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A Foreword

AFTER a period of comparative inactivity, the profession of architecture, through a well-defined repercussion, has become to-day, in certain phases of practice, and particularly as related to housing, one of acute activity. The question of town planning, as allied to industrial housing, when first discussed in this country was viewed in a more or less perfunctory and academic manner. Yet, housing in all its various phases, particularly as relating to town planning, both in its original creation of plan and in its efforts to correct, often at considerable cost, the errors everywhere apparent in our large cities, was beginning to attract the attention of thoughtful men who were able to discern the very active part architects would be called upon to assume.

With the outbreak of the war the impetus given to manufacturing and the vital importance of securing labor (a factor even more vital than the supply of raw material) each showed the grave necessity for adequate housing and the need for thorough study of all the many factors which controlled labor. As the dominating administrative element in all housing operations, architects were confronted with a problem which stimulated the originality and initiative developed by their training. To these elements were added the problems of finance, the social or humanitarian features, and, further, there was presented the important fact that if labor became nomadic it would become more costly than if stabilized. All these things it has become necessary for architects to consider. Many of them are new to professional practice; all of them will form an important part of the architect's necessary mental equipment in the future.

IT is to supply, as far as possible, the knowledge born of these new conditions that the present issue of THE AMERICAN ARCHITECT has been prepared. It has not been considered necessary to devote much space to the illustration of the architectural treatment of industrial housing. Methods of financing industrial housing operations at the outset are believed to be of first importance. Following these it becomes necessary to acquire knowledge of all other economic aspects, the various features of communal

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interest, nationality, the relation of the housing area to the plant and the social and religious aspects of the newly formed community. To these there should be added the proper study of the recreative elements essential to the maintenance of sound minds in sound bodies. In short, in the present development of these communities that are springing up everywhere with incredible rapidity, there must be no mistake—there can be nothing left to chance.

The planner of an industrial community, like the designer of a monumental building, must be able to mentalize and visualize the completed work, and so accurately and thoroughly in every detail that when his labors are completed, the result will stand forth, free of error, well created.

Every article published in this issue and to appear in succeeding issues, referring to this topic, has been prepared or selected with the intention of supplying as far as possible such knowledge as will be necessary to assist the architect to set about a housing operation with the more important facts of successfully accomplished developments in this constantly growing field clearly set before him.



DETAIL OF MARBLE BALUSTRADE—SISTINE CHAPEL, ROME

Planning and Financing the Industrial Housing Project—Part I*

By ARTHUR F. CLOUGH

THE war has brought about a peculiar situation in the development of industrial housing projects throughout the United States. Because of the increase in the cost of labor and building materials, as well as the decrease in the amount of unemployed capital in the country, the manufacturer, the real estate operator and the speculative builder are becoming more circumspect in the erection of habitations until they are assured of a sufficient return on the money invested, either in rents or in an adequate profit on the sale of the property.

On the other hand, the increasing congestion of labor in various manufacturing centers throughout the country, the lack of decent living quarters in many of these centers, and the higher wages which many skilled and unskilled workmen are receiving has encouraged the ambitious worker to desire a home of his own. Hence, while the demand for houses is increasing, the supply is diminishing—and the end is not yet.

In many communities the housing problem is becoming so acute that it is seriously affecting labor turnover in the big industrial interests. A quarter of a century ago or more small communities grew up about the manufacturing interests and the prosperity of the community depended upon the prosperity of its industries.

Changing economic and transportation conditions have altered much of this, and to-day the manufacturer who chooses a site for his plants unwisely, or whose country village has grown to a fair-sized city, finds a perplexing problem on his hands if he is to retain his labor and operate his plant at its maximum productive capacity. High wages alone are not sufficient to hold the most desirable class of workers. They must also find suitable living conditions in the community where they are employed, and, failing that, will go elsewhere, even at less money, where their expenditure of time and effort will bring them some of the comforts of life.

If the manufacturer provides the homes required, he has to draw upon funds which are essential to the operation of his plant and to its continued expansion as the needs of a growing business demand.

In answering the questions presented, the manufacturer must determine whether the housing prob-

lem is a vital one in his community and to what extent his continued business success depends upon it; he must also find out how, under present war conditions, the necessary funds for such enterprises can be provided without tying up necessary public or private capital for long periods of time, or interfering with the flotation of Government bonds.

When considering his answers to these questions the manufacturer hears a great deal about the desirability of better housing accommodations for workers; he learns that England is spending millions of dollars annually in an effort to keep up with the increasing demand for homes; he knows that our own Government has appropriated many more millions to house the shipbuilding and ordnance workers; he sees lengthy articles on the types of houses that are being built, and he reads with interest of the various selling schemes by which these houses are disposed of to the workers—but in none of this material does he find a suggestion as to how he can determine the extent of his own need for industrial housing, or how he is going to finance the project if he finds it a feasible solution for his labor troubles.

All of the phases mentioned have their value—but he is not ready for them yet. First he needs assurance of the wisdom of his housing project, and when convinced of that he must be shown how he is going to do it. In order to help him clarify these matters in his own mind, the following *questionnaire* has been prepared:

- 1—Is there no other solution for the housing situation in this community?
- 2—Can householders be induced to lower rents, convert residences into two-family or tenement houses, offer reasonable board, or take other steps to encourage the desirable stranger to settle here permanently?
- 3—Can contractors, real estate operators or others be induced to build and sell houses at a more reasonable cost in this community?
- 4—What are the financial resources of our workers and other workers in this locality?
- 5—Can they afford to purchase homes on their present wages, or must we raise salaries to enable them to do this?
- 6—Which, of various types of workers, have most difficulty in obtaining proper housing, and which are most apt to purchase homes?
- 7—On what terms can they afford to pay for them?
- 8—Will they keep up their payments?
- 9—If they cannot keep up payments on the purchase of homes, would it be advisable to build houses for rental purposes only?
- 10—Can we sell our houses at cost, or must we make a considerable profit on the enterprise to provide against possible future loss?

*Part II will appear in the issue of May 22.

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11—Are we taking this step co-operatively with our employees because we think it will be of mutual benefit?

12—If not, what do we expect to get out of our investment?

13—Will it bring us a more desirable class of help?

14—Will it tend to reduce our labor turnover?

15—Will the project savor of charity or paternalism?

16—Will it increase the standing and good name of our organization?

17—Will the probable return, as a whole, be worth the investment?

18—Are our workers naturally gregarious or individual?

19—In view of our answer to the foregoing question, what sort of housing would sell best?

20—How many tenement houses will we need at the start?

21—How many two-family houses and cottages?

22—How many, if any, apartment houses?

23—What will be the average cost of each of these respective types?

24—Have we any land available for housing purposes, or must we purchase some?

25—In what condition is the land and how extensively must it be improved by grading, sewers, sidewalks, etc., before it will meet with our requirements?

26—What improvements are absolutely essential to start our project?

27—What will these improvements cost?

28—Does the natural contour of the land lend itself readily to any desired future expansion?

29—Are our plans extensive enough to provide for this growth?

30—What is the approximate aggregate cost of the project?

31—What is the general public opinion about the desirability of this location as a residential section?

32—Is the property apt to appreciate or depreciate in the course of time?

33—Are we going to limit the sale of houses to our employees, or will we take in desirable outsiders also?

34—In view of our answer to questions 7 and 33, what is the best selling plan?

35—Does this plan tie our money up for long periods of time?

36—Is that advisable and can we rest assured that our business growth, or unexpected emergencies, calling for cash capital, will not make it necessary for us to realize on a portion, or all of this investment, suddenly and at a loss?

37—How can we protect ourselves against such a contingency?

38—Last, and most important of all—how, and where, will we get the funds to finance this project so that the maximum amount of building may be done with a small amount of capital, and the investment so made that the time our money is tied up in any single enterprise be reduced to the minimum?

