
Loan and Legal Expense	160.00	160.00	160.00	160.00
Lot	700.00	700.00	700.00	700.00
TOTAL*	\$3,973.98	\$3,973.53	\$3,954.59	\$3,955.93

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* Exclusive of architect's fee.



HOUSE B.



HOUSE C.



HOUSE D.



CONSTRUCTION OUTLINE

FOUNDATION: Walls-poured concrete.

Cellar floor—4 in. concrete. STRUCTURE: Exterior walls—2 x 4 in. studs, braced frame, horizontal sheathing and weatherboard. Interior partitions-2 x 4 in. studs, 1 x 6 in. No. 2 common yellow pine, center match, canvas and paper. Floor construction—2 x 8 in. Joists, rough floor, 1 layer Slater's tar felt, finished flooring.

ROOF: Construction-2 x 6 in. rafters, wood sheathing, covered with Class C asphalt strip shingles. CHIMNEY: Brick with terra cotta lining;

false fireplace.

SHEET METAL WORK: Flashing-26 gauge galvanized iron.

WINDOWS: Sash—white Ponderosa pine, double hung. Frames—yellow pine. FLOOR COVERINGS: Main rooms—No. 1

oak. Kitchen-yellow pine. Bathrooms-tile. WOODWORK: Trim-stock, yellow pine. Interior doors-Colonial 6 panel, white pine.

Exterior doors—Colonial 6 panel, white pine. Exterior doors—Ponderosa white pine. PAINTING: Interior trim— 1 coat primer, 1 coat undercoater and enamel, 1 coat enamel, egg shell finish. Exterior walls—3

coats lead and oil. ELECTRICAL INSTALLATION: Wiring system—Romex. Switches—bakelite plates. Wiring HEATING: Gas floor furnace, warm air.

HOUSE IN JACKSON, MISS. HENRY G. MARKEL, ARCHITECT





KITCHEN-DINING

The architect estimates that by building three of these houses it was possible to save \$100 on each. In room arrangement the house follows one of the most popular of the two-bedroom plans, the variation in this case being a combined dining room and kitchen with low storage units separating the two spaces. The false fireplace in the living room is used for a gas heater. Closet space, for a house lacking a basement, seems unduly limited. Cubage: 13,440. Size of lot: 45 x 140.

COST BREAKDOWN

	MATERIALS	Til
CONSTRUCTION	AND LABOR	Ha
Excavation, backfill and grading	\$30.00	Ele
Concrete	84.00	Ce
Brickwork	65.00	Lii
Carpentry	1,075.00	то
Roofing	90.00	LA
Metal work	30.00	AF
Oak floor	65.00	cc
Painting	125.00	
Plumbing	410.00	
Wallpaper	25.00	то

Hiatt Photo



SCALE - 1/6" = 1'-0"

CONSTRUCTION OUTLINE

FOUNDATION: Walls—reenforced concrete grade beam, brick curtain wall and piers. STRUCTURE: Exterior walls—2 x 4 in. yellow pine studs, 16 in. o.c., shiplap siding; inside solid sheathing and 1/4 in. fir plywood Westcoast Co. Interior partitions—studs, 16 in. o.c., solid sheathed and covered with plywood. Floor construction—creosoted sills, 2 x 8 in. yellow pine joists, 16 in. o.c., bridged, 3/4 in. sub-floor, 15 lb. felt and finished flooring.

ROOF: Construction— 2×6 in. yellow pine rafters, 16 in. o.c., $\frac{3}{4}$ in. sheathing covered with 30 lb. saturated felt and asphalt shingles, slate surface, Lloyd A. Gray Roofing Co.

SHEET METAL WORK: Gutters and leaders -26 gauge Armco galvanized iron, American Rolling Mill Co.

WINDOWS: Sash—southern yellow pine, double hung, Jitney-Jungle Fixture Dept. Glass—single strength, quality B.

FLOOR COVERINGS: Main rooms—strip select grade white oak, E. L. Bruce Co. Kitchen—yellow pine covered with linoleum. WALL COVERINGS: Living room—Celotex tile fiberboard over solid sheathing, Celotex Corp. Bedrooms and halls—canvas and solid sheathing covered with wallpaper. Kitchen, —1/4 in. Celotex fir plywood. Bathrooms—1/4 in. Masonite Corp. Hardboard cemented and nailed to solid sheathing.

HARDWARE: Yale & Towne Mfg. Co.

PAINTING: Interior: Walls—3 coats flat tone warm gray, S. C. Johnson & Sons. Ceilings—2 coats casein, Casein Co. of America. Trim—3 coats enamel. Floors— Bruce natural finish, E. L. Bruce Co. Exterior walls—3 coats lead and oil, S. C. Johnson & Sons.

ELECTRICAL INSTALLATION: Wiring system—Romex, General Cable Corp. Switches —General Electric Co. Fixtures—direct, Montgomery Ward Co. KITCHEN EQUIPMENT: Sink—porcelain

KITCHEN EQUIPMENT: Sink—porcelain enamel, chrome fittings, Standard Sanitary Mfg. Co. Cabinets—wood, Jitney-Jungle Fixture Dept. BATHROOM EQUIPMENT: All fixtures by

BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co. Seat—C. F. Church Mfg. Co. Cabinet—metal.

PLUMBING: Soil pipes—cast iron. Hot and cold water pipes—galvanized steel. HEATING: Gas space heaters in all rooms

except living room which has insert gas heater in fireplace, Adams Bros. Mfg. Co. Hot water heater—20 gal. Montgomery Ward.

TOTAL COST HOUSE AND LAND	\$3,025.00
HEAD AND MISCELLANEOUS	250.00
CONTRACTOR'S PROFIT, OVER-	
ARCHITECT'S FEE	146.0
LAND AND IMPROVEMENTS	425.0
TOTAL CONSTRUCTION COST	\$2,204.00
Linoleum floor	50.00
Celotex ceiling	10.00
Electrical	65.00
Hardware	35.00
Tile floor	45.00

HOUSE IN PORTLAND, OREGON DIRK WINTERS, DESIGNER



Costs were kept down in this house by the use of the economical near-square plan, and by eliminating all exterior breaks, valleys and dormers. While the plan follows a familiar pattern, it adds one highly desirable element: an entrance vestibule with a coat closet. This reduces the size of the dining space—hardly a serious objection in houses of this size. Cubage: 21,500. Size of lot: 46 x 123.

COST BREAKDOWN

CONSTRUCTION	MATERIALS	5 LABOR
Foundation and		
basement floor	\$181.00	\$200.00
Carpentry	772.00	636.00
Plastering	96.00	60.00
Painting		
Exterior	30.00	45.00
Interior	60.00	125.00
Plumbing	240.00	60.00
Tile work	50.00	15.00
Fireplace	62.00	40.00
Heating (gravity hot air)	84.00	60.00
Sheet metal work	6.00	10.00
Electrical work	84.00	30.00
Shades and linoleum	20.00	10.00
Totals	\$1,685.00 \$	\$1,291.00
TOTAL CONSTRUCTION	COST S	\$2,976.00
PERMITS AND COMPEN	SATION	
INSURANCE		35.00
LAND AND IMPROVEM	ENTS	415.50
FINANCING COSTS		68.00
ADVERTISING		23.00
SALES COMMISSION		212.50
MISCELLANEOUS		37.00
PROFIT AND OVERHE	٩D	483.00
TOTAL COST HOUSE AND	LAND	\$4,250.00



CONSTRUCTION OUTLINE

FOUNDATION: Walls and cellar floorconcrete, Oregon Portland Cement Co.

STRUCTURE: Exterior walls—2 x 4 in. frame, 1 x 8 in. shiplap sheathing, asphalt building paper, $\frac{1}{2}$ x 8 in. cedar siding. Interior partitions—wood lath and 2 coats plaster. Floor construction—2 x 8 in. joists, 1 x 8 in. shiplap, sub-floor, 5/16 x 2 in. oak strip finish floor. All lumber by Jones Lumber Co.

ROOF: Construction— 2×4 in. rafters, 1×6 in. roof boards, 2 in. apart, covered with 5/2VG red cedar shingles, 5 in. exposure.

CHIMNEY: No. 1 common brick, face brick mantel, tile hearth, Columbia Brick Works, plastered flues, cast iron damper and cleanouts.

SHEET METAL WORK: Flashing, gutters and leaders—28 gauge galvanized iron. INSULATION: Attic floor—covered with

shiplap sheathing, plate to plate.

WINDOWS: Sash and frames—double run, stock, V. G. fir, W. P. Fuller Co. Glass single strength, quality B, Pennvernon, Pittsburgh Plate Glass Co.

STAIRS: Treads and risers—V. G. fir. Stringers—No. 2 common fir.

FLOOR COVERINGS: Main rooms—oak on kiln dried sub-floor. Kitchen—linoleum. Bathrooms—tile. Porches—concrete.

WALL COVERINGS: All rooms—plaster; knotty pine at fireplace end of living room. WOODWORK: Trim—No. 2 fir, Jones Lumber Co. Cabinets—made on job. Interior, ex-

terior and garage doors stock, V. G. fir, W. P. Fuller Co.

HARDWARE: Interior and exterior-brass plated, Russwin, Russell & Erwin Mfg. Co. PAINTING: Interior: Walls-wallpaper.

PAINTING: Interior: Walls — wallpaper. Ceilings—calcimine. Floors—stain, 2 coats shellac and 1 coat wax. Sash—3 coats enamel. Exterior: Walls—2 coats lead and oil. Roof —1 coat oil stain. All paints by Pittsburgh Plate Glass Co.

ELECTRICAL INSTALLATION: Wiring system—BX cable. Switches—General Electric Co. Fixtures—direct. KITCHEN EQUIPMENT: Sink—Standard

KITCHEN EQUIPMENT: Sink—Standard Sanitary Mfg. Co. Laundry sink—cement wash trays, Anchor Brand.

BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co. PLUMBING: Soil pipes—4 in. cast iron,

PLUMBING: Soil pipes—4 in. cast iron, extra heavy. Cold water pipes— $\frac{1}{2}$ in. galvanized iron pipe. Hot water—30 gal. galvanized iron tank.

HEATING: Cast iron warm air gravity furnace, Northwest Stove Works. Grilles cast iron floor registers. Hot water heater coils in furnace.

HOUSE IN SAN DIEGO, CALIFORNIA CLIFF MAY, DESIGNER









FOUNDATION DETAIL



Where space and climate permit, this design presents a solution of the problem of the low cost house with many advantages. Essentially one room deep, its cross-section permits simplified construction, especially of the roof and ceilings, and guarantees twin exposures for every room, with genuine cross ventilation, while adding to the apparent size of the house through increased width. Also worthy of study is the construction of the floor and footings, poured in one piece over a sand bed with exceedingly simple form-work. Cubage: 12,060. Plot: irregular, approximately 75 x 185.

COST BREAKDOWN

CONSTRUCTION	MATERIALS	LABOR
Foundation and first floor	\$165.00	\$100.00
Exterior walls	275.00	275.00
Partition walls	150.00	125.00
Roof	275.00	125.00
Interior finish	80.00	90.00
Millwork and trim	25.00	25.00
전 경험 이 것 같은 것	25.00	20.00
Kitchen, bathroom tiling, cabinets, accessories	75.00	100.00
Painting		
Exterior	35.00	70.00
Interior	40.00	80.00
Plumbing		
Piping	1	30.00
Fixtures	8	32.00
Fireplace	45.00	20.00
Heating (3 console units)	5	75.00
Sheet metal work		23.00
Electrical work	42.00	68.00
Rail fence	30.00	35.00
TOTAL CONSTRUCTION	COST \$	32,660.00
LAND AND IMPROVEMI	ENTS	637.00
PROFIT AND OVERHEA	D	253.00

TOTAL COST HOUSE AND LAND \$3,550.00

CONSTRUCTION OUTLINE

STRUCTURE: Exterior walls—stucco, 2 x 4 in. studs, 16 in. o.c.; inside—hardwall plaster over lath, U. S. Gypsum Co. Interior partitions— 2 x 4 in. studs with 3⁄4 in. U. S. Gypsum Co. hardwall plaster. Floor construction—3 in. concrete slab Anti-Hydro waterproofed on 3 in. sand cushion, Anti-Hydro Waterproofing Co.

Hydro Waterproofing Co. ROOF: Exposed rafters, 3 x 4 in., 36 in. o.c., solid sheathed covered with cedar shingles. WINDOWS: Sash—double hung. Glass—single strength, quality B, Libbey-Owens-Ford Glass Co.

FLOOR COVERINGS: Cement throughout. Bathrooms—linoleum covered. Porches—brick. HARDWARE: Locks—Schlage Lock Co. Latches—Dexter, National Brass Co.

PAINTING: All paints by W. P. Fuller Co. ELECTRICAL INSTALLATION: Wiring system—steel tube, Steel City Mfg. Co. Switches —Hart Mfg. Co.

KITCHEN EQUIPMENT: Range — Magic Chef, American Stove Co. Refrigerator— Kelvinator, Kelvinator Div., Nash-Kelvinator Corp. Sink—flat rim, Standard San. Mfg. Co. BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co. Shower—Chase Brass & Copper Co.

PLUMBING: Hot and cold water pipescopper tubing, Streamline Pipe & Fittings Div., Mueller Brass Mfg. Co.

HEATING: Gas fired unit heaters, Pacific Furnace Co. Hot water heater—Day & Night Water Heater Co., Ltd.

HOUSE IN MIDLAND, MICH. RALPH W. BOONE, ARCHITECT





A housing shortage in Midland led the town's industry, Dow Chemical Co., to investigate the possibilities of houses its employes could afford to buy. Above is one of the results, built as a demonstration house, sold, and repeated on three other lots. For economy and effective use of space the plan is one of the best in this issue. One reason the architect was able to produce so efficient a plan is the substitution of a shower for a bathtub—an expedient not always possible. The garage, it will be noted from the plan, also serves as a laundry. Cubage: 9,000. Size of lot: 50 x 125.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Masonry	\$118.54
General construction	1,597.61
Plumbing	298.21
Heating	35.00
Wiring and fixtures	63.00
Painting	168.29
Shades	12.98
	\$2,293.63
LAND AND IMPROVEMENTS	400.00
COMPENSATION INSURANCE	
AND TAXES	84.62
ARCHITECT'S FEE, OVERHEAI	D
AND PROFIT	239.73
TOTAL COST HOUSE AND LAND	\$3,017.98

CONSTRUCTION OUTLINE

FOUNDATION: Walls—poured concrete and concrete blocks.

STRUCTURE: Exterior walls—spruce studs, 34 in. Celotex Corp. sheathing, cedar siding, 1/2 in. Celotex planking. Interior partitions —spruce studs, 1/2 in. Celotex plank both sides. Floor construction—2 x 8 in. yellow pine joists, 1 x 6 in. sub-floor. Ceiling—1/2in. Celotex.

ROOF: Rafters, 2×4 in., covered with 15 lb. asphalt felt, Mulehide shingles, The Lehon Co.

CHIMNEY: Red common brick with terra cotta flue lining.

SHEET METAL WORK: Flashing, gutters, leaders and ducts—26 gauge Armco iron, American Rolling Mill Co.

INSULATION: Celotex as listed above serves as insulation, Celotex Corp. Weatherstripping on doors.

WINDOWS: Sash—double hung, white pine; storm sash. Glass—single strength, quality A. Screens—16 mesh, galvanized, 1½ in. frame. FLOORS: No. 2 common oak throughout. WALL COVERINGS: Main rooms—natural finish Celotex, Celotex Corp. Kitchen and bathrooms—Masonite hardboard, Masonite Corp.

WOODWORK: Trim—clear fir. Cabinets built-in, white pine. Interior doors—2-panel, fir. Exterior doors—1¾ in. white pine, Morgan Sash & Door Co. Garage doors—fir.

HARDWARE: Interior—Schlage Lock Co. Exterior—Schlage Lock Co. and Stanley Works. PAINTING: Kitchen and bathroom walls— Wallhide, semi-gloss. Floors and sash varnish. Exterior walls—Sunproof. All paints by Pittsburgh Plate Glass Co.