In answering these questions the manufacturer will find many subjects worthy of mature deliberation. Among those which will require special attention is the analysis of the types of workers who will buy homes and the choice in the types of houses to be built for them. One large New England concern, which built up an ideal community for its employees several years ago, has found difficulty in disposing of the double or two-family type of house. Although the personnel of their organization is exceptional, they found the most of their employees reluctant to purchase half of a double house for fear of being forced into undue familiarity with the purchasers of the other half. As a

consequence this type of construction has been practically abandoned in their case.

When considering this question, it is also necessary to distinguish between the homes for executives, clerical help, skilled workmen and unskilled labor. Even in these days of democracy, there still exists more or less class feeling and, in addition, the type, quality of material and selling price must be adapted to the means of the purchaser.

It is desirable to weigh very seriously the question of what one expects to get out of such a project. While there is no question but that such enterprises yield financial returns, and good ones at that, no exact statistics are available; for, if the houses be erected and sold at cost, the greatest returns the manufacturer will get from his investment lie in the increased contentment of his workers, the reduction in his labor turnover and the building up of his good name as an employer. That these things are desirable and have a financial value no one will deny, but, because they are abstract qualities rather than tangible ones, it is difficult to fix even an approximate valuation for them. There are few, if any, instances, however, where such projects have been properly carried out that have not proved highly successful.

Another query of unusual interest is whether the purchaser will keep up his payments or not. Ignoring, for the moment, the expense involved in reselling the property for the second or third time, we find two distinct viewpoints of this question. On the manufacturer's side, it is desirable to have the terms of sale sufficiently rigid to prevent his workers from disposing of their equity in the property too readily and leaving his employ or the community.

From the purchaser's standpoint it is undesirable to be tied up so tightly to any concern or community that one cannot make a necessary change without suffering considerable financial loss. The right sort of contract must be one which will reconcile these two extremes—that will be sufficiently fluid to permit the purchaser to dispose of his equity at a fair price and within a reasonable time when circumstances justify it; yet which will be sufficiently rigid in its application to prevent an efficient worker from throwing up his job and becoming a "floater" because of some passing disagreement with his superior or temporary disturbance of his working conditions. Such a contract will enable the employer to co-operate with his workmen at all times, for if a worker gets into such financial difficulties that he is compelled to realize on his equity in his home, the employer can help him dispose of it and to do so without the usual loss which attends the average sacrifice of valuable real estate interests. In this way he maintains his good name as

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an employer and adds further laurels to his reputation for fair dealing.

If the manufacturer, after careful deliberation of the foregoing questions, has decided to go ahead with his project and has determined upon the approximate amount of capital necessary to carry it through, before he can start operations he must provide the funds to finance it, and here is where his real troubles begin.

Save in a few instances, most manufacturers to-day are utilizing their funds in expanding their productive capacity or meeting their increased operating expenses, hence have little or no unemployed capital. When they go to the banks they find them averse to tying up large amounts of money for long terms, partly through their obligations in respect to Liberty Loan allotments and partly because present economic conditions demand more or less fluidity in a bank's financial resources. If they try to obtain municipal or state aid, they find restrictions limiting the purposes and amounts for which bonds may be issued. Should they turn to their own workmen or the small investor, they will find that the increased cost of living or subscriptions to Liberty Bonds have left them with a very small amount of money available for further investments. The final resource seems to be the Federal Government—yet here the manufacturer finds that there is no adequate legislation to provide for his housing needs, unless he happens to be building ships or manufacturing munitions.

The problem seems unsolvable—and in many cases it will continue to be unsolvable—until the Government takes a hand and provides the necessary financial aid in certain communities where the housing needs are vital ones. However, before the manufacturer turns to the Government in these days he should exhaust all other possibilities.

The following methods of financing industrial housing projects are offered as suggestions only. Some of them have been tried out and have proved successful. Others exist in theory only, yet might be made practical under the right conditions and with the right sort of organization and promotion. Because of the variations of the laws in the different states, they are offered without regard to their legal aspects. If the method seems feasible, it will be incumbent upon the manufacturer's legal department to adapt it to the particular laws of the community or state.

METHOD I.

Capital supplied from the manufacturer's reserve or surplus.

A prominent Massachusetts organization has successfully financed and operated an industrial housing project by the following method. They first formed a separate corporation to handle the real estate, stock of which was held by the Company, and advanced the initial funds to finance the improvement of the land and erection of the

houses. When the houses were completed and sold, the purchaser made a cash payment of ten per cent of the purchase price, gave the Company a 12-year note for \$1,000, and a demand note for the balance of the purchase price. Both notes were secured by a mortgage on the property. To further secure the payment of the first note, a special agreement was made whereby the purchaser covenanted that he would purchase five shares in a co-operative bank approved of by the Company, and assign his bank holdings to the Company. In the banks approved by the Company, five shares at five per cent matured in 12 years and two months to the sum of \$1,000. Since the majority of the banks have always paid over five per cent interest, maturities have invariably been well within the 12 years.

If the purchaser was under 60 years of age and passed a satisfactory physical examination by the Company's physician, the Company also agreed that, in case of the death or total disability of the purchaser at any time during or before the expiration of the 12-year period, it would accept the surrender value of his co-operative bank holdings at the time of death or total disability in full satisfaction of the time note of \$1,000; and it further agreed that it would not make demand upon the demand note as long as the purchaser was not in default under the terms of his mortgage or under the terms of his agreement relative to the co-operative bank investment.

Monthly rental charges were computed on the basis of 1-12 of five per cent interest on 90 per cent of the purchase price—to be reduced after 12 years when the \$1,000 maturing in the co-operative savings bank was applied on the principal. Taxes, water rates, insurance, etc., were taken care of by the purchaser.

In a supplementary contract the purchaser agreed that he would not convey his equity in the property to a third party without first offering said equity to the Company on the same terms which the said third party was prepared to offer.

The following table shows clearly the factors involved in the sale of house and land worth \$3,851.50:

Total purchase price.....	\$3,851.50
First payment of 10%.....	385.15
Balance loaned on mortgage.....	3,466.35
Amount due in 12 years, secured by time note 1,000.00	
Balance secured by time note.....	2,466.35
Monthly interest (rent) during the first 12	
years.....	14.45
Monthly payments on 5 co-operative bank	
shares.....	5.00
Total monthly payments during first 12 years.....	19.45
Monthly interest payment after 12 years.....	10.30
Total loan.....	\$3,466.35
Five per cent.....	173.32
1-12 (rental charge).....	14.45
Demand loan.....	\$2,466.35
Five per cent.....	123.32
1-12 (rental charge).....	10.30

The purchase price on the property represented the actual cost of the house, land and improvements without profit to the Company, this including the expense of building, heating, lighting, plumbing, piping, hardware, fixtures, papering, window shades, screens, concrete cellar floor, granolithic walks, rough grading, finish grading, planting and clothes reel.

ADVANTAGES.—The Company's money is fully secured and the purchaser's equity fully protected. The contract is fair to both parties, affording the company an opportunity to control the resale of the property if it so desires and affording the purchaser an opportunity to dispose of the property at a profit, should the occasion require. This fluidity in the disposition of the purchaser's equity has always been considered as highly desirable and the foregoing arrangements seem to protect the interests of all. The low monthly payments (totaling \$19.45 in the example given) place the purchase of a home within the reach of the average workingman. The purchaser is protected in

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case of death or disability, and all appearance of charity or paternalism is avoided by permitting the purchaser to make his periodical payments to the co-operative bank rather than the Company. At the end of twelve years the purchaser can transfer the mortgage for the balance of the purchase price to other hands, if he so desires, and thus become independent of the Company's interest.

DISADVANTAGES.—The Company has to advance the money to finance the project. Its funds are tied up for a period of twelve years or more. The plan makes no provision for the worker who cannot pay down 10 per cent of the purchase price and suggests no method by which he would be encouraged to save up this amount.

METHOD 2

"Philanthropy and 5 per cent."

This plan, which is popularly known by the above title, was originated by General George M. Sternberg in 1897, when he organized the Washington Sanitary Improvement Company. It affords corporations and individuals actuated by philanthropic motives an opportunity to provide funds for the relief of civic or community congestion and, at the same time, realizes a conservative but safe return on their investment.

Originally limited by its charter to a capital stock of \$500,000, by investing its surplus in houses and by borrowing money upon its real estate it has been able to increase its usefulness, and the assets of the company now amount to nearly \$1,000,000, with an indebtedness of \$225,000.

Houses are built for rental purposes only, as it was felt that their sale would take them out of the Company's control and there would be no way of getting rid of objectionable occupants.

Rents are figured on 9 per cent gross income on total cost for eleven months' rent. This allows 5 per cent for dividends to stockholders; 2 per cent for taxes, agent's commission and exterior repairs, and 2 per cent for the surplus fund. Under the Company's charter, dividends are limited to 5 per cent.

Interior repairs are provided for by a rebate system, the twelfth month's rent going for repairs, if necessary; and if not, going to the tenant as a reward for his care of the property. The average rentals range from \$7.50 to \$12 a month.

ADVANTAGES.—The chief advantage to industry lies in the relieving of the manufacturer from the investment of funds sorely needed in other activities at this time. The fact that rents can be made lower when houses are not built for sale would also be an advantage to industries employing unskilled and consequently poorly paid labor.

DISADVANTAGES.—The funds are tied up indefinitely and, furthermore, at this time money for philanthropic enterprises is not as plentiful as it was before the war, and the industrial interest relying upon such aid may find it a rather elusive source of capital. In addition, for the skilled workmen, receiving a fair wage, the project savors too much of charity, and his self-respect causes him to resent it as a reflection on his ability to earn a decent living.

METHOD 3

Housing projects financed by private enterprise, or "Home Building Corporations," and sold at low (?) cost to workers on a long-term basis.

ADVANTAGES.—The greatest advantage of this method lies in the fact that it relieves the manufacturer from the necessity of investing his own funds in the project.

DISADVANTAGES.—This method usually has many grave disadvantages, chief of which is the fact that such "building corporations" are usually money-making schemes, run for a profit by professional real estate operators, and the terms of sale are such that a purchaser, in addition to paying a round price for his "installment-plan" house, gets poor material and workmanship and stands to lose a substantial sum, if not all of his scanty savings, when he is compelled to dispose of it.

METHOD 4

The capital loaned by banks or trust companies on security furnished by the manufacturer until the property is disposed of when the bank takes a first mortgage on it, arranging for repayment by long-term notes.

ADVANTAGES.—This plan has the merit of simplicity and it relieves the manufacturer from the necessity of putting up his own capital. In place of it he offers his plants or other property as collateral until the houses are erected and sold to his workmen, then turns a first mortgage on the property over to the bank to replace his collateral, which is released for other uses.

DISADVANTAGES.—Few manufacturers would care to, or have the power to take such a step. Furthermore, the present stringency of the money market and the obligation upon banks to take care of their allotment of Liberty Bonds make the average banker look askance upon such a scheme at this time. Such a plan would have to be very carefully worked out, with strict regard to its legal aspects, and care taken to protect the bank's money in every way. Details regarding the amount paid down on the purchase of a home, and subsequent monthly payments, interest, etc., could be a modification of those outlined in Method 1.

METHOD 5

Housing projects financed by public subscription.

Under this plan a corporation is formed by the local manufacturers and business men of the community for the purpose of financing the erection and sale of houses at cost, on a low margin of profit. Shares can be issued and disposed of in the following manner: Members of the corporation can subscribe to them on a *pro rata* basis, according to the amount of housing each one intends to do; shares can be offered and sold to the public if the appeal is made to the investors of the community on the ground that it is a civic duty to support such a project and thereby promote the welfare and reputation of the municipality; shares of small denomination could be issued and sold to workmen under an agreement permitting the purchaser to convert his shares into an equity in a home when their valuation was sufficient to equal 10 per cent of the purchase price on the property he desired. By this method many men who would otherwise never purchase homes would be encouraged to save their money and invest it in property, a certain portion of working capital would always be available and the burden of financing the housing activities in the community would be fairly equally distributed.

ADVANTAGES.—The manufacturer who has only a few houses to erect receives as good a price on the work as his associate who has many to construct. He is relieved from the necessity of bearing the whole burden or expense of financing his project. He encourages many men to invest small amounts of money in the community before they have reached the point where they can pay down 10 per cent of the purchase price on a home, giving them a definite reason to be thrifty and thereby stabilizing his labor. He is able to erect and sell houses at cost, or very near cost, and the awakened public interest and civic pride will enable him to take care of future housing problems much more readily.

DISADVANTAGES.—The chief difficulty would lie in persuading the moneyed men to invest in the enterprise outside of the interests which would directly gain by the better housing of their employees, owing to the low returns necessary on any funds so employed.

METHOD 6.

Housing enterprises financed by the sale of shares to employees.

This is, in effect, the same plan as outlined in Method 5, save that an outside corporation is formed by the Company, which holds a portion of the shares, the remainder being issued in small denominations and sold to employees, who, when they have accumulated sufficient valuation, exchange them for an equity in a home, equal to a given per cent of the purchase price.

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ADVANTAGES.—Its chief advantage lies in the encouragement of thrift among the employees of an organization and the consequent stabilizing of labor which will ensue from the worker's having even a small amount of money invested in the community. An adaptation of this plan would overcome one of the objections to Method 1—where no encouragement to save is held out to the worker who has not accumulated sufficient to pay down ten per cent of the purchase price.

DISADVANTAGES.—Only a small portion of the burden of expense in financing his housing project would be thus taken from the manufacturer's shoulders by this method. Furthermore, its success would be problematical save in very large organizations employing several thousand workers. Another difficulty would be found in the fact that many workers have their small savings tied up in Liberty Bonds at the present time.

METHOD 7.

Housing projects financed by the issuance of municipal bonds.

ADVANTAGES.—Any plan of this kind would relieve the manufacturer of a part, if not the whole, of the expense involved in housing his employees and, from that standpoint, seems desirable. From the city's viewpoint it would tend to stabilize real estate value, increase the amount of taxable property and permit municipal control of the various improvements so as not to depreciate other property.

DISADVANTAGES.—Federal restrictions prohibit the issuance of municipal bonds beyond certain limits without the consent of the Government. Whether this consent could be gained or not is problematical, but it would undoubtedly be worth the effort in communities where the housing needs are urgent ones. There is also a question as to how banks and investors would look upon bonds issued for such a purpose.

METHOD 8.

Industrial housing projects financed by the State.

In 1911, the Massachusetts Legislature created a Homestead Commission whose avowed purpose was to use public funds for assisting workers and others in acquiring homes in the suburbs of cities and towns.

Such a bill was reported by the Commission in 1912, but was not upheld by the Supreme Court, which declared that the use of public funds, or any funds over which the public had control, for such purposes was unconstitutional, and it was not until the latter part of 1915 that an amendment making such appropriations constitutional was finally approved by the Legislature and ratified by the voters in the State election by a majority of nearly 3 to 1.

Another wait then ensued for lack of funds to carry on the work, but in 1917 the Legislature, by Chapter 310 of the General Acts, made available to the Homestead Commission an appropriation of \$50,000 for a demonstration or experiment in the construction of homes within the means of low-paid workers.

After careful consideration the Commission selected Lowell, Mass., as the community for its initial activities, largely because of its nearness to Boston, its numerous and varied industries with a considerable body of low-paid workers, its suitable available lands, and the cordial co-operation with the Commission of the city authorities, Board of Trade and citizens.

A plot of land has been selected and plans laid out for about thirty houses, costing from \$1,952.85 to \$2,381.65. The erection of 12 houses was begun October 16, 1917. All the houses are of frame construction and the workmanship is superior to that usually done on contract or houses built by speculative builders. Each house has cemented cellar, ventilated attic, bath, water-closet, washbowl, hot and cold water, one set wash-tub, electric lights and gas connection for kitchen gas range. Heating is intended to be by range, with provision for additional stoves, unless the purchaser chooses to put in a heating system. The main thoroughfare of the community, Homestead Road, has been accepted by the City of Lowell as a public way and is being surfaced and equipped with sewers, water, sidewalks, trees, electricity and gas.