ELECTRICAL INSTALLATION: Wiring system—3 circuits Romex, General Cable Corp. Switches—Pass & Seymour.

KITCHEN EQUIPMENT: Sink-Kohler Co. Cabinets-built-in, white pine.

BATHROOM EQUIPMENT: All fixtures by Kohler Co. Shower and cabinets—built-in. PLUMBING: Soil, waste and vent pipes cast iron and galvanized. Hot and cold water

pipes—copper, Mueller Brass Co. HEATING: Warm air, Moore Gas Circulator. Fuel — gas. Hot water heater—25 gallon SandyMac, Everhot Heater Co.

HOUSE IN MIDLAND, MICH. ALDEN B. DOW, ARCHITECT



COST BREAKDOWN

Another attempt to remedy Midland's housing shortage (see p. 277), the house illustrated on these two pages is perhaps the most original of any submitted. The architect's approach was technical rather than stylistic. In the first place, the design is modular, using conventional frame construction with sheet materials used exclusively for exterior and interior finishes. All structural details were carefully worked out; the window sections in particular merit close study. The handsome bay in the living room did not add to the foundation cost as it was cantilevered out from the wall; this bay is a good example of combined fixed and movable sash, noted in the construction section as a practical economy measure. In its plan the house is very well organized, all functions being attractively as well as efficiently cared for. Fortunate in its avoidance of "modernistic" tricks, the exterior is appropriately modest and has a definite quality of style. Cubage: 15,440. Size of lot: 105 x 250.

CONSTRUCTION	MATERIA	LS	LABOR
Foundation	\$225.78		\$363.71
First Floor	147.34		103.60
Exterior walls	270.88		118.40
Partition walls	54.71		22.60
Roof	260.49		36.80
Interior finish	170.17		87.10
Millwork and			
trim	252.96		352.35
Kitchen and			
bathroom			
cabinets and			
accessories	35.01		44.49
Painting		189.83	
Plumbing		473.65	
Chimney	32.06		26.38
Heating (gas			
fired forced air)	311.21	
Sheet metal and			
electrical work		120.20	
Totals \$	1,449.40	\$1,094.89	\$1,155.43
TOTAL CONSTRU	JCTION (COST	\$3,699.72
LAND AND IMP	ROVEME	NTS	432.17
PROFIT, OVERH	EAD, AN	ND	
ARCHITECT'S			419.57

TOTAL COST HOUSE AND LAND \$4,551.46

CONSTRUCTION OUTLINE

FOUNDATION: Walls-concrete block eleven courses high on reenforced concrete footings. Waterproofing-hot asphalt pitch on exterior basement walls.

STRUCTURE: Exterior walls-1/2 in. Homasote Co. building board on 2 x 4 in. studs, 2 in. Balsam wool insulation, Wood Conversion Co. Inside-1/2 in. Celotex, Celotex

Corp. Interior partitions-1/2 in. Celotex. Floor construction-2 x 10 in. joists, 1 x 8 in. matched rough sub-floor, fir finish flooring. Celling $-\frac{1}{2}$ in. Celotex. ROOF: 2 x 10 in. joists, 1 x 8 in. matched

boards, 3-ply built-up roofing Johns-Manville Corp.

SHEET METAL WORK: Flashing-copper. Ducts-galvanized iron trunk line system.

INSULATION: Outside walls and roof-2 in. Balsam wool blanket, Wood Conversion Co. Sash-fabric tape weatherstripping. WINDOWS: Sash-wood casements, H. S.

Getty Co. operators. Glass-double strength, quality A; large front window-1/4 in. polished plate. Screens—16 mesh copper; 34 in. wood frames set on inside of window. WOODWORK: Varnished fir throughout.

WALL COVERINGS: All rooms - natural

finish Celotex, Celotex Corp. HARDWARE: Schlage Lock Co. door hard-

ware; Stanley Works hinges and H. S. Getty Co. window operators.

PAINTING: Bathrooms-white enamel. Floors and sash-varnish. Exterior walls-patented sand finish, Homasote Co. ELECTRICAL INSTALLATION: Wiring sys-

tem-Romex, 4 circuits, General Cable Corp. Switches and fixtures-Pass & Seymour. KITCHEN EQUIPMENT: Sink -- Dalcross,

Kohler Co. BATHROOM EQUIPMENT: All fixtures by

Kohler Co. Medicine cabinet-built-in wood. PLUMBING: Soil, waste and vent pipescast iron. Hot and cold water pipescopper. Streamline Pipe & Fittings Div., Mueller Brass Co.

HEATING: Bryant Heater Co. gas fired, forced air system. Thermostat—Minneapolis-Honeywell Regulator Co. Hot water heater-Consumers Power gas heater, automatic quick recovery.

KITCHEN



BASEMENT

CORNER MULLION WINDOW DETAILS



è

META DRIP

5 3/4"

34"×1112" FASCIA

3/4" x 3" SOFFIT



WALL SECTION



3PLY ROOFING

2%10"JOISTS, 24"0.0-

-2x4"NAILER

SECTION A-A			
BED RM-	BEI LIV- BN	•	
		GAME RM	

1 SQ U A RE - 4-0"

LIVING ROOM

HOUSE IN SPARTA, N. J. EDWIN R. CLOSS, ARCHITECT





LIVING ROOM

An irregular site permitted the placing of this very small house above a one-car garage. Use of a sloping roof over the first-floor bedroom, and of a low front window on the second floor are two devices which successfully minimize the height of the building. The plan is compact and efficient, the only possible disadvantage being the necessity of using the living room as circulation between downstairs bath and upstairs bedroom. Cubage: 7,000. Lot size: 80 x 80.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Foundation, cement floor,	
entrance masonry, walls,	
driveway and grading	\$330.00
Carpentry	1050.00
Painting	155.00
Plumbing	280.00
Chimney (metal outside)	15.00
Heating (hot water—pot heater)	175.00
Sheet metal work	10.00
Electrical work	62.00
Range	56.00
Refrigerator	86.00
TOTAL CONSTRUCTION COST	\$2,219.00
LAND AND IMPROVEMENTS	230.00
PROFIT AND OVERHEAD	211.00
TOTAL COST HOUSE AND LAND	\$2,660.00



CONSTRUCTION OUTLINE

FOUNDATION: Walls—8 x 8 x 16 in. cement block. Cellar floor— $2l_2$ in. concrete. STRUCTURE: Exterior walls—2 x 3 in., 24 in. o.c., stud frame, $\frac{3}{4}$ in. Flintkote Co. insulating sheathing, 1 x 10 in. cedar siding; inside $\frac{1}{4}$ in. fir plywood. Interior partitions— $\frac{3}{4}$ in. fir plywood. Floor construction—(1st) 1 x 4 in. grain fir; finish flooring; (2nd) 4 x 4 in. beams, and fir plywood. Ceiling— $\frac{1}{4}$ in. fir plywood.

ROOF: Construction— 2×4 in. rafters, 20 in. o.c., covered with $\frac{3}{4}$ in. Flintkote Co. insulation, 1×2 in. spruce lath ends closed and 18 in. silver gray cedar shingles.

CHIMNEY: Galvanized one piece pipe outside from brick base to top.

SHEET METAL WORK: Flashing-copper. Roof gutters over entrance door only.

INSULATION: Outside walls and roof-34 in. sheathing board, Flintkote Co. WINDOWS: Sash-double hung, Unique Win-

dow Balance Co. balancers. Glass-double strength, quality A.

STAIRS: Treads—oak. Risers—pine. Stringers—fir. Hand rail—round pine.

FLOORS: Wood throughout; special floor enamel in kitchen and bathroom.

WALL COVERINGS: Living room—V-joint random width white pine; remainder 1/4 in. fir plywood, enameled in kitchen and bath. WOODWORK: Trim and exterior doors white pine. Cabinets and interior doors—fir plywood.

PAINTING: Interior: Walls and sash-2 coats wax, Minwax Co. Ceilings and floor-3 coats lacquer, Flood & Conklin. Exterior: Walls-2 coats prime, 1 coat Liquawood white, Flood & Conklin. Roof-1 coat double light gray, Samuel Cabot, Inc.

ELECTRICAL INSTALLATION: Wiring system—Romex, fiber covered, General Cable Co. Fixtures—direct.

KITCHEN EQUIPMENT: Range—Philgas, Phillips Petroleum Co. Refrigerator—³General Electric Co. Sink—flat rim basket drain, built-in linoleum counter. Cabinets—wood. BATHROOM EQUIPMENT: All fixtures by Kohler Co. Cabinets—Lawco, F. H. Lawson Mfg. Co.

PLUMBING: Soil pipes—cast iron. Hot and cold water pipes—Anaconda copper tubing, American Brass Co.

HEATING: Tank heater—gravity circulating system, Richardson & Boynton Co. Radiators and valves—American Radiator Co. HOUSE IN DELRAY BEACH, FLORIDA PAIST AND STEWARD, ARCHITECTS



BED · RM · BED · RM ·

This plan should be compared with that on page 294, as the two are practically identical, save for small differences in room sizes. The car shelter is rapidly being adopted as a cost-saving feature in the South. Closets are efficient in shape and of adequate size. The builder notes that he completes two houses a week with a very small force of men, and estimates his savings due to the construction of 20 houses at once at 20 per cent of the cost of a single house. Selling price with land: \$2,895. Land was put in at \$160, financing charges at \$100. Lot size: $56 \ge 132$.

CONSTRUCTION OUTLINE

FOUNDATION: Walls—reenforced concrete. STRUCTURE: Exterior walls—No. 1 cypress siding, 1×8 in. storm sheeting, No. 2 shiplap, 2×4 in. studs, Gold Bond rock lath, National Gypsum Co., 2 coats plaster, colored finish. Interior partitions—No. 2 shiplap, studs, rock lath, plaster finish. Floor construction—No. 2 L.L.Y. P., 2 $\times 8$ in. joists, 1×8 in. sub-flooring, No. 1 common oak finish flooring. Ceiling—plaster. ROOF: No. 2 shiplap, 2 $\times 6$ in. rafters, 1×8

ROOF: No. 2 shiplap, 2×6 in. rafters, 1×8 in. sheeting covered with 30 lb. felt and 137 lb. white slate surface shingles, Flintkote Co.

SHEET METAL WORK: Flashing-galvanized iron.

INSULATION: Outside walls—building paper. Roof—30 lb. felt, Flintkote Co. Weatherstripping—on rear door. WINDOWS: Sash—cypress stock, double

WINDOWS: Sash—cypress stock, double hung, Rochester Sash Balance Co. balancers. Glass—Libbey-Owens-Ford Glass Co.

FLOOR COVERINGS: Main rooms—No. 1 common oak. Kitchen and bathrooms—pine covered with linoleum. Porches—reenforced concrete slab, 2 in. topping. WALL COVERINGS: All rooms—Gold Bond

wALL COVERINGS: All rooms—Gold Bond plaster, colored, National Gypsum Co.

HARDWARE: Interior and exterior—Schlage Lock Co. and National Brass Co.

PAINTING: Floors—shellac and wax. Sash -2 coats paint. Exterior walls—3 coats paint. All walls colored plaster. Paints by Benjamin Moore & Co., Glidden Co. and Sherwin-Williams Co.

ELECTRICAL INSTALLATION: Switches-Arrow-Hart & Hegeman Electric Co. Fixtures-Virden.

KITCHEN EQUIPMENT: Sink—Kohler Co. BATHROOM EQUIPMENT: All fixtures by Kohler Co. Cabinet—Columbia Metal Cabinet Co.

HOUSES IN FREDERICKSBURG, VA. CECIL L. REID, DESIGNER



These five houses were built to rent at \$45 a month. Designed as a group and erected at one time, they cost \$100 less per house than if built singly, according to the owner's estimate. The houses are described as "a modified Cape Cod-Williamsburg-Early American combination," said to meet the local demand better than any other style. The manner of heating is of interest: the house at the head of the quadrangle has a stokerfired furnace which heats all five houses; hot water is used. In this basement are also located all meters so that they can be read without disturbing the occupants. Each house has its own circulating pump and thermostat for the heating system. The plan is standard save for the kitchen-dinette arrangement. Cost per house, including land: approximately \$4,000. Total cubage: 66,000. Size of lot: 132 x 150.









KITCHEN-DINING



LIVING ROOM



BEDROOM

CONSTRUCTION OUTLINE

FOUNDATION: Walls-9 x 16 in. concrete footings, 8 in. concrete block. Cellar floor -12 in. sand fill with drain tile and 4 in. concrete (under center house only). Waterproofing-cement plaster and 1 coat asphalt. STRUCTURE: Exterior walls-2 coats Bondex, Reardon Co., 8 in. concrete block, 2 coats emulsified asphalt plaster board and gray plaster, 1 coat white plaster. Interior partitions—4 in. studs, U. S. Gypsum Co. rock lath, plaster. Floor construction—reenforced concrete joists, precast cinder concrete slabs, 30 lb. felt, Baines Lumber Co. clear plain white oak finish flooring. ROOF: Covered with 3/8 in. Buckingham

slate. CHIMNEY: Cinder block with lining, cast iron damper, ash dump and firebrick. SHEET METAL WORK: Flashing, gutters

and leaders—16 oz. copper. INSULATION: Attic—4 in. rock wool, Phillip Carey. Weatherstripping-bronze and zinc. WINDOWS: Sash-double hung, cypress. Glass-single strength. Screens-bronze mesh.

FLOOR COVERINGS: Main rooms-clear white oak. Kitchen-B. & B. pine covered with heavy linoleum. Bathrooms-tile floor. WOODWORK: Trim—B. & B. pine. Interior doors—2-panel. Exterior doors—6-panel. HARDWARE: Interior and exterior-Schlage

Lock Co. PAINTING: Kitchen and bathroom-3 coats

paint. Floor—1 coat fill, 2 coats shellac and wax. Sash—2 coats flat, 1 coat enamel. Ex-terior walls—2 coat Bondex, Reardon Co.

ELECTRICAL INSTALLATION: Complete wiring system, no fuse load center. Switches —tumbler, General Electric Co.

KITCHEN EQUIPMENT: Range—Standard Gas Equipment Co. Sink—Crane Co.

BATHROOM EQUIPMENT: All fixtures by Crane Co. Cabinet-F. H. Lawson Co.

PLUMBING: Soil pipes—cast iron. Hot and cold water pipes—copper, Revere Brass Co. HEATING: Hot water system, H. A. Thrust

Co., thermostat control. Boiler-Crane Mfg. Co. Radiators and valves-National Radiator Co. Hot water heater-Excelso No. 27, Excelso Products Corp.

HOUSES IN LOUISVILLE, KY. G. ALFRED, ARCHITECT; W. M. SMOCK, BUILDER





The device of using a single plan to serve for a whole development is one that has been adopted by many builders as an economy measure. Here the plan shown has been used in a group of 36, variety being achieved by the expedient of turning the plan 90°. Commendable as this kind of standardization may be, it seems surprising that the plan selected should be one in which occupants of the larger bedroom should have to use the other bedroom, or the living room and kitchen, as the route to the bathroom. For other plans connecting bathroom and kitchen plumbing, but with more convenient circulation, see pages 265, 267. Allocating the same amount of space to a bedroom and to the living room is unusual, but apparently was not considered objectionable by buyers. For additional data on the development, see ARCH. FORUM, Mar. 1938, p. 260.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Lumber and millwork	\$640.00
Plumbing	350.00
Carpentry	300.00
Foundation and chimney	175.00
Plastering	150.00
Painting	125.00
Wiring and fixtures	75.00
Roofing	75.00
Concrete stoop and walks	65.00
Wallpaper, shades, linoleum	60.00
Finishing hardwood floors	35.00
Hardware	25.00
Gutters and flashing	20.00
Tile floor, bathroom	17.00
TOTAL CONSTRUCTION COST	\$2,112.00
COST OF LOT	250.00
GRADING AND SHRUBBERY	25.00
SELLING EXPENSES	138.00
PROFIT	225,00
TOTAL COST HOUSE AND LAND	\$2,750.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls—18 in. concrete footings; 3 layers of concrete blocks. Concrete block piers with concrete footings.