It was originally expected that these houses would cost about \$2,000, but the recent rise in the prices of materials, labor, etc., has made it impossible to provide them at that figure.

The selling plan has been carefully worked out and, in addition to providing for the proper upkeep and use of the property, has a requirement stipulating that when a sale is desired the property shall first be offered to the Homestead Commission. It is hoped in this way to stabilize values and prevent property from deteriorating.

The lowest terms upon which it was found that property could be sold with safety was with a small cash payment and a nine per cent gross income on the balance remaining unpaid, divided into monthly installments. This figures out to approximately 75 cents per month on each \$100 of the face value of the mortgage. Thus, if the indebtedness remaining after the initial payment amounted to \$2,000, the monthly installments would be \$15; if the indebtedness was \$2,200, the monthly payment would be \$16.50, and for \$2,400, it would be \$18.00 a month.

The Commission consists of the director of the Bureau of Statistics, the bank commissioner, the president of the Massachusetts Agricultural College, one member of the State Board of Health (to be elected by the board), and three other persons, to be selected by the Governor, with the advice and consent of the Council.

It is vested with the authority to take or purchase in behalf of and in the name of the commonwealth a tract or tracts of land for the purpose of relieving congestion of population and providing homesteads or small houses and plots of ground for mechanics, laborers, wage-earners of any kind, or others, citizens of the commonwealth; and may hold, improve, subdivide, build upon, sell, repurchase, manage and care for such land and the buildings constructed thereon in accordance with such terms and conditions as it may determine upon.

While the project has not yet reached the point where its success or failure can be accurately predicted, there seem to be no substantial reasons why it should not work out satisfactorily. Undoubtedly, in the light of accumulated experience, slight modification may be made in the original plan of the commission, but they are taking a step in the right direction, and those concerned with industrial housing problems will watch their progress with no small degree of interest.

(To be continued.)

The Status of the Architect

HAS the architect any status at present in the housing problem? If the answer is in the affirmative, a second question is pertinent. What is it? If these two questions were to be asked generally, it is feared that in the majority of answers, while the profession would be accorded a place, the grade of that place would be very low.

The status of the architect has always been a matter of question to the lay public. To many he has seemed but a soulful artist, intent upon the creation of visionary, idealistic dream-buildings, and highly contemptuous of the unspeakable warehouses and other plebeian buildings which the humble client would have him plan. To others he has seemed a clever sort of person, who by some means edged his way in between owner and contractor and sliced off a neat share of profit on everything he undertook.

He has never, or at least seldom, made himself the indispensable factor in the building industry that he might well be. He has lost sight of his essential relationship to the building problem in his function as master builder, and has acquired little else to take its place.

There is much discussion latterly of the high handed way in which architects are being ignored in the present crisis, which brings to the mind of the observer the well-known and much-quoted:

"If a man write a better book, preach a better sermon, or make a better mousetrap than his neighbor, though he build his house in the woods the world will make a beaten path to his door."

Even in these evil times it is pretty generally admitted that real worth and service are recognized as such, and the man who demonstrates his worth in this greatest of present-day architectural problems—the question of industrial housing—will find himself with other and weightier things to do than to rail at a fate which leaves him useless and unemployed in this hour of the nation's need.

Episodes of the past year have indicated that the architect, as such, has had no status. Not that he should not have, for by all rights he should be the mainspring in all operations of this character. Why is he not? There is nothing extremely difficult architecturally nor insoluble practically in the problem of housing workmen. If it were a question of the development of a country estate, or a city house of large and expensive proportions, the architect would feel at ease and would set about the task with composure of mind and complacent poise of manner.

But in the case of the industrial project this cannot be said. Why cannot this be done?

What the architect should be asking is, "By what means can this be done? What must I do or be in order to take an active professional part in the world's present-day affairs?"

First of all, he must forget, for the time being, that he has been a planner of houses, and become a planner of towns and cities. He must have vision to see the scheme in its entirety, view it from all angles, and particularly from the angle of the workman who is to be the deciding factor in its success. It is no small task that lies before the architect if he would be the brain directing the housing of this nation.

The architect has always been more or less of a financial agent in matters of building, in the way of his accounting to the owner for funds expended and the like. Now he must be more. He must be a financial *authority*, with complete information concerning all possible schemes for the floating and furthering of housing projects at his fingers' ends. And after they are built the various means of disposing of these low-cost houses to their occupants must all be within his sphere, together with the other financial problems bound to arise.

In his relationship to the project as house and city planner, the element of efficiency creeps in. Here we have another phase of the architect's influence; he must be an efficiency expert. This is a need which will grow even more vital as the element of standardization enters into our lives. It is obvious that if one type of structure is to be adopted for repeated use it should embody the best artistically and structurally, and yet the simplest and most livable principles obtainable, and must work for the efficient welfare of the home worker regardless of all else. For one woman to wear out her life in the pursuit of her labors in an ill-planned house may be a negligible matter—for a thousand houses to be designed after the same pattern is a crime against society.

This applies equally to the laying out of the town. Not only must there be attractive laying out of streets and parkways, but there must be economical and well advised disposition of the city's constituent and vital elements—a strong regard for the *practical* as well as the beautiful. This means, of course, a familiarity with workingmen's needs and problems, with his mode of life and his idiosyncracies. It is probably safe to say that not one in a hundred architects knows in more than a slight and super-

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ficial way how even an average American workingman lives, to say nothing of the many other nationalities of which the laboring class in this country is composed.

This is, perhaps, the most vital essential of the whole question of housing. The architect must familiarize himself fully and intimately with the workingman's point of view, his requirements, and how he wants or should want to conduct his household affairs, before he can hope to cope successfully with the problem. Different nationalities require very different architectural treatment, and the various classes of labor must each be given due consideration. Some foreign types are not happy away from their huddled, gregarious lives. For them the multi-family type of house, after a repeat pattern, could be used with success. For the higher waged, comparatively well educated skilled mechanic nothing but the single—and preferably detached—house will do.

There is also the legal aspect of the matter on which the architect must be fully informed. This, too, has previously come more or less within his province, but there is now even more occasion for his thorough familiarity with building codes, housing laws, contractual relationships, and all the many other points of law arising in connection with this problem.

It would seem that this is a "large order," and that in undertaking to be responsible for all these matters the architect might have too much upon his hands, but in actual practice it would doubtless be found that these various problems would be so coordinated and inter-related as to work out in a very natural manner.

Certain it is that if the architect will make himself master of all these points, his indispensability in the world's affairs, and particularly in the housing of this nation's workers, will not be disputed.



BRICK COTTAGES, ST. ALBANS, ENGLAND.

(Courtesy The Architectural Review, London.)

Notes on Space Economy in Housing

THE architect who would plan houses for mill operatives must place himself between an upper and nether millstone. Under his feet are the laws of economy and order; over him hangs the weight of habit and prejudice. If he rests his work on the former, the conservatism of those who are to buy the houses will defeat the enterprise. If, on the other hand, he follows accepted rules of housekeeping he can never work out a plan that will meet the present market requirements for cost. The price of labor and material makes necessary every possible economy in construction consistent with a strong, durable, comfortable home.

As a point of departure he starts with the American standard—parlor, dining room, kitchen, china closet, pantry, bedrooms and bath. This is the upper millstone. He meets it with the hard logic of bare necessity in housekeeping to see what compromise can be ground out.

First, the family must have a common room in which they can gather together at will. To call this a parlor fills the inward eye with crayon portraits, drawn shades and a faint odor of stale furniture polish. The room that we want to describe is a living room. It must be large enough to provide suitable space for a table, chairs and a phonograph or piano.

Second, the family must eat. It can eat in the kitchen, or it can eat in a dining room, or it can eat in one end of the living room. In fact, it can eat in the middle of the living room, so long as proper floor space is provided.