STRUCTURE: Exterior walls— 2×4 in. studs, 16 in. on centers with $\frac{1}{2}$ in. insulation board for storm sheeting, 10 in. redwood siding. Inside—rock lath with 3 coats plaster. Floor construction—tongued and grooved red oak nailed directly to Joists.

ROOF: Construction— 2×6 in. rafters, 16 in. on centers; 1×8 in. sheathing, covered with 185 lb. Certainteed slate surfaced shingles, Certainteed Products, Inc.

SHEET METAL WORK: Flashing, gutters and leaders—28 gauge galvanized iron.

INSULATION: Outside walls—1/2 in. Evenair insulation board, Plastergon Wallboard Co. Weatherstripping on outside doors—bronze. WINDOWS: Sash—double hung; yellow pine cypress sills. Glass—single strength, quality A. Screens—wood frames, bronze wire.

WALL COVERINGS: Living room and bedrooms—wallpaper, selected by buyer. WOODWORK: Trim—molded yellow pine.

Interior doors—1% in. thick, white pine, 6panel Colonial.

HARDWARE: Interior—dull brass, plated, mortised locks. Exterior—cylinder locks, 3 hinges, Russell & Erwin Mfg. Co.

PAINTING: Interior: Walls and ceilings—3 coats washable wall paint, Porter Paint Co. Floors—1 coat filler, 2 shellac, 1 wax. Exterior—titanium paint, Porter Paint Co.

ELECTRICAL INSTALLATION: Cable—BX. Switches—Bakelite, all by General Electric Co. Fixtures—direct. KITCHEN EQUIPMENT: Sink—42 in. Duo-

KITCHEN EQUIPMENT: Sink—42 in. Duostrainer cabinet type, Kohler Co. Cabinet built-in, drawers, biscuit board and work top; built-in ironing board.

BATHROOM EQUIPMENT: Lavatory—hanging type, Kohler Co. Cabinet—steel.

PLUMBING: Soil pipes—cast iron. Water pipes—copper, Revere Copper & Brass Co. HEATING: Flue provided with outlet for

circulator to be placed in living room. Hot water heater—Hoffman 20-gal., insulated, thermostatically controlled gas, Hoffman Gas & Electric Heater Co.

HOUSE IN SHELDON, IOWA F. W. BENSON, DESIGNER





A standard plan, with bedrooms and bath in one unit, centrally located chimney, and dining space off the living room. Separation of kitchen and bath adds somewhat to plumbing costs, but the expense in this instance is compensated for by greater privacy. It is difficult to understand the placing of the garage, close to the house but not connected to it. An interesting solution of the sliding door problem is the frame, visible in the lower photograph.

COST BREAKDOWN

CONSTRUCTION	MATERIAL	S LABOR
Foundation	\$148.49	\$88.10
Carpentry	813.24	458.85
Millwork and trim	184.00	70.30
Kitchen and bathroom		
cabinets and accessories	24.00	9.20
Painting Exterior	15.20	14.20
Interior	19.71	32.20
Plumbing Piping	48.15)	40.05
Fixtures	84.98	42.35
Heating (Gravity Hot Air)	157.69	34.00
Sheet metal work	18.03	7.50
Electrical work	30.25	19.05
Totals 8	31,543.74	\$775.75
TOTAL CONSTRUCTION	9	2,319.49
LAND AND IMPROVEME	NTS	531.72
TOTAL COST HOUSE AND L	AND S	2,851.21



CONSTRUCTION OUTLINE

FOUNDATION: Walls—cement block, Sheldon Concrete Works. Cellar floor—clay fill, cement, 1-2-3 mix, 2 in. thick.

STRUCTURE: Exterior walls—2 coats plaster, wood lath, 2 x 4 in. studs, $\frac{3}{4}$ in. sheathing, asphalt paper, cedar siding. Interior partitions—2 coats plaster, wood lath, 2 x 4 in. studs, 16 in. o.c., wood lath. Floor construction—2 x 8 in. joists, 16 in. o.c., $\frac{3}{4}$ in. sheathing, Rosin paper, oak finish flooring. Ceiling—plaster, wood lath. All lumber by Weyerhaeuser Sales Co.

ROOF: Construction— 2×4 in. rafters, $\frac{3}{4}$ in. sheathing, heavy asphalt felt, wood shingles. CHIMNEY: Common brick, no lining, 36 x 36 in. footings, 8×8 in. flue.

SHEET METAL WORK: Flashing, gutters and leaders—26 gauge Armco galvanized iron, American Rolling Mill Co.

INSULATION: Outside walls and roofasphalt paper, Mulehide, Lehon Co. Attic floor-to be covered with 3 in. rock wool this summer.

WINDOWS: Sash-1% in. pine, double hung, counter-weighted, Jordon Sash & Door Co.; storm sash. Glass-double strength, quality A, Libbey-Owens-Ford Glass Co. Screensgalvanized wire. Jordon Sash & Door Co.

galvanized wire, Jordon Sash & Door Co. FLOOR COVERINGS: Living room—oak; remainder—hard pine; kitchen and bathrooms linoleum covered.

WOODWORK: Trim and cabinets—soft pine, Weyerhaeuser Sales Co. Interior and exterior doors—soft pine, Jordon Sash & Door Co.

HARDWARE: Interior—dull bronze, glass knobs; exterior—dull brass, Montgomery Ward Co.

PAINTING: Interior: Floors—fill, 2 coats MarNot varnish. Sash—3 coats Ivory White, semi-luster. Exterior walls—2 coats outside white. All paints by Sherwin-Williams Co. ELECTRICAL INSTALLATION: Wiring sys-

tem—2-10, 2-12, 2-14 non-metallic loom. Switches—togcle, flush, Montgomery Ward Co. Fixtures—built-in, indirect, Opal Flash glass, Pittsburgh Plate Glass Co.

KITCHEN EQUIPMENT: Sink—flat rim, built into work table, basket-sink strainer, mixing faucet, Montgomery Ward Co. Cabinet and worktable—wood, built-in, linoleum covered, B. & T. Floor Co. Chromedge trim. BATHROOM EQUIPMENT: All fixtures and cabinet by Montgomery Ward Co. PLUMBING: Soil pipes—cast iron. Hot and

cold water pipes—galvanized iron. Hot and cold water pipes—galvanized iron. Septic tank—12 gal. copper steel, coated. Water pump—250 gal. All equipment by Montgomery Ward Co.

HEATING: Hot air with register and cold air return in every room and cold air return from every room but kitchen and bath; 1st. floor draft regulator in baseboard, cold air regulator in floor, Agregola Foundry & U. S. Register Co. Boiler—20 in. hot air, cast iron, 3 section, Montgomery Ward Co. Grilles— U. S. Register Co. Hot water heater—coal type, 55 gal., hand feed; furnace water coil attached for winter, Dupage Boiler Works.

HOUSE IN SEATTLE, WASH. GEORGE WELLINGTON STODDARD, ARCHITECT





GENERAL HOUSING CORP., BUILDERS



Straight-line production under cover in an assembly plant organized for maximum efficiency accounts for the largest saving in the construction of this completely prefabricated or "mobile" house, now available at a fixed price to residents of Seattle and vicinity. Strengthened for safe handling in transit by a steel angle frame surrounding the floor and by sheathing glued and nailed to the studs, the individual units which comprise the finished house are otherwise of conventional construction, joined together at the site with special bolts and connectors. Designed for use with or without a basement, the standard unit includes a removable floor panel in the utility room which provides space for a basement stair. Windows, outswinging wood casements with patented sliding screens which disappear into the wall cavitv.

COST BREAKDOWN

TOTAL SALES PRICE

4-room house f.o.b.	\$2,980.00
Delivery on ordinary lot	
in Seattle, Wash.	125.00
Sales tax	57.50
Cost of lot (average)	450.00
Service connections (average)	85.00
Landscaping (average)	100.00
Foundation (estimated)	85.00

\$3,882.50

FOUNDATION: Concrete blocks. STRUCTURE: Exterior walls— $\frac{1}{2} \times 8$ in. grade A cedar lap siding, building paper, $\frac{5}{16}$ in. 3-ply plywood panels, studs, $\frac{1}{2}$ in. Homasote boards, Homasote Co. Interior partitions—studs and Homasote. Floor construction— 2×8 in. No. 1 common fir joists, 16 in. o.c., 4×8 ft. $\frac{3}{4}$ in. plywood, treated with Laucks & Co. Resite, glued and nailed, $\frac{3}{16}$ in. Masonite Corp. tempered Presdwood finish. ROOF: No. 1 common fir open sheathing,

CONSTRUCTION OUTLINE

clear cedar shingles, 5¾ in. to weather. SHEET METAL WORK: Flashing, gutters and leaders—26 gauge galvanized iron, Armco, American Rolling Mill Co. INSULATION: Outside walls—Homasote Co. boards. Ceilings—2 in. mineral wool Universal Insulation Co.

FLOOR COVERINGS: Main rooms—3/16 in. Masonite Presdwood in 2 x 4 ft. blocks, pretreated, Frinnell Co. "Fulfil." PAINTING: Walls and ceilings—oil primer and 2 coats Speedwall semi-gloss Woodwork—No. 116 oil primer, 2 coats Japalac enamel. Exterior walls—1 coat base coat and 1 coat No. 550 titanium paste. All paints by Glidden Co. ELECTRICAL INSTALLATION: Cabinet

-Trumbull, 6 circuit, no fuse panel. Wiring system—knob and tube; conduit for range and water heater. Switches— Bryant Electric Co.

KITCHEN EQUIPMENT: Sink—Standard Sanitary Mfg. Co. Fan—Westwind, Jr. Laundry sink—single compartment.

BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co. PLUMBING: Soil pipes—cast iron. Hot and

cold water pipes—copper tubing Chase Brass and Copper Co.

HEATING: Furnace, warm air, fan type; automatic oil burner. Grilles—stamped steel. Hot water heater—electric.



HOUSE IN LAFAYETTE, INDIANA BERTRAND GOLDBERG, ARCHITECT FOR



A single house, built of prefabricated plywood sections. Built as a more or less experimental unit, the house was designed for erection in groups of not less than five, with a top selling price of \$3,000 without land. The model shown here has a number of excellent features. Fenestration, particularly in the bedrooms, is generous, and the windows are high enough to permit the placing of furniture below. The heater is built into a closet unit in the living room which gives some privacy to the bedrooms without the need for a separate corridor. Ample space for dining is available in the kitchen, which is also located for convenient service to the porch or for supervision of children if the porch is used as a play space. An important element in cost saving is not only the standardization of windows and wall panels, but also the reduction of partitions and millwork wherever possible. The detail shows an interesting wiring set-up, designed to reduce fixture and outlet costs. The construction cost of the house, exclusive of land and landscaping, is given as \$2,600.

STANDARD HOUSES CORP.



CONSTRUCTION OUTLINE

FOUNDATION: Walls—concrete pier. STRUCTURE: Exterior walls—2 x 4 in. studs, 14 in. o.c., 1/4 in. plywood glued, nailed, and hot press on outside; inside same but no hot press. Floor construction—2 x 6 in. joist, 14 in. o.c., 5/8 in. plywood top, 1/4 in. hot press under, glued and nailed. Special process of prefabrication for foundation and structure by Standard Houses Corp. Special storage cabinet built as part of exterior design to replace basement.

ROOF: Construction—2 x 4 in. rafters with $\frac{1}{4}$ in. hot press plywood outside and $\frac{1}{4}$ in. plywood inside, glued and nailed, covered with asphalt shingles.

CHIMNEY: Material and lining—transite. SHEET METAL WORK: Flashing and leaders—galvanized iron.

INSULATION: Johns-Manville rock wool with special built-in moistureproofing used throughout. Weatherstripping—spring bronze. WINDOWS: Sash—wood casement. Glass double strength, quality A, Libbey-Owens-Ford Glass Co. Screens—wood, hinged.

FLOOR COVERINGS: Main rooms—3% in. oak. Kitchen and bathrooms—1% in. block tempered Masonite, Masonite Corp. Porches —plywood, Harbor Plywood Corp. WOODWORK: Trim—pine. Cabinets—ply.

WOODWORK: Trim-pine. Cabinets-plywood, Harbor Plywood Corp.

PAINTING: Sash—A. C. Horn Co. Remainder—special finish developed by Standard Houses Corp.

ELECTRICAL INSTALLATION: Special prefabricated system by Standard Houses Corp. and M. B. Austin Co. Fixtures— Lumiline. KITCHEN EQUIPMENT: Refrigerator—

KITCHEN EQUIPMENT: Refrigerator stainless steel. Kitchen and laundry sink and cabinets—special design by Standard Houses Corp.

BATHROOM EQUIPMENT: All fixtures by Crane Co. Seat—Beneke Corp.

PLUMBING: Soil pipes—cast iron. Hot and cold water—copper. Prefabricated special by Standard Houses Corp.

HEATING: Gas fired hot air system, Reznor Mfg. Co. Heaters—Crane Co. HOUSE ON BALBOA IS., CAL. G. BRANCH, DESIGNER, H. C. MARSHALL, BUILDER





In this example the rear of the garage has been pressed into service as a utility room, an expedient which, whatever its disadvantages, does save space. Garage and house have been combined into one unit under an economical hipped roof, and the roof overhang serves as a shelter for the front door. Floor construction, as indicated in the detail above, is based on the plank and girder system, advocated as a means of saving material and labor. Cubage: 6,120. Size of lot: 50 x 120.



COST BREAKDOWN

CONSTRUCTION	\$2,250.00
LAND	350.00
PROFIT, OVERHEAD AND MISCELLANEOUS	350.00
TOTAL COST HOUSE AND LAN	D \$2,950.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls-battered type, concrete.

STRUCTURE: Exterior walls-3 coats stucco, hogwire, building paper, 2×4 in. studs, firestops, diagonal bracing, button lath. Interior partitions-2 coats stucco, tight trowel wall finish. Floor construction-2 x 6 in. T. & G. sub-floor on 4 x 6 in. girders, 4 in. o.c., $\frac{1}{2} \times 2$ in. select oak finish flooring. Ceiling—dash finish, troweled tight. ROOF: Frame construction covered with No.

1 red cedar shingles. SHEET METAL WORK: Flashing—gal-

vanized iron.

floor-felt INSULATION: Ground paper under hardwood, Elrey Products Mfg. Co. Weatherstripping—on outside doors.

WINDOWS: Sash—double hung. Glass— single strength, Pittsburgh Plate Glass Co. Screens-Oregon pine frames.

FLOOR COVERINGS: Main rooms-hardwood. Kitchen and bathrooms-linoleum

covering. Porches—concrete. WALL COVERINGS: Main rooms—natural stucco. Kitchen-5 tipple finish paint. Bathrooms-Sanitas, Standard Coated Products

WOODWORK: Trim and cabinets-Oregon pine. Interior doors-4-panel. Exterior doors -(front) 3-panel; (rear) combination Hollywood, Jr. Garage doors--overhead type

HARDWARE: Interior and exterior-Schlage Lock Co. PAINTING: Interior walls, ceilings and sash

-interior paint. Floors-oak, polished. Exterior walls-stucco. Roof-natural finish.

ELECTRICAL INSTALLATION: Wiring system—flexible tubing. Fixtures—direct (al-lowance \$25), J. M. Feldman.

KITCHEN EQUIPMENT: Sink-Standard Sanitary Mfg. Co. Cabinets--wood. Sink-Standard

LAUNDRY EQUIPMENT: Sanitary Mfg. Co. BATHROOM EQUIPMENT: All fixtures by

Standard Sanitary Mfg. Co. Cabinets-builtin. PLUMBING:

Automatic Heater-Mission Water Heater Co.

HEATING: Floor furnace, Dual wall type, Unimatic Heating Systems, Inc. Hot water heater-20 gal. gas automatic. Forced air ventilator mounted in hall ceiling with ducts to living and bedrooms, suction.

HOUSE IN SAFFORD, ARIZONA J. D. HALSTEAD LUMBER CO., BUILDERS





In its accommodations, this house is above average for its price class. The living room, while somewhat small, is supplemented by a full-size dining room. The kitchen, of reasonable dimensions, adjoins a utility room which serves as laundry, service vestibule and storage space. Plumbing is as well concentrated as possible. The exterior suggests that simplification is not always synonymous with good design, although the entrance treatment is a pleasant feature. Lot size: 65 by 120.

COST BREAKDOWN

		MATERIALS
CONSTRUCTION		AND LABOR
Foundation	\$67.25	\$32.00
First floor	240.05	67.10
Exterior walls	436.00	182.00
Partition walls	222.08	114.12
Roof	157.02	63.18
Interior finish	198.00	110.60
Millwork and trim	26.00	22.12
Kitchen and bathroom		
cabinets and accessories	93.00	30.00
Painting Exterior	97.08	81.00
Interior	8.18	6.42
Plumbing	132.00	97.00
Heating (gas furnace)	83.00	18.00
Sheet metal work	4.90	3.67
Electrical work	91.00	45.00
	1,855.56	\$872.21
TOTAL CONSTRUCTION C	COST	\$2,727.77
GARAGE		377.18
PROFIT AND OVERHEAD		255.45
TOTAL COST WITHOUT LAN	D	\$3,360,40



CONSTRUCTION OUTLINE

FOUNDATION: Walls—concrete, Southwestern Portland Cement Co.

STRUCTURE: Exterior walls—2 x 4 in. studs, rock lath and U. S. Gypsum Co. plaster inside, 1 x 4 in. spaced sheathing, 15 lb. Flintkote Co. felt, Colorado fuel and iron netting and cement stucco. Interior partitions—rock lath and U. S. Gypsum Co. plaster, fine texture finish. Floor construction—2 x 6 in. joist, 1 x 2 in. Nickey Bros. No. 2 common oak flooring.

ROOF: Construction -2x + 4 in. rafters, 1×6 in. native sheeting, 210 Flintkote Co. thick butt white shingles.

CHIMNEY: Common brick.

SHEET METAL WORK: Flashing and eaves drip—Wheeling Corrugating Co.

WINDOWS: Sash—steel casements, Truscon Steel Co. Glass—single strength, quality B, Pittsburgh Plate Glass Co.

FLOOR COVERINGS: Main rooms—No. 2 common oak, Nickey Bros. Kitchen and bathroom—pine covered with Masonite Century Progress, Masonite Corp. Porches—cement, Southwestern Portland Cement Co.

WOODWORK: Trim—white pine. Cabinets— Peerless Built-In Fixture Co. Interior doors— 1-panel WACO. Exterior doors—sash, Southwestern Sash & Door Co. Garage doors built on job.

HARDWARE: Interior and exterior—Sargent & Co.

PAINTING: Interior: Walls and ceilings-Texolite, U. S. Gypsum Co. Floor-filler and 2 coats varnish; sash-semi-gloss, Pittsburgh Plate Glass Co.

ELECTRICAL INSTALLATION: Wiring system—BX. Switches—J. I. Paulding. Fixtures —direct.

KITCHEN EQUIPMENT: Kitchen and laundry sinks—Crane Co. Cabinets—Peerless Built-In Fixture Co.

BATHROOM EQUIPMENT: All fixtures by Crane Co. Seat—C. F. Church Mfg. Co. Cabinets—Tyre Paint & Glass.

PLUMBING: Soil pipes—Crane Co. Hot and cold water pipes—Revere Copper & Brass Co.

HEATING: Butane gas furnace, 60,000 Btu. floor type, Pacific Radiator Co. HOUSE IN LOS ANGELES, CALIF. RAPHAEL S. SORIANO, DESIGNER





SOUTH ELEVATION



In this house, requirements as well as solution were special: there is only one bedroom, and this is treated as part of the general living space. The low cost of construction can be attributed in large part to the elimination of partitions and to the complete regularity of the framing. Fenestration is excellent; two walls of the living room are glazed, while the street has only one strip of high windows. Sash is alternately fixed and movable, another saving where the design calls for so much glass. Space for expansion is provided in the basement, enough to accommodate two additional bedrooms and a bath. Cubage: 6,400. Lot size: $50 \ge 135$.



LIVING



DINING





CONSTRUCTION OUTLINE

FOUNDATION: Walls—continuous concrete, Portland cement. Cellar floor—4 in. concrete. Waterproofing—Johns-Manville coal tar for floor slab and walls.

STRUCTURE: Exterior walls—4 x 4 in. Oregon pine posts, 3 ft. 6 in. o.c., 30 lb. felt, $\frac{3}{4}$ x 12 in. redwood outside; inside— $\frac{1}{2}$ in. Celotex Corp. insulation board, $\frac{3}{2}$ in. putty coat plaster, canvas, 3 coats paint. Interior partitions—2 x 4 in., 16 in. o.c., $\frac{1}{2}$ in. Celotex Corp. insulating board, $\frac{1}{2}$ in. putty coat plaster, canvas, paint. Ceilings—white Luminall, National Chemical & Mfg. Co.

ROOF: Construction— 2×8 in. rafters, 21 in. o.c., 1×6 in. diagonal sheathing covered with 2 layers Johns-Manville 15 lb. felt and 45 lb. asbestos cap sheet.

SHEET METAL WORK: Flashing, gutters, leaders and ducts—24 gauge galvanized iron, American Rolling Mill Co.

INSULATION: Attic floor—overhang continuous screen ventilation. $Roof-\frac{1}{2}$ in. Celotex board, Celotex Corp. Weatherstripping— 24 gauge copper.

WINDOWS: Sash—casement, steel Druwhit Metal Products Co. Glass—double strength, quality A, Libbey-Owens-Ford Glass Co. Screens—copper roller, automatic tension, Roll-Away Window & Screen Co.

FLOOR COVERINGS: Main rooms—Pilgrim hook, with 90 lb. felt, Mohawk Carpet Co. Kitchen and bathrooms—linoleum.

WALL COVERINGS: Main rooms—canvas. Kitchen—tile, Hermosa, Gladding, McBean & Co. Bathrooms—part Sanitas, Standard Coated Products Co., remainder W. P. Fuller Co. paint.

WOODWORK: Trim and cabinets—mahogany. Interior and exterior doors—Oregon pine Rezo, M. & M. Woodworking Co. Garage doors—redwood.

HARDWARE: Interior — Druwhit bronze, Exterior—Schlage Lock Co.

PAINTING: Interior and exterior walls—3 coats paint, W. P. Fuller Co. Ceilings—3 coats Luminall, National Chemical & Mfg. Co. Sash—silver, U. S. Bronze Co. ELECTRICAL INSTALLATION: Wiring

ELECTRICAL INSTALLATION: Wiring system and switches—General Electric Co. Fixtures—W. C. Cole Co.

KITCHEN EQUIPMENT: Range—Tappan Stove Co. Refrigerator—Westinghouse Electric & Mfg. Co. Sink—Crane Co. Cabinets— Ponderosa pine. LAUNDRY EQUIPMENT: Sink—Crane Co.

EAUNDRY EQUIPMENT: Sink—Crane Co. BATHROOM EQUIPMENT: All fixtures by Crane Co. Seat—C. F. Church Mfg. Co.

PLUMBING: Soil pipes—cast iron. Hot and cold water pipes—galvanized iron. Septic tank—steel.

HEATING: Warm air system, Andrews Heating Co. vented heater. Thermostat— Minneapolis-Honeywell Regulator Co. Hot water heater—30 gal. Crane Co.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Foundation	\$80.00
First floor	
Exterior walls	120.00
Partition walls	275.00
Roof	50.00
Interior finish	74.00
	196.00
Millwork and interior trim	49.37
Kitchen and bathroom	
cabinets and accessories	110.61
Painting Exterior	180.00
Interior	100.00
Plumbing	375.00
Heating (vented wall)	200.000.000
Sheet Metal Work	50.00
Electrical work	50.00
Lioschical Work	110.00
TOTAL CONSTRUCTION COST	\$1,819.98
LAND AND IMPROVEMENTS	600.00
TOTAL COST HOUSE AND LAND	
TOTAL COST HOUSE AND LAND	\$2,419.98

HOUSE IN CEDAR RAPIDS, IOWA DONALD BARRY, DESIGNER FOR

HAWKEYE LUMBER CO.







BEDROOM

A subdivision house, showing one of four style variations used with the same plan. Corner windows are used here for the very practical purpose of gaining wall space in the bedrooms. The complete lack of separation between dinette and living room is also a good solution in that it increases the room size and flexibility of furniture arrangement. A full basement is provided, half of which has been left clear for recreational uses. Lots: 50 x 140.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Masonry	\$584.00
Carpentry	1,775.00
Painting	165.00
Flastering	304.00
Plumbing	375.00
Hardware	85.00
Heating (hot air gravity)	210.00
Sheet metal work	45.00
Electrical work and fixtures	98.00
Insurance	72.00
Venetian blinds	40.00
Permit	6.00
TOTAL CONSTRUCTION COST	\$3,759.00
LAND AND IMPROVEMENTS	725.00
TOTAL COST HOUSE AND LAND	\$4,484.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls 8 in. concrete block. Cellar floor—3 in. cement.

STRUCTURE: Exterior walls— $\frac{1}{2} \times 8$ in. cedar siding, K. V. parchment paper, No. 2 shiplap, 2×4 in. studs, $\frac{1}{2}$ in. plaster base. Interior partitions— 2×4 in. studs, U. S. Gypsum Co. rock lath and colored plaster. Floor construction— 2×8 in. joists, 1×6 in. T. & G. sub floor, K. V. paper, E. L. Bruce Co. No. 1 common oak finished flooring.

ROOF: Construction— 2×4 in. rafters, 16 in., o.c., covered with 1×6 in. open and 5/2 wood shingles.

CHIMNEY: Brick with 8 x 12 in. flue lining. SHEET METAL WORK: Galvanized iron used throughout.

INSULATION: Outside walls and attic—1/2 in. Weatherwood, U. S. Gypsum Co.

WINDOWS: Sash — wood, with Unique Window Balance Co. balancers. Glass—Pittsburgh Plate Glass Co. FLOOR COVERINGS: Main rooms—No. 1

FLOOR COVERINGS: Main rooms-No. 1 common oak, E. L. Bruce Co.

WALL COVERINGS: All rooms colored texured plaster, King Crown Plaster Co.

WOODWORK: White pine, doors, cabinets, etc., Hawkeye Lumber & Coal Co. HARDWARE: Interior and exterior—Russell

& Erwin Mfg. Co.

ELECTRICAL INSTALLATION: Wiring system—BX.

KITCHEN EQUIPMENT: Sinks by Briggs Mfg. Co. or Ebco Mfg. Co. BATHROOM EQUIPMENT: All fixtures by

BATHROOM EQUIPMENT: All fixtures by Kohler Co. Cabinets—Columbia Metal Box Co.

HEATING: Warm air gravity system, American Radiator Co.; gas range boiler, Johnson Gas Appliance Co. Water heater—Ruud Water Heater Mfg. Co.

HOUSE IN NORFOLK, VA. R. O. TATE, DESIGNER





COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Foundation	\$235.00
Carpentry	1,440.00
Roof	160.00
Interior finish	230.00
Kitchen and bathroom	
cabinets and accessories	50.00
Painting	115.00
Plumbing	300.00
Electrical work	70.00
TOTAL CONSTRUCTION COST	\$2,600.00
LAND AND IMPROVEMENTS	400.00
PROFIT AND OVERHEAD	500.00
TOTAL COST HOUSE AND LAND	\$3,500.00

The development in which this house is located consists at present of 21 houses, and an additional 20 are to be completed this year. Commenting on the ease with which the houses have been sold, the builder lists as supplementary advantages the size of the lot (100 x 100), the provision of paved streets, concrete walks, sewers, water, gas and electricity, and to the fact that monthly payments are under local rent levels. Estimated savings per house due to group building are \$100. Cubage: approximately 8,500.

CONSTRUCTION OUTLINE

FOUNDATION: Concrete footings, brick foundation.

STRUCTURE: Exterior walls — asbestos shingles, Johns-Manville, Inc., and Philip Carey Co., 2 x 4 in. studs, 16 in. o.c., storm sheathed, 15 lb. felt. Interior partitions— 2 x 4 in. studs, 16 in. o.c., wood lath and plaster. Floor construction—2 x 10 in. joists, sub-floor, felt and select white oak flooring. ROOF: Construction—2 x 8 in. rafters, 16 in. o.c., sheathing, 30 lb. felt, asbestos, Johns-Manville, Inc., and Philip Carey Co. SHEET METAL WORK: Flashing, gutters

and leaders—galvanized Toncan metal, Republic Steel Corp.

INSULATION: Weatherstripping — bronze with brass sill (windows not stripped).

WINDOWS: Sash—No. 1 Ponderosa white pine. Glass—single strength, Libbey-Owens-Ford Glass Co. FLOOR COVERINGS: Main rooms—select

white oak. Kitchen—No. 2 pine.

WOODWORK: Trim—(outside) cypress; (inside) B. & B. pine. Cabinets—wood. Interior doors—2-panel fir. Exterior doors—pine.

HARDWARE: Interior and exterior—brass. PAINTING: Interior: Walls—plaster, natural finish; Keene cement and enamel in kitchen and bathroom. Floors—machine sanded, paste fill, 2 coats shellac and wax. Sash—3 coats lead and oil. Exterior: Walls and trim—3 coats lead and oil. Roof—2 coats of stain on wood shingles.

ELECTRICAL INSTALLATION: Wiring system—BX.

KITCHEN EQUIPMENT: Combination laundry tray and sink. Cabinets—wood. BATHROOM EQUIPMENT: Wall type lava-

tory, built-in tub, Norfolk porcelain type toilet, shower, metal medicine cabinet.

PLUMBING: Standard cast iron soil pipes. Hot and cold water pipes—copper, National Copper and Smelting Co.

HEATING: Heat not included in price, but oil circulators are used; gas connected to hot water tank, Holyoke Heater Mfg. Co.

HOUSES IN MIAMI, FLORIDA PAIST AND STEWARD, ARCHITECTS





The houses in this development cover fifteen blocks. One general plan and fifteen exterior variations are the basis for the design. Intended to be a 300-house project, to date 200 have been completed and 240 have been sold, including sales from plans. Chief reason for the phenomenal success of the development is the fact that the buyer gets a good deal for his moneythe plan is sound and rooms are reasonably adequate. Carports replace garages in all cases. The panels visible on some of the roofs are glass-covered solar water heaters, much used in this part of the country. Many of the buyers, according to the builders, are winter visitors who find that a down payment of \$270 and monthly payments of \$17.31 are less than rent in a cottage or hotel. Lot size: 50 x 106.



BISCAYNE IMPROVEMENT CORP., BUILDERS



LIVING ROOM

Charles E. Goodridge

CONSTRUCTION OUTLINE

FOUNDATION: Poured concrete piers and 8 in. concrete block walls. Porch floors-precast reenforced concrete.

STRUCTURE: Exterior walls—2 x 4 in. studs, braced, 30 lb. waterproof paper, and beveled weather boarding; inside—finished plaster on wood lath. Interior partitions— 2×4 in. studs, plaster on wood lath. Floor construction— 2×8 in. long leaf yellow pine joists, creosote treated, rough and finish flooring.

ROOF: Construction-2 x 6 in. long leaf yellow pine rafters, open sheathing, covered with No. 1 red cedar shingles.

SHEET METAL WORK: Galvanized iron

termite shield and flashing. WINDOWS: Sash—1¾ in. cypress, Pullman balances. Screens—wood frame, 18 mesh bronze.

FLOOR COVERINGS: Main rooms-end matched No. 2 common Tennessee red oak. Kitchen and bathrooms—linoleum covered. WOODWORK: Trim, interior and exterior doors—cypress. Cabinets—stock pine, plywood doors.