Third, the cooking can be done in a kitchenette better than in a larger room. Fewer steps are required and everything can be arranged for maximum convenience for preparing and handling food. The cooking can be done in one end of the living room. One room thus serves for living room, dining room and kitchen.

Fourth, the bath, whether it is used or not, is an essential feature. Even if it does not insure cleanliness it at least makes it possible. Hot water is hardly less important, as no one is likely to appreciate a tub not provided with it.

Fifth, the bedrooms must each afford room for bed, bureau and chair. Instead of bedrooms, a sleeping balcony inclosed with glass and large enough for the whole family can be used in connection with two small warm dressing rooms and a bath room. This is one of the practical things that does not yet appeal to the average housewife. Double-decker beds to increase the capacity of bedrooms for children is another very reasonable feature which is not usually made use of.

For all these rooms the standards of size, light and air have been carefully fixed by housing experts, but the height has been placed at a figure which may well be challenged. Seven and a half feet is as good as eight and a half if the windows are closed, and better if they are open. The lower height gives an apparent greater area to the room, and better proportions. The charms of the Wayside Inn would be dispelled as the ceilings rose to proper "housing" heights. The lower stud has a strong influence on the outside appearance of the house, giving it broader and pleasanter lines. As for the ventilation, if none is provided, there is little choice between a room with 7 ft. 6 in. head room and one with 8 ft. 6 in. or 9 ft. If the room is ventilated it matters not what the height is. It costs much less to add a flue to each room than to add two feet to its height. In the face of all these advantages of economy and exterior and interior beauty, any question of hypothetical superiority of atmosphere can be dismissed.

Along with economies in the principal rooms come certain requirements, by the way. Let us draw them up for review:

(1) Front porch. Many well-to-do house builders omit this and substitute a double door. It is desirable to have a front porch but not essential. The back door is in much more constant use. The addition of a storm door on the front of the house can be left to the future owner to take care of if, as, and when he is able.

(2) Back porch or vestibule. Some such space is absolutely essential for the ice box, outside clothes, etc.

(3) Bulkhead. The cheapest and best access to the cellar is by a back door located on a landing part way down the cellar stairs. This door can serve as the back door to the kitchen as well.

(4) Stairs. One flight only can be afforded. If winders are used, take care to permit room for the passage of a bedstead, spring, etc., 2 ft. 8 in. is about the minimum width, and 8 in. rise by 9 in. tread the steepest cut that is safe.

(5) Pantry and china closet. Storage for supplies and dishes must be provided. This can be done not only by furnishing separate rooms, but by cabinets, built in or of the "Hoosier" type.

(6) Bedroom closets. A dark inclosed space is not likely to encourage neatness or cleanliness. Imagine the front wall and door of the closet omitted, and the resulting alcove is ideal. The neat housekeeper can hang a curtain across the opening and the untidy one will have her untidiness staring her

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in the face. The light and air will make it less noisome, and the cost of wall and door will put in a register in the bathroom floor, over the kitchen range.

(7) Linen closet. Shelves must be included in the upper hall for sheets, blankets and other bedroom supplies.

(8) Piazza. To omit the piazza is a grim necessity. There are two ways of making its absence less of a hardship. One is to provide windows on three sides of the living room, the other to plan for the easy addition of a piazza by the owner when he can afford it.

All the economies noted above and others besides must be introduced into the plan of a workingman's house if it is to come within reach of his purse. Houses such as those already built at Bridgeport, Akron, etc., are in every way excellent, but, as they cost in the vicinity of \$3,500 to \$4,000 to build they

do not come within reach of the average wage earner. They represent a rental value of about \$30 a month. The vast majority of wage earners cannot afford more than \$20 a month in rent.

It is not difficult to produce \$4,000 houses, but it is very difficult to reduce the cost so that the houses can be sold for \$2,000 or even \$2,500, and not spoil the house as a home. It means the saving of space as outlined above and as exemplified in such houses as Massachusetts is building through her Homestead Commission. Even these are out of the reach of great hordes of low-paid workers in our American cities. For this part of our population an independent homestead and plot of land is not at present possible. There must be a slow moving up along the line. Good housing of any character, whether calling for rents of \$20, \$25, \$30 or \$35, will help. Readjustments will follow automatically.

Preserving Community Standards

By WM. ROGER GREELEY

A HOME cannot rest on its own foundation alone, not even a rock (or a Rockefeller) foundation. The neighborhood makes or mars the home. A constant adjustment is going on to regulate the character of the "locality." The chain is as strong as its weakest link, and when the first 3-decker invades the residential district the die is cast; the residents voluntarily depart to make room for more 3-deckers. The loss of values attending such a change is very large. It would seem that regulations tending to stabilize community standards are a public benefit. The list of such regulations is worth enumerating.

1. Zoning and districting, *i.e.*, establishing zones or districts within which development will be limited to certain uses, such as residential district, farm, market garden, industrial and commercial districts, etc. The value of such order should be obvious. Some of our State constitutions, however, do not even permit it. In a limited way the health power in regard to public nuisances accomplishes something of this kind. Piggeries, rendering plants, and dynamite factories can be kept out of residential areas. So far are we intelligent.

2. Restrictive building codes: Codes requiring reasonably high standards of construction, and prohibiting classes of buildings subject to rapid and heavy depreciation help to insure neighborhoods against calamitous slumps in value. Cities and towns that have already suffered are adopting such

codes. Only here and there, however, is the stable door being locked in advance of the loss of the horse.

3. Insurance standards. Much can be done through insurance to encourage proper building methods; and still more could be accomplished if we could have a system of co-insurance which would promote carefulness and responsibility instead of the reckless carelessness and even deliberate destruction encouraged by the present system of complete reparation for loss.

4. Social standards. The community that is composed of home owners is much more stable than that made up of people occupying rented quarters. On the whole, the owner is more likely than the tenant to treat the house well. As between owning and renting, the latter offers one great advantage to the employee. He can gather up his belongings and move on to a better job very easily. The advantage of home ownership and of renting are, of course, combined in the co-partnership plan. If a man owns a "share" in his neighborhood entitling him to the use or practical ownership of a house, and at the same time can sell this "share" or "turn it in" at full value at any time, what more can he desire? There is a further benefit. His interest does not limit itself to his own acre. He is a part owner of the whole neighborhood, and as such will keep a citizen's eye on the common expenditures for roads, parks, etc.; and will scarcely accept mildly

the conduct of a neighbor who leaves his garbage uncovered on the sidewalk or allows his boy to break the street lights and twist the signposts. The coming citizen of a town or state can have no better training than as a co-partner in a community. If it does not teach him to love his neighbor as himself it will at least bring him to think of his neighbor as well as of himself.

5. Beauty. Poor "Beauty"! What crimes have not been committed in thy name? Nevertheless, beauty remains as the one most important element in elevating the standards of a community. The little group of houses that are pleasant to look upon that awaken pride in the owner's attitude toward his home, that inspire the envy of the people who are housed in tawdry tenements and uncomely cubicals, that are admired by the passerby; these will always bring a good price, be occupied, and will be a bulwark of respectability and high character for the neighborhood.

Extravagance is not necessary. Neither the Crews House nor the Cape Cod cottages show a trace of it, and yet they are music in the landscape.

The American who leaves out of consideration in his housing development the element of beauty will

be a 19th-century American, not a 20th. His efficiency will fail. There is much in life besides a room at 70 degrees, an oven full of food, and an enameled iron bath tub in one of a thousand rubber-stamped cottages. Make it look like a home, give it grace and modesty and a protecting roof. Efficiency isn't all. For a wife, for instance, efficiency demands a cook and a muscular washer-woman all in one, but a man prefers to take a long chance on a butterfly.

Here are five elements that may contribute to the maintenance of high standards in a community. They can be achieved only by the use of one faculty, foresight, or, to use a semi-technical word, planning. The planning must be comprehensive, too. It must include all the above elements, and many minor ones. The community that we have got is the result of indifference, neglect, greed, graft and complaisance. The community that we want to have in all our cities is a little better than the best one that we can plan out in our minds.