PAINTING: Interior trim—3 coats oil paint, enamel finish. Floor—1 coat fill, 2 coats shel-lac, 1 coat wax. Exterior walls—2 coats oil paint, Murphy Varnish Co. Roof—creosote stain, Gabletite Products Co.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Excavation of footings,	
backfill and grading	\$17.00
Concrete footings, slabs	0.0000000000000000000000000000000000000
and sub-floors	46.70
Cement blocks and bricks	16.98
Gravel driveway and	
concrete stepping stones	7.25
Lathing, plastering and	
stucco work	200.50
Lumber, framing, bridging,	
sub-floor	148.07
Wood preservative	10.00
Wood siding	44.10
Cedar shingles	75.00
Millwork	220.00
Carpentry labor	266.00
Wood floors and linoleum	110.00
Steel reenforcing	19.09
Weatherstrips and bronze thresho	lds 7.00
Medicine cabinet	6.90
Roofing, sheet metal work	14.28
Painting	154.00
Finish hardware	20.00
Rough hardware	20.00
Plumbing and septic tank	260.00
Wiring and fixtures	100.00
Layout, permit, temporary buildin	gs,
water, light and power, cleaning and misc.	
	51.00
Employes' compensation, public liability, insurance and social	
security	
security	35.00
TOTAL CONSTRUCTION COST	\$1,848.87
LAND AND IMPROVEMENTS	322.50
SALES AND ADVERTISING	52.00
FINANCING CHARGES	137.00
PROFIT, OVERHEAD, FEES	309.63
TOTAL COST HOUSE AND LAND	\$2,670.00



HOUSE IN KIRTLAND, OHIO B. J. MCGARRY, ARCHITECT FOR CONTEMPORARY



An uncompromisingly modern design, constructed of prefabricated sections. The house is being sold as a standard package, suitable for weekend use, or as a year-round apartment type dwelling. Manufactured units contain door and window openings, complete closets and other fittings. Most unusual single feature of the house is the kitchenette, located in the hall between the bedrooms, and illustrated on the opposite page. The unit contains a refrigerator as well as a stove. This drastic reduction of cooking space is highly ingenious, but also restricts the market to which the house would otherwise be acceptable. Selling price, including improved land, \$3,500.

CONSTRUCTION OUTLINE

FOUNDATION: Walls—concrete slab. STRUCTURE: Exterior walls—structural sheet steel and plywood interior finish. Interior partitions—sheet steel and plywood. Floor construction—concrete slab asphalt tile. Ceiling—steel.

ROOF: Sheet steel, 1 in. asphalt impregnated insulating board covered with 3-ply tar and gravel, U. S. Gypsum Co. CHIMNEY: Brick with terra cotta flue lining;

CHIMNEY: Brick with terra cotta flue lining; specially made and designed by Week End House Corp.

SHEET METAL WORK: Flashing—composition. Leaders and ducts—galvanized iron.

INSULATION: Outside walls—Red Top blanket, U. S. Gypsum Co. Roof—1 in. asphalt impregnated board, Johns-Manville.

WINDOWS: Sash and screens—steel casement, Crittall-Federal, Inc. Glass—double strength, quality A, Libbey-Owens-Ford Glass Co.

FLOOR COVERINGS: All rooms—asphalt tile, Johns-Manville. Porches—concrete.

WALL COVERINGS: Main rooms—birch face plywood. Kitchen and bathrooms—Marsh Tile, Marsh Wall Products Co. WOODWORK: Trim and cabinets—hollow

metal. Interior doors—flush, transite face, Johns-Manville. Exterior doors—steel, Crittall-Federal, Inc.

HARDWARE: Interior and exterior-P. & F. Corbin.

PAINTING: Interior-flat tone, Sherwin-Williams Co.

ELECTRICAL INSTALLATION: Wiring system—BX conduit.

KITCHEN EQUIPMENT: Made specially for Week End House Corp. BATHROOM EQUIPMENT: Lavatory—

BATHROOM EQUIPMENT: Lavatory— Briggs Mfg. Co. Tub—sheet steel, Alliance Porcelain Products Co. HEATING: Warm air system.

HOUSES, INC.



LIVING ROOM









SCALE-%-I-0

KITCHENETTE

HOUSE IN KINGSPORT, TENN. L. MAXON, ARCHITECT, N. K. WINSTON, BUILDER



FOUNDATION: Walls-poured concrete, continuous. Cellar floor-concrete, cement finish. STRUCTURE: Exterior walls--studs, sheathing, building paper and siding. Interiorwood lath and plaster. Floor constructionoak sub- and finished flooring. ROOF: Construction-2 x 6 in. rafters,

roofers, felt and asphalt shingles, Certainteed Products, Inc.

CHIMNEY: Terra cotta, 8 x 8 in. Fireplace -cast iron throat and damper, 4 in. fire brick lining.

SHEET METAL WORK: Flashing-copper. Gutters and leaders-galvanized iron.

WINDOWS: Sash-double hung, wood.

STAIRS: Treads-oak. Risers and stringers -pine.

FLOOR COVERINGS: Kitchen-covered with linoleum. Bathrooms-tile.

WOODWORK: Trim, shelving, cabinets and exterior doors-pine. Interior doors-fir. PAINTING: Interior: walls-3 coats stipple.

Floors-shellac. Exterior: walls and sash-3 coats paint.

ELECTRICAL INSTALLATION: Wiring system—BX. Fixtures—direct ceiling lights, ex-cept wall brackets in living room. KITCHEN EQUIPMENT: Sink—flat rim,

Duo strainer, Standard Sanitary Mfg. Co. LAUNDRY EQUIPMENT: Sink-48 in., two-

tray, enameled iron. PLUMBING: All fixtures by Standard Sanitary Mfg. Co. Pipes: Soil-cast iron. Water -copper tubing.

HEATING AND AIR CONDITIONING: Filtering and humidifying, coal fired boiler, Montgomery Ward & Co. Hot water heater pot-bellied stove.

SPECIAL EQUIPMENT: Kitchen cabinet equipped with radio.

One of 62 houses built in a development for industrial workers. Selling at \$3,190, or \$26.35 monthly on the FHA plan, it is the cheapest of six models ranging upward to \$4,790. Designed to permit the addition of a fifth room by finishing the attic space, the house features a full-size basement with laundry. Added selling points, uncommon in this price field: open fireplace, porch. For additional data on the development, see ARCH. FORUM, June, 1937, p. 546.



HOUSE IN CHICAGO, ILL. VICTOR STROMQUIST, ARCHITECT A. BOHNEN, BUILDER





Large glass areas and a completely unpretentious exterior treatment are the most unusual characteristics of this speculatively built house. In plan it will be noted that closet doors have been omitted and that storage space has been incorporated to compensate for the lack of a basement. A good design feature is the bay in the kitchen; moving the fixtures outside the room limits makes its use for dining pleasanter as well as more practical. A low-pitched roof reduces the cubical content of the house. Elimination of lintels over the windows is a further element in cost reduction.



COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Survey, permits and foundation	\$375.00
Interior carpentry, insulation	
and hardware	864.00
Exterior walls	316.00
Roof	90.00
Interior finish (plaster)	290.00
Millwork and trim	180.00
Steel windows and glazing	172.00
Kitchen and bathroom cabinets	
and accessories	50.00
Painting	168.00
Plumbing	510.00
Heating (gas fired forced air)	315.00
Sheet metal work	45.00
Electrical work	125.00
TOTAL	\$3,500.00
LAND AND IMPROVEMENTS	500.00
TOTAL COST HOUSE AND LAND	\$4,000.00

CONSTRUCTION OUTLINE

FOUNDATION. Walls-8 in. concrete. Cellar floor- $1!_2$ in. concrete seal coat over cinder fill.

STRUCTURE: Walls-8 in. brick, 1 in. furring strips, plaster on foil-backed rock lath, U. S. Gypsum Co. Interior partitions-2 x 4 in. stud walls, plaster on rock lath. Floor construction—2 x 8 in. joists, 16 in. o. c., sub-floor, paper, fur flooring.

ROOF: Construction-2 x 6 in. rafters, 16 in. o. c. roof boards, U. S. Gypsum Co. asphalt shingles.

INSULATION: Outside walls-foil-back rock lath, U. S. Gypsum Co. Roof-Junior wool batts, U. S. Gypsum Co.

WINDOWS: Sash—Fenestra Economy, De-troit Steel Products Co. Glass—single strength quality A, Libbey-Owens-Ford strength quality A, Libbey-Glass Co. Screens-metal frames.

WOODWORK: Trim-gum. Shelving and cabinets—white pine, maple work tops. In-terior doors—Rezo flush, birch, M & M. Woodworking Co. Exterior doors—Roddis flush, birch, Roddis Lumber & Veneer Co. KITCHEN EQUIPMENT: Laundry tub combination, sink with metal cabinet, Standard Sanitary Mfg. Co. BATHROOM EQUIPMENT: All fixtures by

Standard Sanitary Mfg. Co.

PLUMBING: Soil pipes-cast iron. Water pipes-galvanized steel. HEATING AND AIR

CONDITIONING: Bryant forced air Model VB 8, gas fired, Bryant Heater Co. Regulators—Minneapolis-Honeywell Regulator Co.

HOUSE IN BIRMINGHAM, ALA. MILLER, MARTIN & LEWIS, ARCHITECTS





FIRST FLOOR

SCALE - 16 - 1-0"



BASEMENT

Architect-designed to meet the owner's individual needs, this attractive house is one of a number which have been built in Birmingham under a "limited service" plan in which the architect furnishes complete drawings at a nominal fee, but leaves specifications and supervision up to the owner and his contractor. Result: an attractive home tailored to the client's plot and suited to his needs, increased demand for architectural services. Cubage, 16,190. Lot, 100 x 100 feet, faces due south across valley.

COST BREAKDOWN

450.00
-10.00
185.00
60.00
60.00
50.00
\$3,555.00
900.00
\$4,455.00

CONSTRUCTION OUTLINE

STRUCTURE: Exterior walls-yellow pine studs and sheathing, waterproof building paper, Creo-Dipt Co. shingles, wood lath and sand finish plaster. Interior partitions-wood studs, lath and plaster; metal corners. Floor construction-wood joists, T. & G. sub-floor. ROOF: Wood rafters and decking, builders felt under Philip Carey Co. slate color asbestos shingles.

CHIMNEY: Common brick, terra cotta flue lining.

SHEET METAL WORK: Flashing, gutters, leaders and ducts—galvanized iron. WINDOWS: Sash—white pine, double hung.

Glass—single strength, quality B. Screens— rustless galvanized 16 mesh wire.

FLOOR COVERINGS: Main rooms-plain select red oak. Kitchen—linoleum on pine. Bathrooms - ceramic tile. Porches - red quarry tile. WALL COVERINGS: Main rooms—sand

finish plaster. Kitchen—smooth finish plaster.

Bathrooms—tile wainscot. WOODWORK: Trim, cabinets, exterior and garage doors—pine. Interior doors—fir. HARDWARE: Interior and exterior —

wrought bronze.

PAINTING: Floors—varnish and wax. Sash and trim—enamel. Exterior walls—3 coats lead and oil. Roof-asphalt shingles. All paints by Acme White Lead Co.

ELECTRICAL INSTALLATION: Fixturesdirect and indirect, Chase Brass & Copper Co. KITCHEN EQUIPMENT: Range and refrigerator-Frigidaire Corp. Sink-Standard Sanitary Mfg. Co.

BATHROOM EQUIPMENT: Lavatory -Crane Co. Tub and toilet-Standard Sanitary Mfg. Co. Shower—Standard Sanitary Mfg. Co. Cabinet—Venetian type.

FLUMBING: All pipes by Youngstown Shect & Tube Co.

HEATING: Hot air with hot water coil, American Radiator Co. SPECIAL: Venetian blinds in living and

00 bedrooms.

HOUSE IN SEATTLE, WASHINGTON R. L. DURHAM, ARCHITECT







This house offers a good deal for the money despite the uncommon accommodation of but one bedroom. There is a basement with inside stairs, a well-placed coat closet, large living room, and a good kitchen. The combination of vertical and horizontal siding, the entrance unit and the variation in window treatment are designed to give interest to the exterior. Cubage: 16,484. Size of lot: 50 x 120.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Foundation	\$257.00
First floor	228.00
Exterior walls	273.00
Partition walls	43.00
Second floor	28.00
Roof	97.00
Interior finish	176.00
Millwork and trim	301.00
Kitchen and bathroom cabinets	
and accessories	116.00
Painting	
Exterior	46.00
Interior	90.00
Plumbing	324.00
Chimney	44.00
Heating	142.00
Sheet metal work	32.00
Electrical work	122.00
TOTAL CONSTRUCTION	\$2,319.00
LAND AND IMPROVEMENTS	515.00
PROFIT AND OVERHEAD	231.00
ARCHITECT'S FEE	200.00
TOTAL COST HOUSE AND LAND	\$3,265.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls—6 in. monolithic concrete 1:3:5. Cellar floor—4 in. concrete on sand fill.

STRUCTURE: Exterior walls—2 x 4 in. studs, 16 in. o.c., 1 x 8 in. shiplap, $\frac{1}{2}$ x 8 in. cedar siding. Floor construction—2 x 10 in. floor joists, 1 x 8 in. shiplap sub-floor. Ceiling—2 x 6 in., 16 in. o.c., joists.

Ceiling—2 x 6 in., 16 in. o.c., joists. ROOF: Construction—2 x 6 in. rafters, 24 in. o.c., braced 4 ft. o.c., 16 in. No. 1, 5/2Western red cedar shingles.

CHIMNEY: Common brick with terra cotta flue lining.

SHEET METAL WORK: Flashing, leaders and ducts—26 gauge galvanized iron. Gutters—3 x 4 in. wood.

WINDOWS: Sash—double hung, fir. Glass single strength, quality B, Pennvernon, Pittsburgh Plate Glass Co. FLOOR COVERINGS: Living room—No. 1

FLOOR COVERINGS: Living room—No. 1 common oak. Remainder of rooms—fir; inlaid linoleum covering in kitchen.

WALL COVERINGS: All rooms-wood lath and plaster.

WOODWORK: Trim, cabinets, interior and rear exterior and garage doors—fir. Exterior door (front)—134 in. mahogany.

HARDWARE: Interior and exterior-Russell & Erwin Mfg. Co. PAINTING: Interior: Walls and ceilings-

calcimine. Floors—shellac, varnish, wax. Sash—3 coats paint. Exterior walls—3 coats lead and oil.

ELECTRICAL INSTALLATION: Wiring system—knob and tube. Switches—tumbler. Fixtures—direct, Seattle Lighting & Fixture Co., Gill Glass Co. and Phoenix Glass Co. KITCHEN EQUIPMENT: Sink—Standard Sanitary Mfg. Co. Cabinets—fir, flush door, linoleum top.

BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co.

PLUMBING: Soil pipes—cast iron. Hot and cold water pipes—galvanized iron. HEATING: Warm air, gravity, L. J. Mueller

Furnace Co. cast iron furnace, wood burning.

HOUSES IN ASHEVILLE, N. C. HENRY IRVEN GAINES, ARCHITECT











LIVING ROOM



DINETTE

This group of four houses is the first unit in a development of eighteen; all are being built for rent, charges on these houses being \$40 per month. This unit is of interest as a plan, with two attached and two detached houses, an arrangement sufficiently flexible to accommodate varying preferences of tenants. The detached units have two bedrooms; those in the center are provided with "state rooms," designed for use as dining or sleeping rooms. Economical heating is furnished by an oil burning furnace in a small closet; a plenum chamber, fan and short metal ducts complete the equipment. The architect estimates that building four houses at once resulted in a 15 per cent saving. The property is 120×427 ; its use for a rental project was determined by its location, not far enough out for the usual residential set-up, and not close enough to the center for business use. The units cost \$2,220 each to build.

CONSTRUCTION OUTLINE

FOUNDATION:Concrete footings, common brick walls.

STRUCTURE: Exterior walls—2 x 4 in. wood studs, sheathing, building felt, beveled siding; inside— $\frac{1}{2}$ in. Masonite wall board, Masonite Corp., for walls and ceilings; living room knotty spruce. Interior partitions— 2 x 4 in. wood studs finished as above. Floor construction—2 x 10 in. wood joists, pine sub-floor, building felt, select red oak finish flooring. Carolina Oak Flooring Co.

ROOF: Construction—2 x 6 in. wood rafters, T. & G. roofers, covered with asphalt shingles, Johns-Manville, Inc.

CHIMNEY: Common brick, terra cotta flue lining.

SHEET METAL WORK: Flashing, gutters, leaders and ducts—25 gauge galvanized iron. INSULATION: Outside walls and attic floor —4 in. rock wool, Johns-Manville, Inc. Weatherstripping—copper Nu-Way at doors, Macklanbury-Duncan Co.

WINDOWS: Sash—wood, double hung, Silentite, Curtis Cos. Glass—double strength, quality A, Libbey-Owens-Ford Glass Co. Screens—full length, 16 mesh, galvanized white pine frame, Curtis Cos. FLOOR COVERINGS: Main rooms—select

FLOOR COVERINGS: Main rooms—select red oak, Carolina Oak Flooring Co. Kitchen and bathrooms—linoleum over felt over pine floor. Porches—quarry tile, B. Mifflin Hood Co.

WALL COVERINGS: Living room—Carolina knotty spruce and Masonite Corp. wall board. Kitchen and bathroom—Monotile wall board, Standard Wall Covering Co., Inc.

WOODWORK: Trim, cabinets, interior and exterior doors—white pine, Curtis Cos. HARDWARE: Interior and exterior—wrought

iron, Lockwood Co. PAINTING: Walls and ceilings—casein, Devoe & Raynolds. Floors—filler, varnish and wax; sash—3 coats enamel, Pratt & Lambert. Exterior walls—3 coats lead and oil, Devoe & Raynolds.

ELECTRICAL INSTALLATION: Wiring system—flexible cable 110-220. Switches plates, Bakelite Corp. Fixtures—direct, Lightolier Co.

KITCHEN EQUIPMENT: Range—gas. Refrigerator—Electrolux, Servel Inc. Sink enameled iron, Crane Co. Laundry sink and tray—Crane Co.

BATHROOM EQUIPMENT: All fixtures by Crane Co. Seat—C. F. Church Mfg. Co. Cabinets—metal, Miami Cabinet Div., Philip Carey Co.

PLUMBING: Soil pipes—cast iron. Cold water pipes—steel. Hot water pipes—copper, Chase Copper and Brass Co.

HEATING AND AIR CONDITIONING: Forced warm air, filtered, humidified, General Electric Co. Duotherm oil heater in living room, Motor Wheel Corp. with plenum chamber above. Ducts to each room. Oil by gravity from outside storage tank, Motor Wheel Corp. Grilles—pressed steel, Tuttle & Bailey Mfg. Co. Regulators—thermostatic, Sears Roebuck & Co. Hot water heater—automatic gas, Rudd Mfg. Co.

SPECIAL EQUIPMENT: Venetian blinds, Duplex window shades, combination breakfast room seats and Pullman bed, Trailer Mfg. Co.

ROW HOUSES IN SEATTLE, WASH.

THIRY AND SHAY, ARCHITECTS THE SPEEDWALL COMPANY, BUILDERS







Used successfully abroad for many years, the set-back type of plan shown here has distinct advantages. It gives added light in kitchens and living rooms, and improves ventilation through each unit. The development, consisting of twelve identical units, was built with special plywood sections, a type of construction which is estimated to have produced savings of \$150 to \$200 per unit. Each dwelling consists of one bedroom, a large living room, individual heater and an inside bath. Rent per month is \$35. The lot size of the development is 150 x 344. Cubage per unit: 4,600. Cost per unit: \$1,425.

CONSTRUCTION OUTLINE

FOUNDATION: Walls—concrete footings. STRUCTURE: Exterior and interior walls— Speedwall construction, using stressed covering of plywood over light wooden grille or framework. Floor construction— 2×6 in. joists, 16 in. o.c., 8 ft. span, shiplap sub-floor, paper, B. & B. vertical grain hemlock finish flooring. Ceiling— $\frac{1}{2}$ in. Celotex insulating board, Celotex Corp.

ROOF: Construction—2 x 12 in. roof and ceiling joists, 3-ply, 15 lb. felt, tar and gravel. CHIMNEY: Brick with terra cotta lining.

SHEET METAL WORK: Flashing—26 gauge Armco galvanized iron, American Rolling Mill Co. Gutters—3 x 4 in. wood with galvanized iron downspouts.

INSULATION: Roof-1/2 in. Celotex, Celotex Corp. Sound insulation-loose fill expanded vermiculite between party walls.

vermiculite between party walls. WINDOWS: Sash—wood with wood bars. Glass—single strength, Pennvernon, Pittsburgh Plate Glass Co.

FLOOR COVERINGS: Main rooms—B. & B. vertical grain hemlock. Kitchen and bathroom—linoleum covered.

WOODWORK: Trim— $\frac{1}{2} \times 134$ detail casings. Cabinets, interior and exterior doors—Douglas fir.

HARDWARE: Interior and exterior—Sargent & Co.

PAINTING: Interior: Walls—2 coats Plasterez. Floor—1 coat hot boiled linseed oil. Sash—3 coats lead and oil. Exterior walls—2 coats Rezitex. All paints by I. F. Laucks Co. ELECTRICAL INSTALLATION: Wiring system—conduit, 3-wire. Switches—Harvey Hubbell, Inc. Fixtures—direct, supplied by

Hubbell, Inc. Fixtures—direct, supplied by owner. KITCHEN EQUIPMENT: Range and re-

frigerator—Westinghouse Electric & Mfg. Co. Sink—Standard Sanitary Mfg. Co. Laundry sink—combination sink and tray.

BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co. Cabinets—Venetian No. 555.

PLUMBING: Soil pipes—cast iron. Hot and cold water pipes—galvanized iron.

HEATING: Warm air by individual circulating heaters. Grilles—metal, in walls. Hot water heater—electric.

HOUSE IN PHOENIX, ARIZONA BEN O. DAVEY, ARCHITECT



One of the common problems in planning the minimum house is illustrated here: to get privacy in the sleeping unit without removing the bath from its location next to the kitchen. Here both parts of the problem have been solved. Another good plan feature is the small dining room, well placed in relation to both kitchen and living room. Closets are of good size, an important consideration in the basementless house. The roof vents are very well designed for inexpensive fabrication. Cubage: 9,700. Lot size: 45 x 142.



VENT IN ROOF



COST BREAKDOWN

CONSTRUCTION	MATERIAL	S LABOR
Foundation	\$125.00	\$75.00
First floor	100.00	75.00
Exterior walls	350.00	150.00
Partition walls	100.00	50.00
Roof	200.00	100.00
Interior finish	100.00	100.00
Millwork and trim	200.00	85.00
Kitchen and bathroom		
cabinets and accessories	100.00	25.00
Painting Exterior	50.00	50.00
Interior	75.00	75.00
Plumbing Piping	50.00	50.00
Fixtures	150.00	50.00
Heating (cost of flue)	20.00	10.00
Sheet metal work	15.00	20.00
Electrical work	50.00	50.00
Insulation and linoleum	100.00	50.00
Totals	\$1,785.00	\$1,015.00
TOTAL CONSTRUCTION		\$2,800.00
LAND AND IMPROVEME		400.00
TOTAL COST HOUSE AND I	AND	\$3,200.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls — concrete, 1:3:4. Waterproofing—15 lb. waterproof paper under stud walls.

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PLOT PLAN V

STRUCTURE: Exterior walls— 2×4 in. studs, 16 in. o.c., 15 lb. waterproof paper over piano wire, 8 in. o.c., 3⁄4 in. mesh poultry netting over paper, 3⁄4 in. Portland cement plaster, inside rock lath and plaster. Interior partitions— 2×4 in. studs, 16 in. o.c., 5/16 in. rock lath and plaster both sides. Floor construction—colored cement finish floor. Ceilings—plaster on joists.

ROOF: Construction— 2×4 in. rafters, 24 in. o.c., 1 x 4 in. spaced sheathing, covered with 5/2 No. 1 redwood shingles, $4\frac{1}{2}$ in. to weather.

INSULATION: Outside walls—4 in. rock wool batts; roof—4 in. rock wool loose, Johns-Manville, Inc.

WINDOWS: Sash—casement, steel, with flat screens, Truscon Steel Co. Glass—quality A, Libbey-Owens-Ford Glass Co.

WOODWORK: Trim, cabinets and interior

doors—white pine. Exterior doors—Douglas fir. Garage doors—built-up. HARDWARE: P. & F. Corbin.

PAINTING: Interior: Walls and ceiling in kitchen and bath—1 coat sealer, 1 coat flat enamel, 1 coat enamel. Floor—waxed concrete. Sash and woodwork—lead and oil. Paints by W. P. Fuller & Co. Exterior: Walls—plastered, 2 coats Resicote, I. F. Laucks, Inc. Roof—1 heavy coat linseed oil. ELECTRICAL INSTALLATION: Wiring system—BX. Switches—flush tumbler type, General Electric Co.

KITCHEN EQUIPMENT: Range—gas, Lindeman & Hoverson. Refrigerator—Westinghouse Electric & Mfg. Co. Sink—Crane Co. BATHROOM EQUIPMENT: All fixtures by

Crane Co. Seat—C. F. Church Mfg. Co. Cabinet—Hess Warming and Ventilating Co. PLUMBING: Soil pipes—cast iron. Vent, hot and cold water pipes—galvanized iron.

HOT WATER HEATER: Crane Co. No heating system for house.
HOUSE IN BOISE, IDAHO H. C. HULBE, ARCHITECT; BOISE PAYETTE LUMBER CO., BUILDERS





Johnson & Son



Provision has been made for the addition of a bedroom to this house, although it seems unfortunate that it would require the use of the bathroom as a passageway. Service space is generous, a utility room being included as well as the kitchen. Omission of a hall connecting living room, bath and bedrooms was apparently not considered a drawback; other examples in this issue, however, suggest that it can be included without waste of space. Cubage: 9,570. Size of lot: 50 x 122.

COST BREAKDOWN

CONSTRUCTION	\$2,500
LAND	240
LANDSCAPING	60

TOTAL COST HOUSE AND LAND..... \$2,800

CONSTRUCTION OUTLINE

FOUNDATION: Walls-concrete, Oregon Portland Cement Co.

STRUCTURE: Exterior walls— $\frac{34}{4} \times 10$ in. common pine siding, waterproof paper, 1 in. No. 4 pine sheathing, No. 2 2 x 4 in. studs, $\frac{1}{2}$ in. Wood Conversion Co. Nu-Wood lath, $\frac{1}{2}$ in. plaster. Interior partitions—plaster, wood lath, 2 x 4 in. studs. Floor construction—2 x 10 in. floor joists, No. 4 pine subfloor, building paper, No. 2 common oak finish flooring. All lumber by Boise Payette Lumber Co.

ROOF: Construction— 2×6 in. rafters, 24 in. o.c., 1×6 in. roof sheathing, No. 1 5/2 cedar shingles, 5 in. to weather, covered with graphite and oil.

CHIMNEY: Double course brick, plastered inside, cleanout, Burley Brick Co.

SHEET METAL WORK: Flashing-40 lb. galvanized iron roofing tin.

INSULATION: Outside walls and ceiling— Nu-Wood lath, Wood Conversion Co. Weatherstripping—metal on windows, Curtis Cos.

WINDOWS: Sash—pre-fit Silentite, Curtis Cos. Glass—single strength, Pennvernon, Pittsburgh Plate Glass Co. Screens—16 mesh galvanized wire cloth. FLOOR COVERINGS: Living room and bedrooms—No. 2 common oak, E. L. Bruce Co. Halls, kitchen and bathrooms—No. 2 common oak covered with inlaid linoleum.

WALL COVERINGS: Living room and bedrooms — wallpaper. Remainder — smooth plaster and enamel.

WOODWORK: Trim and cabinets—common pine, enameled. Interior doors—fir, 1-panel, enameled. Lumber by Boise Payette Lumber Co. Exterior door—Curtis Cos. HARDWARE: Interior and exterior—Schlage

Lock Co.

PAINTING: Interior: Walls and sash—3 coats Master Painter enamel. Ceilings—1 coat wall size, 1 coat Dulteen calcimine. Floor—1 coat Master Painter filler, 2 coats varnish. Exterior: Walls—2 coats house paint. Roof—1 coat graphite and oil. All paints by Devoe & Raynolds Co.

ELECTRICAL INSTALLATION: Wiring system—knob and tube. Switches—ivory tumbler; 3-way in living and main bedroom. Fixtures—direct.

KITCHEN EQUIPMENT: Range—Hot Point, 3 plate, Edison General Electric Appliance Co. Refrigerator—Norge Corp. Sink—Crane Co. Cabinets—wood, built-in. LAUNDRY EQUIPMENT: Sink—Crane Co.

LAUNDRY EQUIPMENT: Sink—Crane Co. Washing machine and drier—Easy, Syracuse Easy Washer.

BATHROOM EQUIPMENT: All fixtures by Crane Co. Seat—C. F. Church Mfg. Co. Medicine cabinet by National Metal Products Co. PLUMBING: Soil pipes—cast iron. Hot and cold water pipes—galvanized iron, Youngstown Steel Products Co. Hot water heater -30 gal. Hot Point electric, built-in with cabinet, Edison General Electric Appliance Co. HOUSES IN BURBANK, CALIFORNIA ARTHUR WEBER, DESIGNER



HOUSE A



The three houses shown on these pages are part of a development of about 50 houses. Selling prices, without land, range from \$2,400 to \$3,150. Land prices are \$200 for a 50 x 135 lot and go up to \$500. It will be noted that in all of these houses the essential accommodations are the same, the differences being in amenities. In plan B, for example, the living room is used for circulation between one bedroom and the bath, and there is no dining room. The larger plans have dining rooms, more privacy in the sleeping quarters, better kitchens. Plan A, the most expensive, has in addition a fireplace and a two-car garage. Service porches are standard in all houses, adding valuable work and storage space.

CONSTRUCTION OUTLINE

FOUNDATION: Walls—continuous concrete. STRUCTURE: Exterior walls—2 x 4 in. studs, 15 lb. felt, hog wire and 3 coats stucco; inside—Reynolds fireproof wall board and stucco.

ROOF: Construction— 2×4 in. rafters, 1 in. sheeting, covered with No. 1 red cedar shingles, Northwestern Lumber Co.

SHEET METAL WORK: Flashing, gutters and leaders—galvanized iron.

WINDOWS: Sash—double hung, sugar pine. Glass—single strength, Libbey-Owens-Ford Glass Co. Screens—Autom. Tension Screen Co. FLOOR COVERINGS: All rooms—oak. Kitchen and bathrooms—linoleum covered. Porches—cement.

WALL COVERINGS: Main rooms—stucco. Kitchen and bathrooms—hardwall plaster, 3 coats paint and enamel. Dinette—hardwall plaster covered with wallpaper.

WOODWORK: Trim, cabinets and doors-Douglas fir. Garage doors-Overhead type. HARDWARE: Schlage Lock Co.

PAINTING: Interior: Kitchen, bathroom and sash—3 coats Dutch Boy paint, National Lead Co. Floor—1 coat fill, 2 coats shellac, 1 coat wax. Exterior: Walls—stucco. Roof —red cedar shingles.

ELECTRICAL INSTALLATION: Switchestoggle, Bryant Electric Co.

KITCHEN EQUIPMENT: Sink—Crane Co., Pomona No. 1 tile drainboard. Cabinets built-in, Douglas fir.

BATHROOM EQUIPMENT: All fixtures and laundry sink by Crane Co.

PLUMBING: Soil pipes—cast iron. Hot and cold water—galvanized, Crane Co.

HEATING: Wall gas heaters, De Luxe Mfg. Co. Hot water heater—20 gal. Champion, Crane Co.