Let us use our minds fully and put our hearts into it, too.

"He builded better than he knew,
The conscious stone to beauty grew."

The General Housing Problem

Its Importance, Magnitude and Character

THIS nation has plunged into the midst of the greatest war that the world has ever known; we are learning—slowly but none the less surely—that armies and navies are not the only factors in the successful prosecution of warfare. They are, after all, simply cogs in the big machine. The power that drives it and makes it effective lies back of the military branch, in the forces that provide the necessary munitions and supplies.

It is axiomatic that "A chain is only as strong as its weakest link." It is also true that a nation whose military forces are in all respects excellent may still be far inferior in effectiveness to another in which these forces may be only mediocre, but whose whole organization, military and industrial, is thoroughly co-ordinated.

Since we have entered into active participation in this war we have accomplished wonders, according to unprejudiced authorities, in the development of our army and navy, and this makes our failure, so far, to keep pace on the industrial side the more

apparent. In the production of munitions, arms and airplanes—all fields in which we should excel—we are far behind, and the fact that we are is seriously limiting the effectiveness of our military efforts.

The causes for this failure are many, but they can, in the main, be reduced to two fundamentals: the lack of co-ordination of labor and the lack of housing for labor. There is a vast army of mechanics which must be concentrated in both old and new centers of manufacturing. Unless these two lacks are overcome in the near future it will be impossible to secure and retain the workmen who are necessary to carry on the various branches of this work rapidly and effectively.

The problem of housing has been urgent for some years, but the enormously increased demands caused by war conditions have raised it from local to national importance.

It has been estimated that to provide adequately for the present housing demand an expenditure of \$2,000,000,000 would be required, a sum manifestly

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too great to be expected from private sources; therefore some sort of aid from public funds must be devised.

The housing needs in the metropolitan district of New York can well be taken as representing, in a modified form, that of all the other congested centers in the country. The following data will give some idea of conditions there. South of the Harlem River and north of the Battery, and bounded on the east and west by the East and Hudson Rivers, there has been practically no tenement house construction undertaken in the last four years; while in Queens and Kings Counties, the Boroughs of the Bronx and Richmond in New York City, and in Hudson, Bergen, Essex and Union Counties in New Jersey, not to exceed 1200 houses have been erected in the last eighteen months. These areas comprise practically the entire Metropolitan zone.

Statistics show that in this zone there is normally an annual increase of housing facilities needed of 250,000 rooms, or the equivalent of 50,000 houses, counting five rooms to the house. This increased demand is created: by removals from the congested districts, which reduces the per capita occupation per room; by the necessity for providing quarters for the newly married, estimated by census reports to be in excess of 50,000 per annum; by the constant migration from smaller communities to the New York district, because of the imagined greater opportunities there; and lastly by the annual excess of births over deaths.

To keep pace with this demand an expenditure of \$12,500,000 per month would be required, whereas there has been only \$2,500,000 expended in the last year and one-half. Based on the facts true of this district, which, as already stated, is typical of all, there is to-day a national shortage of 600,000 homes, calculating five rooms to a house or the equivalent in larger and multi-family houses.

Surely only a little study of these figures will be sufficient to impress on the most doubting "Thomas" the importance and magnitude of the housing problem and the necessity of solving it without delay.

Until recently any mention of character in connection with workingmen's housing would cause merriment; but fortunately that attitude is passing away. Some of the brightest minds in the architectural profession have taken up the study of housing and are finding that, instead of a simple, uninteresting question, it is one full of complexities, and, properly approached, is as full of interest as any other problem in the architectural field.

In the past, as far as can be judged from reports of housing associations and contributions to housing literature, particular emphasis has been placed on the provision of homes for paupers or near paupers. This failure to take account of the decrease in these

classes, owing to the high wage rate for the past decade, is a false premise; to attack the problem from a philanthropic angle shows a lack of understanding that is as much of a hindrance to ultimate success as is the disregard of the changing type of mechanic.

In order to secure success, two fundamentals must be incorporated into every housing proposition: a practical, financial return, both to the creator and to the eventual owner, and such home surroundings as will be a growing source of satisfaction to the latter. It is only by effecting these conditions that there can be found, not only a solution of the housing problem, but of the excessive labor turnover, now prevalent in almost all manufacturing plants.

Standardization

THE word "standardization" presents to the mind an image of something which may be useful, economical and capable of serving the purpose for which it was intended, but which is uninteresting and monotonous. Yet standardization is undoubtedly the keynote in the construction of workingmen's houses.

The fault lies, however, in the wrong application of the word. What is really meant is the utilization of the principles of standardization in this connection. For, if the successful solution of the housing question is to be found, all efforts must be guided by the consideration laid down in the essential character of the problem—i.e., economy of construction. Standardized construction methods must be used, not that standardization shall be the end in view, but that a reduction in the amounts of all materials used may be secured.

The problem before the American architect is much more complex than that with which his *confrères* in England and France are confronted. In those countries the labor class, as a whole, is practically of one nationality and has uniform habits of living. In America, we have people of almost every nation under the heavens, each differing in more or less essential points in its habits; and these habits have been bred into them and their descendants for generations. A standard plan, therefore, must be sufficiently flexible to permit such minor modifications as will allow some deference to their desires.

This is not an insoluble equation, for as in a mathematical problem there are certain different elements which must be reduced to a certain denominator, so in planning elements exist that are common to all similar undertakings and the task will be to reduce the unusual elements to a denomi-

nator which will allow their incorporation without disturbing the main standard to any great extent.

In thus standardizing the plan, the application of that principle to every material that enters into the construction must always be borne in mind. Only timbers of such lengths and sizes should be required as conform to the dimensions commonly cut by all mills, so as to reduce to a minimum not only the labor at the building, but also the waste at the mill and site. In the same way mill work, plumbing and heating apparatus, lighting fixtures and everything else, including the labor of putting the materials in place, must be studied to cut from the cost every penny that can possibly be saved.

The principal decorative features in design from which effects can be secured are the fenestration and the mouldings. Manufacturers of these materials have stated, in response to inquiries, that in operations of sufficient magnitude minor alterations in the present standard sizes could be made without increase in cost, provided such variations did not require unusual lumber sizes or intricate labor, and there is no doubt that manufacturers of other materials would be willing to do the same in their lines.

This is, of course, based on the assumption that the group will be sufficiently large, either as a single unit or a combination of units, to justify the study, from both an architectural and a manufacturing standpoint.

With these points in mind, standardization loses much of its terror, and it would seem possible to secure good architecture in this inexpensive work, thereby raising the standards of beauty among the working classes and at the same time removing the curse that the average workingmen's quarters inflict on the localities where they abound.

Some Causes for the Failure of Past Housing Experiments

INDUSTRIAL housing in this country is only in its infancy as yet and what has already been done, and much that has been suggested, is more in the nature of experimentation than it is of constructive value in solving the problem.

The problem is much more complex in this country than it is in the countries across the water, from the number and diversity of requirements to be met and overcome, and because of the variety

of nationalities that must be dealt with here. While we can, no doubt, obtain many valuable suggestions from what has been done over there, we must realize that these are suggestions only and must be re-studied and adjusted to our needs.

Americans, as a rule, have very little patience with anything that differs from their way of looking at a subject, so instead of studying a suggested change to get its good or bad points, they are very apt to cut it short by remarking, "Oh yes, that may be so, but it would be infinitely better for you to learn our way." This attitude has been very evident in all the housing projects with which we have come in contact either actually or through descriptions in the press.

Workingmen are human beings and not machines and as humans have their own standards and habits of living. In the majority of cases these have been developed in the school of personal experience so that in providing housing for them this must be taken into account, which has not been done in the past.

To say to any one, "You don't know what is good for you and have no right to think you do. We will do your thinking and give you what we think you ought to have," or words to that effect, creates a suspicion in the mind of the workman at once that there is some joker concealed in the proposition which he can't see, but which is sure to be detrimental to himself; therefore he will have nothing to do with it.