HOUSE B



HOUSE C



COST BREAKDOWN-HOUSE A

(including profit and overhead)	
Foundation-walls, permits, etc.	\$275.00
Lumber, sash and doors, screens	525.00
Carpenter labor, compensation	
insurance and taxes	375.00
Plastering	425.00
Painting	200.00
Plumbing	400.00
Wiring and electrical fixtures	145.00
Finish floors	165.00
Sheet metal	90.00
Cabinets and built-in units	115.00
Roof—shingles and labor	155.00
Rough and finish hardware	75.00
Heating	65.00
Tile	90.00
Miscellaneous	50.00
TOTAL COST OF HOUSE	\$3,150.00

COST BREAKDOWN-HOUSE B

(including profit and overhead)	
Foundation-walls, permits, etc.	\$200.00
Lumber, sash and doors, screens	450.00
Carpenter labor, compensation	
insurance and taxes	300.00
Plastering	350.00
Painting	150.00
Plumbing	350.00
Wiring and electrical fixtures	100.00
Finish floors	100.00
Sheet metal	50.00
Cabinets and built-in items	80.00
Roof—shingles and labor	100.00
Rough and finish hardware	50.00
Heating	30.00
Tile	40.00
Miscellaneous	50.00
TOTAL COST OF HOUSE	\$2,400.00

COST BREAKDOWN-HOUSE C

TOTAL COST OF HOUSE	\$2,600.00
Miscellaneous	50.00
Tile	40.00
Heating	40.00
Rough and finish hardware	50.00
Roof—shingles and labor	110.00
Cabinets and built-in items	80.00
Sheet metal	50.00
Finish floors	125.00
Wiring and electrical fixtures	105.00
Plumbing	375.00
Painting	165.00
Plastering	380.00
Carpenter labor, compensation insurance and taxes	330.00
Lumber, sash and doors, screens	480.00
Foundation-walls, permits, etc.	\$220.00
(including profit and overhead)	

HOUSES IN NORTH HEMPSTEAD, L. I. BENJAMIN DRIESLER, ARCHITECT



Ernest Tanare Photos



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\$2,500 is what the house shown at the left, original basic design in the Hillside Heights development, sold for in 1936. No secret, however, was the fact that this rock-bottom price was intended as a come-on for the projected development, would have been about \$2,850 with normal profit. Four minimum-sized rooms, no basement, and absence of a vestibule and coat closet, however, were found to create too much sales resistance, so the design was modified to produce the plan below, which now sells for ...





... \$3,450, and includes the following additions to the original minimal unit: basement, \$300; dining bay, \$150; vestibule, \$60; 2 extra windows, \$40; copper piping, \$50. Initially offered as optional at \$150 extra, demand for the dining bay proved so general that it is now "standard equipment." Similarly, basements were originally an optional item, are now furnished in all cases.

RICHARD W. DUGGAN, BUILDER



\$3,550

Pioneer in the low cost field, this Long Island development, known as Hillside Heights, boasted a house selling for as little as \$2,500 as early as 1936 (see Arch. FORUM, Jan. 1937, pp. 70-73). Since that time, more than 250 houses have been completed and sold (with lots 45 x 100) for less than \$3,500, an additional 150 houses at prices slightly higher. Thus, despite the fact that its ownership has changed hands in the interim, the development as a whole has accumulated an exceptional amount of valuable experience in low cost housing, which finds its most practical expression in the evolution of Hillside's basic design-illustrated and described on the opposite page.

Surrounded on all sides by builders who assert that it is impossible to build houses selling for under \$3,500 in the New York metropolitan area, Richard W. Duggan, present owner of the development, currently has more than 100 new homes in this prices class completed or under construction, contemplates 400 more on what remains of Hillside's 93 acres.

Attributing his low costs to mass production methods, Duggan estimates the resulting savings as follows:

Raw land	\$50	per	house
Land improvements	50	**	"
Title searching	43	**	**
Financing	50	**	**
Purchase of materials	125	**	**
Labor (saving in time)	75	**	"
Total	\$393	\mathbf{per}	house

COST BREAKDOWN

CONSTRUCTION	MATERIAL	S LABOR
Permit	\$15.00	
Foundation	85.00	272.00
Lally columns	10.00	
Carpentry	675.00	317.00
Bathroom cabinet	4.50	
Tiling	10.00	10.00
Painting Exterior	20.00	40.00
Interior	30.00	60.00
Plumbing	80.00	80.00
Chimney	50.00	40.00
Heating (coal)	60.00	10.00
Sheet metal work	18.00	12.50
Weatherstripping	10.00	
Electrical work	42.00	30.00
Hardware	43.41	
Linoleum and shades	37.00	
Range	30.25	
Clothes drier	4.50	
Compensation insurance	15.00	
Totals	\$1,239.66	\$871.50
TOTAL CONSTRUCTION	COST S	\$2,111.16
LAND AND IMPROVEM	ENTS	556.00
TAXES AND INTEREST		10.00
FHA FEES		10.00
ARCHITECT'S FEE		25.00
FINANCING, OVERHEA		
COMMISSIONS, CLOSI AND PROFIT	NG FEES	737.84
TOTAL COST HOUSE AND		\$3,450.00



CONSTRUCTION OUTLINE

FOUNDATION: Walls and cellar floor-concrete, Atlas cement. Waterproofing-Barber Co.

STRUCTURE: Exterior walls-2 x 4 in. siding and shingles, No. 1 spruce lath, 3 coats plaster. Interior partitions—No. grade lumber, 3 coats plaster. 1

ROOF: Covered with asphalt shingles, 15 Ib. felt, Barber Co.

CHIMNEY: Lining-terra cotta.

SHEET METAL WORK: Flashing-Anaconda copper, American Brass Co. Leaders and gutters—Toncan metal, Republic Steel Corp.

WEATHERSTRIPPING: Aluminum tongue saddles.

WINDOWS: Sash-double hung. Glasssingle strength, Pittsburgh Plate Glass Co. Galvanized window pans. STAIRS: Material—white pine.

FLOOR COVERINGS: Living room-No. 1 red oak. Kitchen-double floor of pine, linoleum covered. Bathrooms-tile.

WALL COVERINGS: Main rooms — wall-paper, Richard E. Thibaut and Imperial Paper & Color Corp. Kitchen and bathroom -Sanitas, Standard Coated Products Co.

WOODWORK: Trim, cabinets and exterior doors—white pine. Interior doors—fir. HARDWARE: Interior and exterior—Sargent

& Co.

PAINTING: Interior paints by Devoe & Raynolds Co. Exterior paints by Sherwin-Williams & Co.

ELECTRICAL INSTALLATION: Wiring sys-

tem and switches by General Electric Co. KITCHEN EQUIPMENT: Range — Magic Chef, American Stove Co. Kitchen and laundry sinks-Standard Sanitary Mfg. Co. Cabinets-white pine.

BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co. Seat—C. F. Church Mfg. Co. PLUMBING: Soil pipes—cast iron. Hot and

cold water pipes-Anaconda, American Brass Co.

HEATING: One pipe steam system with boiler, National Radiator Corp. Hot water heater—American Radiator Corp.

HOUSE IN LEXINGTON, MASS. SAMUEL GLASER, ARCHITECT





Gerda Fulder Photos

Excellent selling points for the concrete block house are its fireproof properties and low maintenance costs. Here it has been used to produce an attractive house as well. Somewhat above the average price level indicated in this issue, the house contains a fireplace, basement, two bay windows, plenty of closets, a compact kitchen well equipped with storage units.



CONSTRUCTION OUTLINE

FOUNDATION: Walls—concrete block. STRUCTURE: Exterior walls—cinder block; inside furred 1 x 2 in. strapping, U. S. Gypsum Co. rock lath, 2 coats plaster. Floor construction—precast concrete joists, concrete slab.

ROOF: Frame construction, covered with asphalt shingle, Bird & Son.

CHIMNEY: Cinder block, brick trim. Damper —Burnet Co.

SHEET METAL WORK: Flashing—copper. Gutters—Toncan metal, Republic Steel Corp. INSULATION: Ceiling—U. S. Gypsum Co. rock wool.

WINDOWS: Sash—screened Fenwrought casement, Detroit Steel Products Co. FLOOR COVERINGS: All rooms oak; bath-

room and kitchen linoleum. PAINTING: Interior: Walls and sash—3

coats lead and oil. Ceilings—2 coats water color paint. Floors—stain and wax.

PLUMBING: Bathroom fixtures and kitchen sink—Briggs Beautyware, Briggs Mfg. Co. HEATING AND AIR CONDITIONING: Moncrief air conditioning unit and oil burner, The Henry Furnace & Foundry Co.

COST BREAKDOWN

	MATERIALS
CONSTRUCTION	AND LABOR
Excavation	\$50.00
Masonry work (including	
exterior walls)	865.00
Steel sash and glazing	200.00
Carpentry	890.00
Roofing and flashing	140.00
Insulation	60.00
Plastering	270.00
Plumbing	340.00
Heating	350.00
Wiring and fixtures	130.00
Painting	225.00
Linoleum	30.00
Hardware	30.00
Accessories	20.00
Miscellaneous and overhead	100.00
TOTAL CONSTRUCTION COST	\$3,700.00
PROFIT	300.00
LAND COST	200.00
TOTAL COST HOUSE AND LAND	\$4,200.00

HOUSE IN DOTHAN, ALABAMA JOHN DAVID SWEENEY, ARCHITECT









LIVING ROOM

BEDROOM



A screened terrace, service pantry, built-in dressing table and cypress walls in the living room serve to set this house apart from others in price range. Of particular interest is the kitchen, located for service to terrace as well as dining room. Cubage: 17,188. Lot size: 81 x 175.



COST BREAKDOWN

CONSTRUCTION	MATERIAL	S LABOR
Foundation	\$280.00	\$80.00
First floor	260.80	180.00
Exterior walls	260.90	110.30
Partition walls	155.80	60.20
Roof	120.00	40.00
Interior finish	125.00	50.00
Millwork and trim	250.00	140.00
Kitchen and bathroom		
cabinets and accessories	45.00	16.00
Painting		
Exterior	80.00	40.00
Interior	120.00	55.00
Plumbing	250.00	165.00
Fireplace	40.00	15.00
Electrical work	50.00	30.00
Totals	\$2,037.50	\$981.50
TOTAL CONSTRUCTION		3,019.00
Weatherstripping and vene		••
blinds		210.00
ARCHITECT'S FEE		181.00
LAND AND IMPROVEME	ENTS	1,020.00
TOTAL COST HOUSE AND		\$4,430.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls-common brick, galvanized iron Termite shields, sill bolted to piers.

STRUCTURE: Exterior walls-No. 1 short leaf Southern yellow pine, 8 in. Novelty siding, Sisalkraft Co., paper, studs, No. 2 Southern yellow pine, T. & G. sheathing, L-L canvas. Interior partitions—clear cypress, random width, for living and dining room walls and ceilings. Floor construction—2 x 10 joists, rough flooring, finish flooring, all joists bridged.

ROOF: Construction-rafters, 2 x 6 in., 24 in. o.c., covered with 1 \times 6 T. & G. sheathing covered with 30 lb. saturated roofing felt and 300 lb. asbestos shingles, Ruberoid Co.

CHIMNEY: Common brick, terra cotta flue lining.

SHEET METAL WORK: Flashing-26 gauge galvanized iron.

WINDOWS: Sash-wood, white pine. Glass -single strength, quality B, Pittsburgh Plate Glass Co. Screens-wood framing, 16 mesh, galvanized iron.

FLOOR COVERINGS: Main rooms-No. 1 common red oak. Kitchen and bathroom-No. 1 common pine covered with linoleum. Porches-4 in. concrete slab.

COVERING: Living WALL room-clear cypress, vertical sheathing, random width. Bedrooms and halls-wallpaper on L-L sheeting. Kitchen and bathrooms—Insulite Co. tile board and Sanitas wallpaper, Standard Coated Products Corp.

WOODWORK: Trim-clear Southern yellow pine. Cabinets-veneer plywood. Exterior doors-cypress.

HARDWARE: Allowance \$50 for interior and exterior.

PAINTING: Walls and sash-3 coats semigloss, stained in living and dining room. Floors-2 coats varnish and S. C. Johnson & Son wax. Exterior walls-3 coats white. All paints and varnish by Lowe Bros. ELECTRICAL INSTALLATION:

Wiring system-BX, General Electric Co. Switches-Bryant Electric Co. Fixtures-Lightolier Co. KITCHEN EQUIPMENT: Sink - Standard

Sanitary Mfg. Co. BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co.

PLUMBING: Soil pipes-cast iron. Hot and cold water pipes-galvanized iron, National Tube.

HEATING: Circulating oil heater and fireplace. Hot water heater-Holyoke coil oil water heater with 30 gal. range boiler.

HOUSES IN NEW ALBANY, INDIANA GUNNISON HOUSING CORP., DESIGNERS



HOUSE A.

Charles H. Longley

The most surprising fact about recent prefabricated houses is that it is impossible to distinguish them from conventionally built and styled structures. While this means somewhat increased cost, it is apparently a necessary expedient for overcoming sales resistance. The two houses illustrated here show the types used in a 20-house development. House B is as close to minimum as any salable house could get; its best feature is the large utility room, a common sense recognition of the fact that no matter how small the house, some reasonable storage space should be furnished in addition to closets. Considered from this point of view type A is also well above average. In both cases an uncomplicated rectangle was selected. More details on the development in which the houses were built are given in the September 1938 issue, page 236. Size of lots: 50 x 125.



HOUSE B.

HOUSEA.



SCALE -% = 1.0"

HOUSE B.



COST BREAKDOWN	HOUSE A.	HOUSE B.
CONSTRUCTION	MATERIALS	S LABOR
Foundation	\$153.00	\$173.00
General construction, including carpentry,		
heating and sheet metal work	2,166.00	2,739.00
Painting	82.00	84.00
Plumbing	384.00	384.00
Electrical work	65.00	70.00
Porches and Gunnison Architectural Treatment	50.00	75.00
TOTAL CONSTRUCTION COST	\$2,900.00	\$3,525.00
LAND AND IMPROVEMENTS	350.00	400.00
TOTAL COST HOUSE AND LAND	\$3,250.00	\$3,925.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls — poured concrete. Waterproofing—below grade.

STRUCTURE: Exterior walls, interior partitions and floor construction—Gunnison Housing Corp. panels. Roof: Gunnison panels covered with asphalt shingles. Decks—painted tin.

CHIMNEY: Prefabricated metal with Johns-Manville transite flues. SHEET METAL WORK: Flashing—copper.

SHEET METAL WORK: Flashing—copper. Gutters—Douglas fir. Leaders—stainless steel, Armco, American Rolling Mill Co. Ducts galvanized iron.

INSULATION: Outside walls, ground floor and attic floor — rock wool in panels. Weatherstripping—copper.

WINDOWS: Sash—Fenestra steel, Detroit Steel Products Co. Glass—double strength, Pittsburgh Plate Glass Co. Screens—copper, sliding trap door. Windows and screens shipped with house; glass installed at factory.

FLOORS: Quartered oak impregnated with resin sealer, finished with waterproof resin, varnish used throughout, finished at factory. Porches—concrete.

WALL FINISHES: Living room—American walnut. Bedrooms—figured gum and mahogany. Halls—American walnut. Kitchen and bathrooms—plain gum, enameled. All walls made of waterproof plywood as integral part of wall panel construction, finished and waxed at factory.

WOODWORK: Trim—(interior) gum; (exterior) appal-poplar. Interior doors—plywood. Exterior doors—flush, walnut faced. Garage doors—white pine. All finished at factory. HARDWARE: Interior and exterior—solid brass, finished at factory.

PAINTING: Interior: Walls—wood paneled. Ceilings — maple. Floors — varnish. Sash enameled. All finished at factory. Exterior walls—2 coats paint at factory; 1 coat at field. All paints by E. I. du Pont de Nemours Co., Inc.

ELECTRICAL INSTALLATION: Wiring system—BX, General Electric Co. Fixtures shipped with house.

KITCHEN EQUIPMENT: Sink—combination sink and laundry tray, Standard Sanitary Mfg. Co.

BATHROOM EQUIPMENT: Tub—Apron, American Radiator Co. Cabinets—steel.

PLUMBING: Soil pipes—galvanized and cast iron. Hot and cold water pipes—brass, Anaconda, American Brass Co. HEATING: System made for Gunnison

HEATING: System made for Gunnison Housing Corp. by Duo-Therm, Motor Wheel Corp., Peerless blower, Peerless Mfg. Corp. Grilles—built-in at factory. Thermostat— Minneapolis-Honeywell Regulator Co. Hot water heater—oil fired, Duo-Therm, Motor Wheel Corp. All equipment shipped with house.

HOUSE IN BROWNSVILLE, TEXAS R. L. BROCKMAN, BUILDER





SECOND FLOOR



A practical solution for the small twostory house, not too well organized in its exterior treatment, but workable inside. Rooms are well above average in size. The kitchen is placed for service to either dining room or screened porch. A corner stair takes advantage of the roof slope, using otherwise wasted space. Size of lot: 90 x 300.

COST BREAKDOWN

TOTAL CONSTRUCTION COST	\$3,150.00
Electrical work	100.00
Plumbing	300.00
Interior	200.00
Painting Exterior	100.00
Millwork and trim	350.00
Foundation and general construction	\$2,100.00
CONSTRUCTION	AND LABOR
	MATERIALS

CONSTRUCTION OUTLINE

FOUNDATION: Concrete piling, 8 in., 8 ft. deep, 7 ft. o.c., 4×6 in. sills.

STRUCTURE: Exterior walls-No. 1 shiplap siding, 1×8 in. yellow pine, No. 2 studs, No. 2 sheathing, Sheetrock canvas and paper, 1 x 5 in. base, B. & B. yellow pine. Interior partitions—knotty pine, 2 x 4 in. studs, sheetrock and shiplap, canvas and paper, 1×5 in. base. Floor construction— 2×8 in. and 2×10 in. joists, 1×8 in. No. 2 yellow pine sub-floor, No. 2 oak finish flooring. Ceilings—Sheetrock.

ROOF: No. 2 rafters, 2 x 4 in., 1 x 4 in. sheathing, covered with No. 2 Perfection cedar shingles.

SHEET METAL WORK: Armco, 16 gauge, American Rolling Mill Co., used throughout. INSULATION: Ceiling (2nd floor) — tile board, U. S. Gypsum Co.

WINDOWS: Sash-double hung, white pine, William Cameron. Glass—single strength, Pennvernon, Pittsburgh Plate Glass Co. FLOOR COVERINGS: Main rooms-No. 2 oak. Kitchen-Tile-Tex Corp. Bathroomsceramic tile. Porches-yellow pine.

WALL COVERINGS: Living and bedroomscanvas and wallpaper. Halls-knotty pine. Kitchen-sheetrock and paint. Bathrooms-Keene cement and plaster.

WOODWORK: Trim-B. & B. yellow pine. Cabinets-34 in. veneer, stock. Interior doors -white pine, 2-panel. Exterior doors-tuggle sash and door, special. Garage doors-builtup, yellow pine. HARDWARE: P. & F. Corbin.

PAINTING: Interior: Walls, sash, and ceil-ings-interior gloss. Floors-varnish. Exterior walls-A-40 outside paint. Roof-oil and stain.

ELECTRICAL INSTALLATION: Wiring system, switches and fixtures-General Electric Co.

KITCHEN EQUIPMENT: Range and refrigerator-General Electric Co. Sink-Kohler Co.

BATHROOM EQUIPMENT: Fixtures by Kohler Co.

PLUMBING: Soil pipes-cast iron, Alamo Iron Works. Hot and cold water pipes-3/4 in. galvanized. Spang-Chalfant, Inc.

HOUSES IN VICTORVILLE, CALIF. E. WEBSTER AND A. WILSON, ARCHITECTS







LIVING ROOM

SOUTHWESTERN PORTLAND CEMENT CO., BUILDERS

A double-barreled experiment in construction methods and employer-employe relationships, these attractive, permanently constructed houses rent for the remarkably low price of \$25 a month. Built for thirty lucky employes of a California cement company interested in developing low cost construction methods, prefabrication and straight-line production were emphasized throughout, from exterior walls to kitchen cabinets (for savings, see ARCH. FORUM, March 1939, pp 230-32).

Clyde Stoughton Photo.

Both exterior and interior walls consist of precast cement blocks, laid dry and bonded with reenforced concrete corner posts and studs poured through holes in the blocks at 24 in. intervals. Floors are concrete with asphalt tile, windows steel. Plumbing was shop assembled in a unit standardized for the four plan-variants, and serves the bathroom, kitchen sink, and laundry tray in the utility room from a single double-walled partition.

Variety in design was achieved through the use of six different roof plans over the four plan-variants, and differing porch treatment. Low pitch hip roofs, used on all but four of the houses, complete simplification of detail, and disposition of the houses on a gently sloping site, all contribute to the attractiveness of the outside of the houses, while inside built-in furniture has been used to good effect.



VARIATION: Plan reversed: Flat Roof

CONSTRUCTION OUTLINE

FOUNDATION: Walls-reenforced concrete, monolithic.

STRUCTURE: Exterior walls—interlocking, webbed, hollow concrete blocks, dry laid and reenforced with poured concrete studs, 24 in. o.c., reenforced continuous bond beam and concrete jambs and heads; plastered both sides with cement mortar. Floors—reenforced concrete. Ceilings—cement plaster, sand finish over 1 in. chicken wire over 1 in. Thermax, Celotex Corp.

ROOF: Hip for 26 houses; flat on 4 houses; rafters 2 x 4 in., 24 in. o.c., solid 1 x 6 in. sheathing, covered with Johns-Manville 30 lb. Dutch Lap asbestos shingles for hip roofs; flat roofs—2 layers 40 lb. smooth; 1-75 lb. cap sheet all hot mopped and painted with aluminum paint, Pioneer Paper Co.

CHIMNEY: Reenforced concrete poured solid with concrete; plastered inside with metallic kiln lining. Fireplace backed with fire brick and faced with 1 x 4 in. x 8 in. red face brick, edge revealed; Heat:nore friction dampers.

SHEET METAL WORK: Chimney and flat roof parapets—galvanized Armco iron, 26 gauge, American Rolling Mill Co.

INSULATION: Outside walls—hollow concrete blocks. Ground floor—sand cushion under concrete slab. Ceilings—1 in. Thermax, Celotex Corp.

WINDOWS: Sash and screens—steel, Truscom Steel Co. Glass—single strength, quality B, Libbey-Owens-Ford Glass Co.

FLOOR COVERINGS: All floors—1/8 in. Accotile, Armstrong Cork Co. Porches—troweled and marked smooth cement.

WOODWORK: Trim—scribing molds around pre-made cases. Cabinets and doors—Douglas fir. Garage doors—overhead type.

HARDWARE: Interior and exterior—Russell & Erwin Mfg. Co.

PAINTING: Interior—Portland cement, texture finish; 1 coat sealer, 2 coats washable wall paint, General Paint Co. Sash—3 coats lead and oil. Exterior: Walls—2 coats waterproof stucco brush coat.

ELECTRICAL INSTALLATION: Wiring system—flexible conduit. Switches—toggle, Harvey Hubbell, Inc.

KITCHEN EQUIPMENT: Sink—Standard Sanitary Mfg. Co. Cabinets—wood. Laundry sink—enameled iron, installed on porch.

BATHROOM EQUIPMENT: All fixtures by Standard Sanitary Mfg. Co. Cabinet—flush mirror type.

PLUMBING: Soil pipes—standard cast iron. Hot and cold water pipes—galvanized iron.

HEATING: Warm air system. Houses piped for gas to all living and bedrooms; tenants provide portable heaters and utilize dampered fireplace. Hot water heater—16 gal. Corporal automatic, General Water Heater Co.

HOUSE IN PORTLAND, OREGON JOHN YEON, ARCHITECT





Most unusual single feature of this house is the window treatment. Plate glass is inserted between the studs, and ventilation is provided by louvers beneath the windows. Advantages claimed by the builder are the elimination of screens from view, greater security against burglars, reduction of heat loss, free ventilation in all kinds of weather. Other structural innovations are listed in the construction outline. The plan is excellent-a de luxe version of the minimum house. Most pleasing characteristic of the attractive exterior is the simple expression of the carefully integrated construction. Lot size: 72 x 126. Cubage: 7,800.







COST BREAKDOWN

CONSTRUCTION	MATERIALS	LABOR
Foundation	\$71.00	\$82.00
First floor	169.00	118.00
Exterior walls	117.00	63.00
Partition walls	28.00	32.00
Roof	231.00	90.00
Interior finish	200.00	152.00
Millwork and trim	250.00	292.00

Kitchen and bathroom		
cabinets and accessories	115.00	60.00
Painting		
Exterior	100.00	40.00
Interior	100.00	60.00
Plumbing		
Piping	80.00	40.00
Fixtures	120.00	10.00
Fireplace	80.00	50.00
Heating (gas automatic)	262.00	120.00
Sheet metal work	25.00	15.00

CONSTRUCTION OUTLINE

FOUNDATION: Walls-concrete and native stone.

STRUCTURE: Exterior walls-2 x 4 in. fir studs, 16 in. o.c., dry 1 x 6 in. T & G fir, 15 lb. Johns-Manville saturated felt, Resn-Prest plywood, M. & M. Woodworking Co., Portland Oregon fir battens, 28 in. o.c. In-terior partitions—2 x 4 in. fir studs, 16 in. o.c., plaster on Johns-Manville Steeltex metal lath. Floor construction-4 in. concrete slab. ROOF: Construction-2 in. T & G fir laid vertical, rafters omitted, Purlin plates sup-porting, covered with 5/2 Perfect V.G. shingles laid 4 in. to weather.

CHIMNEY: Clay brick with clay tile flue lining, Columbia Brick Works. Dampercast iron. Firebox lined with Columbia split brick.

SHEET METAL WORK: Flashing-28 gauge

galvanized iron. Ducts—40 lb. tin. INSULATION: Attic floor—1 in. Thermax, Celotex Corp. Weatherstripping—Interlocking metal, Chamberlin Metal Weather Strip Co.

WINDOWS: Fixed windows set in structural members, no sash used. Glass—crystal plate, 3/16 in., Libbey-Owens-Ford Glass Co. Screens-built-up, galvanized iron frames fitted to ventilators, removable.

FLOOR COVERINGS: Main rooms—oak blocks set in asphalt, E. L. Bruce Co. Kitchen and bathrooms—linoleum laid over Masonite Corp. Quartrboard. Porches-concrete.

WALL COVERINGS: All rooms plaster on Johns-Manville Steeltex lath. WOODWORK: Trim—3/4 in. metal casing,

painted fir base set before plaster. Cabinets -plywood, Rezo doors. Interior and exterior doors-Rezo, M. & M. Woodworking Co. Garage doors-1/4 in. Resn.-Prest plywood on 2 in. frame, overhead type, Frantz Mfg. Co. HARDWARE: Interior and exterior—Schlage Lock Co., Stanley Works and Frost & Son. PAINTING: Interior: Walls and ceilings-Rodda Hideall wall paint. Kitchen and bath—super white, Murphy

Varnish Co. Floor—Pentrafill, American Floor Surfacing Co.

Sash—semi-gloss Velvetex, Preservative Paint Co. Exterior: Walls—exterior paint, Murphy Varnish Co. Roof—Super Fine Murphy Var shingle stain.

ELECTRICAL INSTALLATION: Wiring system and switches-General Electric Co. Fixtures—Pachard-Mallory, Inc.

KITCHEN EQUIPMENT: Sink—Kohler Co. LAUNDRY EQUIPMENT: Equipped with Bendix Co. washer at owner's option.

BATHROOM EQUIPMENT: All fixtures by Kohler Co. Cabinets—Hall Mack, baked enamel, Hallensheid & McDonald. PLUMBING: All pipes—Spang-Chalfant, Inc.

HEATING: L. J. Mueller Furnace Co. High Boy gas automatic furnace with Climatrol air conditioning unit. Combination furnace stat and high limit control. Da-Nite Acrathrem control, Minneapolis-Honeywell Regulator Co. Grilles-Independence 311-A, Barber-Colman Co.

SPECIAL EQUIPMENT: Venetian blinds in living room, bedrooms and kitchen. Oregon Venetian Blind Co.

Electrical work 6	4.00 44.00
Totals \$2,01	2.00 \$1,268.00
TOTAL CONSTRUCTION	\$3,280.00
EQUIPMENT	520.00
LAND AND IMPROVEMENTS	700.00
PROFIT AND OVERHEAD	250.00
TOTAL COST HOUSE AND LAND	\$4,750.00

HOUSE IN ORELAND, PA. RICHARD C. MARTIN, ARCHITECT;





LIVING ROOM

The house illustrated is one of 68 built and sold in a Philadelphia suburb. Constructed of concrete block, the houses contain three bedrooms and a garage and are sold on 50-foot lots for \$3,490. All houses have the same plan and the same exterior. A practice which gives an appearance of unity rare in such developments. The remarkably compact plan has little waste space, small but adequate rooms. Equipment includes a warm air furnace in the basement, gas range, overhead kitchen cabinets, individual sewage disposal units. Heating costs are estimated at \$50 per season. For details on the development see Arch. Forum, Nov. 1938, p. 414.



BEDROOM

COST BREAKDOWN

	MATCHIALO
CONSTRUCTION	AND LABOR
Permits	\$11.00
Excavate and grade	25.00
Concrete masonry	491.00
Cesspool	55.00
Carpentry	903.00
Flashing	18.00
Hardware, medicine cabinet	60.00
Sand and shellac floors	80.00
Painting	157.00
Electric wiring and fixtures	75.00
Plumbing—water and gas	307.00
Heating (hot air)	150.00
Copper gutter, drainspout	30.00
Rock lath and plaster	99.00
	30.00
Paper Miscellaneous and insurance	45.00
TOTAL CONSTRUCTION COST	\$2,536.00
PROFIT	282.00
LAND, IMPROVEMENTS,	
SERVICE CONNECTIONS,	
EQUIPMENT, FEES	954.00
TOTAL COST HOUSE AND LAND	\$3,772.00

MATERIALS

BOARDMAN-SMITH CORP., BUILDERS





CONSTRUCTION OUTLINE

t

FOUNDATION: Walls—8 x 8 x 16 in. solid cinder concrete block, Bethayres Concrete Products Co. Cellar floor—3 in. cinder concrete, 1 in. top coat. Waterproofing—asphalt coating on exterior foundation walls. STRUCTURE: Exterior walls—8 in. hollow cinder concrete block finished with Medusa Portland cement paint. Interior—1 x 2 in. stripping, rock lath, 3 coats plaster. Bearing partitions—3 x 4 in. hemlock studs; nonbearing—2 x 3 in., rock lath, 3 coats plaster. Floor construction—2 x 8 in. hemlock surfaced joists, 1 x 6 in. roofers, 5/16 x 2 in. oak flooring. Ceilings—plaster, rock lath. ROOF: Construction—2 x 6 in. rafter covered

with No. 1 Washington cedar shingles. CHIMNEY: Concrete block, 8×8 in. terra cotta lining.

SHEET METAL WORK: Flashing—16 oz. copper and 40 lb. tin coated. Gutters—4 in. copper. Leaders—3 in. copper. Ducts—tin covered with asbestos.

INSULATION: Roof-Gold Bond rock lath on one side, National Gypsum Co.

WINDOWS: Sash—White pine. Glass—single strength, American Window Glass Co.

STAIRS: N. C. white pine throughout. FLOOR COVERINGS: Main rooms—hard-

wood. Kitchen and bathrooms—yellow pine covered with linoleum.

WALL COVERINGS: All rooms—wall paper. Kitchen and bathrooms—Sanitas, Standard Coated Products Corp.

WOODWORK: Trim and cabinets and exterior doors—white pine. Interior doors—fir. HARDWARE: Interior and exterior—brass. PAINTING: Interior—3 coats paint. Floors white 5 lb. cut shellac. Exterior walls—2 coats Medusa Portland cement paint.

ELECTRICAL INSTALLATION: Wiring system—2 circuit wiring. Switches—toggle type. KITCHEN EQUIPMENT: Range—gas, Wellbuilt Stove Co. Sink—Kohler Co.

BATHROOM EQUIPMENT: All fixtures by Kohler Co. Cabinets—Quaker Metal Co. PLUMBING: Soil pipes—cast iron. Water pipes—copper.

HEATING: Warm air system. Boiler-warm air 22 in. pot, coal fired, Lennox Furnace Co.