Another cause that often interferes with the success of a project is that the philanthropic phase enters into it. Any self-respecting man, whatever social rank he may occupy, strenuously objects to being considered from a charitable point of view in any way.

The high cost of many of the otherwise creditable projects is also responsible for failure. It has been carefully calculated that few, if any, workmen can afford to pay more than \$500 per room or a total cost for house alone of \$2,500. This in the present abnormal period of construction cost will be difficult to accomplish, but with study and careful consideration, and if on a large scale, it is believed it can be done.

Many other causes could be enumerated, but those mentioned cover the main reasons for the failures in so many projects; the others all lie along similar lines and logical thought on the subject will enable anyone to deduce them for himself

Fresh Air, Sunlight and Sanitation

IT is now a universally accepted fact that the working conditions, the mode of living and domestic relations produce a direct and measurable effect on the industrial worker. The growth of this idea has been quite rapid of late years and has been furthered by economical motives on the part of employers and by the gradual realization that every law-abiding man is, of right, entitled to certain things. To differentiate and weigh the value of these three elements is a matter of speculation to a great extent, but each is of importance.

The mode of living is affected to a very great extent by the character of the building in which the worker lives. There are certain well recognized essentials to decent living conditions. The first, of course, is protection from the elements, which is afforded by a bare structure. This bare house must be augmented to furnish the other essentials of heat, light, ventilation and sanitation. All of these things, to an adequate extent, are essential to proper human existence regardless of social status.

Daylight and ventilation are usually provided by the same means, the window. All living rooms, including bath rooms, should have windows opening to the street, alley, yards or courts having one side open to a street, alley or yard. The only rooms that might possibly open into an air or vent shaft are halls, pantries, closets and other minor rooms, and in all cases these air or vent shafts should have an open top and be of a sufficient area, based on the height of the shaft. The top of the windows should be as near the ceiling as possible and the window area sufficient to admit light to all parts of the room. To secure proper light and ventilation in houses built together in rows they should be not more than two rooms deep, possibly with halls, passages and closets between. All windows should have movable sash, double hung preferred.

Heat can be furnished by means of stoves, hot-air furnaces, steam or hot-water heating systems. Fireplaces as a means of heating are not desirable, except in the extreme Southern States, and at best are wasteful of fuel.

Houses without basements or cellars are necessarily heated by stoves. To heat an ordinary sized house properly with stoves requires from two to three fires, which is uneconomical owing to the difficulty of distributing stove heat. But in some climates stove heat is entirely satisfactory and the cost of installing other means of heating is not justified.

The objection to the usual installation of hot-air furnaces is based on unsatisfactory and variable

service. This condition is due to the ignorance or carelessness of the architect, when one is employed, and the failure of furnace contractors to refuse unitedly to install apparatus that cannot possibly be effective. It is generally customary to build a house and fit the furnace to it. This is as logical a proceeding as to build a house without reference to stairs and then to install a stairway after the structure is framed. The usual procedure is to place the vertical hot-air ducts in 4-in. stud partitions. This permits of a stock single wall flue of $3\frac{1}{2}$ in. x 12 in. or $3\frac{1}{4}$ in. x 10 in. in size, or a double wall flue 3 in. x $11\frac{1}{2}$ in. or $2\frac{3}{4}$ in. x $9\frac{1}{4}$ in. in size. Anyone conversant with the flow of gas or air through pipes readily understands that the effective area of these flues for passage of hot air is probably reduced 50 per cent due to the shape of the duct. This grave fault is easily overcome by using 6-in. or 8-in. studs in a short section of partition, at a very small added cost, or by carrying the round or square duct up in closets or other suitable places. The failure of the furnace contractor to insist on the necessities for proper installation is due largely to the competition permitted by the architect, which is a competition based on cost rather than service.

As a result of unsatisfactory furnace experiences, a new type of furnace, known as the pipeless furnace, has come into vogue. This apparatus simply delivers all the air heated by the furnace through one opening in the first floor, from whence it travels through open or cut-off doors to the various rooms as it may be able to do so. To heat a house by this means results practically in a one-room house, which is not in conformity with the needs of proper privacy. This radical departure will undoubtedly force the proper installation of the hot-air furnace, which can be done satisfactorily and operated with a reasonable fuel consumption.

The most direct and positive means of heating is the hot-water or low pressure steam apparatus. The first cost of installation is the greatest drawback to these methods of heating, which is in a measure compensated for by the saving in fuel consumption. In any event, the proper temperature of the house is a necessity which can be accomplished, and the method used must be selected with proper consideration being given to the climate, initial cost, upkeep and fuel expense.

The tendency of the present demand for plumbing equipment in the low-cost house is for a good and substantial grade of fixtures. The bath tubs are of the porcelain enameled type with 3-in. roll rim and feet. The size called for in the majority

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of cases is 5 ft. x 30 in, fitted with combination double compression bath faucet, connected waste and overflow, chain and rubber stopper. In some cases galvanized iron supplies are used to effect a small apparent economy, but the tendency is to use the standard nickel-plated pipes. In some few instances specifications have called for recessed tiled-in tubs, but the cost precluded their use, and the added advantage of this type is doubtful. Some architects are considering the new type of concrete tubs, but there is a disposition to question the durability of this article, especially in view of the expansion and contraction that must take place during its use and the durability and sanitary effectiveness of the applied surface finish.

Lavatories are porcelain enameled, with slab, bowl and back in one piece, and with separate compression faucets. They are hung on concealed wall hangers and fitted with nickel-plated trap and supply pipes. The apron is used quite extensively on these fixtures. The sizes generally used are 18 in. x 4 in., although 18 in. x 21 in. is extensively used with an oval faced slab.

The water closets have vitreous china bowls of the siphon action wash-down flushing rim type, with

either porcelain enameled or wood-finished, low-down tanks. They are fitted with wooden open-front seats or with wooden saddle seats and covers.

The kitchen equipment varies, and the sinks used are either the enameled flat-rim sinks, fitted with wood drain boards and back, or of porcelain enamel with roll rim and integral back hung on concealed wall hangers. In this case the porcelain enameled drain board is separate and in some cases with integral back. Fittings consist of nickel-plated bibbs and trap. The sizes used are 18 in. x 24 in. and 20 in. x 30 in.

The installation of stationary laundry tubs is not so general, but where such fixtures are furnished two are provided. The soapstone, slate and porcelain enameled kinds are used, either with or without covers, according to whether the tubs are located in the kitchen or the basement laundry.

All of these things are essential, and to be effective should be carefully studied, not with the idea that anything is good enough for the occupant, but with the purpose of furnishing an equipment that will render maximum service with economy of operation and be substantial and durable in construction and installation.

Durable Construction an Essential Thing

"THE Deacon's One Hoss Shay" was, as it happened, so constructed that all of its parts depreciated uniformly and concurrently. When failure occurred, disaster was complete; there was nothing left on which to base a new vehicle.

A similar scheme of construction has apparently been adopted with great success—to the promoters at least—by the builders of houses to be sold. The vehicle, however, was built with an idea of permanence and durability, real value being the basic consideration. In the case of the "speculative building," the idea of permanence and durability is limited by the estimated time required to sell the building and to achieve an *appearance* of real value. Depreciation of all its parts is concurrently uniform, rapid and complete, and to repair the building means to rebuild it.

A very small percentage of buyers of homes are intelligent in the art of building and have knowledge of the use and value of building materials or workmanship. The great majority of home buyers, being ignorant in such matters, are exploited by the crafty salesman and deceived by the fresh paint, varnish and possibly by an element of sentiment.

It is apparent that the purchaser of a house built

for profitable sale must be the loser, and the quality of the houses so built is responsible for the growing idea that a person cannot afford to own realty in the form of dwellings. A majority of such purchasers buy on some kind of a deferred payment plan; by the time the deterioration begins to develop, they have a sum invested that they cannot afford to forfeit; and on completion of the purchase contract they possess a structure scarcely worthy of possession. It is a desirable thing that people live in their own dwellings and this is well understood. The problem now is to make the possession of a dwelling desirable.

It goes without saying that reputable and conscientious architects are not party to the reprehensible exploitation of ignorant buyers. In fact, architects are seldom employed in the planning and construction of the numberless houses annually built for sale. These plans and specifications are generally prepared by a draftsman employed by the builder or are the output of some publications or producers of building materials. In localities where the profession of architecture is licensed, plans and specifications, properly sealed, can be secured and used. These plans are purchased outright without supervision of construction, and there is no check

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by the architect nor by municipal inspection, on the quality of the material and workmanship.

While many architects do not cater to this class of work, except in large projects, there are many to whom it is a desirable element of their business. In a measure their sphere of influence is restricted to personal contacts and they are helpless to combat the deplorable conditions existing in this field of activity. Opposed to the idea of returning real value for money invested, is the persistent and craftily managed campaign of certain trade journals, house organs and display advertising to stimulate "build now" and "own a home" propaganda, causing the credulous reader to buy ready-made plans and use the material so convincingly exploited. The basis of these representations is a promised economy, which leads the supposedly clever buyer to think he will enjoy an advantage which his common sense should show him cannot exist.

To correct these evils, organized effort is necessary. Valuable and necessary action can be taken by architectural organizations in the way of articles, display advertising and the spoken word in the form of addresses wherever possible. The ad-

vertising can be done by the association, calling the prospective purchaser's attention to his lack of knowledge and the desirability of having the structure properly inspected as to its construction, the fitness of the materials used and the workmanship, this inspection to be the basis of a detailed report. Effort should also be made to instill the idea that all things possessing value are worth money and cost money, and that durability is secured only by adequate investment. Such action will result in architects being so employed, and while employment in that way will yield no great profit it will ultimately force the speculative builder to erect properly constructed houses and probably to advertise them as having been planned and supervised by reputable architects.

As an improperly constructed house is a waste, which like all other wastes should be eliminated, this condition must be abated. It can be accomplished only by united and forceful action along a well organized plan of action. Not only should the element of waste be eradicated, but the element of protection to the uninformed is worthy of our best efforts.

Costs Will Not Decrease

Building material costs are adjusting themselves. People who have an interest in construction generally are beginning to understand that the days of low cost—if they ever come again—are far distant. The war has caused a huge increase in everything that goes into building. The increase thus far has been excessive, it is true, but not so excessive as some may think.

Labor prices will remain high for a long time. The decrease in men through losses in the war, the rebuilding of shattered Europe, even after peace comes, and the consequent demand for labor, means that, under the working of the inexorable law of supply and demand, labor is going to be high for a long time. This applies both to skilled and unskilled labor.

For practically the same reason material costs are going to remain high. It will not only be because of the manufacture of war necessities, but from the demand for peace necessities which will come after the war. Institutions of production have been destroyed and will have to be rebuilt. Demands of an extraordinary nature have been made upon every branch of industry and production, and factories which have supplied these demands have been demolished in the war zone, while others have been converted to other uses.

In short, all industry has been metamorphosed, and to get it to a sound basis will mean the consumption of huge quantities of material, aside from that directly required in the process of reconstructing that portion of the world shattered in the war. That means a continuance of high building costs.

Now, what will builders do? Inevitably they must adjust themselves to changed conditions, and they are already beginning to do so. They are realizing that high costs are stable now, and they must predicate future operations upon high costs. That does not mean a restriction of building. It really means an extension, and, once the people interested get the idea out of their heads that by waiting they will save money in material and labor, they will adjust themselves to changed conditions.—*National Real Estate Journal*.

Labor, and Again Labor

No subject, comments *Engineering News-Record*, recurred so frequently at the recent meeting of the National Chamber of Commerce as labor. One heard it in the presidential address, in the great speeches by Secretary Lane, Secretary Daniels and the Earl of Reading, in a number of committee reports, in sessions devoted to the industrial situation, and in those given over primarily to quite for-

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eign subjects. There were progressive views and some that were radical; conservative views and some wherein the old antagonism was struggling to the surface. The speakers divided easily into two classes: those with courage, who faced the facts and were willing to strike out and, against the opposition of their own friends, advocate with hope and confidence a forward-looking policy; and those who reluctantly admitted that some steps had to be taken to meet a serious situation, but grudgingly fought concessions every inch of the way. While both classes were heard—the extreme conservatives trying to camouflage their toryism by sounding occasionally a progressive note—we believe that the sentiment of the gathering, so far as it was given expression, was decidedly progressive. Possibly Dr. Marshall's repeated thought that labor must be regarded and studied as a factor in production—a truly engineering conception—would have received the approval of a very large majority, had there been opportunity to register the sentiment. The outlook, therefore, for an intelligent consideration of the labor problem would be most encouraging if those in attendance at Chicago were truly representative. As a matter of fact, though, we believe them to be the progressive element in the industrial world. The conservative element is not so ready to enlist through chambers of commerce in community service. Nevertheless, the fact that so large an element in the business world is forward-looking is significant of the changing sentiment.

Future Economic Relationships

France recognizes clearly the double character of her future problem, states the *Guaranty Bulletin*. She must restore the country itself and re-establish its necessary and profitable relationships with other countries, and it is noteworthy that she looks to the United States for help in doing both. She proposes to place in this country those vast purchases of raw material, building supplies and machinery which she must have, and which she cannot get from her own colonies, and will not be able to get in sufficient quantities from other nations engaged like herself in the work of rehabilitation. She proposes to pay for these things and to meet the debts she now owes by selling to this country not only an increased quantity of those things in the manufacture of which she excels, but also those things for which this country in the past has looked to Germany. In her present temper France refuses to consider the possibility of resuming purchases of raw materials in Germany, as before the war, and she is so confident of what our feeling will be after more extended contact with the common enemy

that she believes we shall rather buy from her than from Germany. Whatever may be the hopes of mankind with respect to a political league of nations after this war, it is evident that in France, as in England, there is a disposition among financiers, manufacturers and business men to eliminate Germany when proposals affecting future economic relationships are under consideration.

Sheet Steel Replaces Linen in Aeroplanes

Seventeen thousand tons of what is believed to be the thinnest sheet steel ever rolled are being turned out by one steel company for the United States Government, and will be made into wings for fighting planes on the Western front. The material is to supplant the linen fabric wings now in use.

Sheet steel is described as being thinner than ordinary paper and very flexible. It is expected to minimize the danger from bullets, for instead of the jagged tear which a bullet produces in a linen wing, and which the wind enlarges, a clean-cut hole is made in the steel which neither endangers the aviator nor hampers his movements.

U. S. Women in Industry

A comparison of the work of women in this country with that undertaken by the women in France and England, in replacing the men at the front, shows that American women are willing to attempt any work that seems needful. The Woman's Committee of the Council of National Defense states that, "there are 1,266,001 women in this country to-day engaged in industrial work necessary to carry on the war, but we have just begun." The figures show an increase of 20 per cent over normal times.

Goldwin Starrett Dead

Goldwin Starrett, senior member of Starrett & Van Vleck, architects, New York, died from pneumonia, May 9, at his home in Glen Ridge, N. J. Mr. Starrett was forty-four years old.

One of the most important buildings designed by his firm was the Lord & Taylor Building, the Hill Publishing Company Building and the new building completed at Court and Remsen Streets, Brooklyn. Mr. Starrett was a brother of Paul Starrett, president of the George A. Fuller Company, building contractors. Another brother, Major William Starrett, a member of the Council on National Defense at Washington, was the architect who designed the national army cantonment buildings.

Bristol, America's Greatest Single Industrial Housing Development

By C. STANLEY TAYLOR

UNDER the supervision of Perry R. MacNeille of Mann & MacNeille, architects and town planners, of New York City, the new village of Bristol, Pennsylvania, is being built to house thousands of shipyard workers at the plant of the Merchant Shipbuilding Corporation.

At this time, when an insistent demand for additional industrial housing is being voiced by practically every manufacturing community throughout the United States, there is no longer need for arguing the merits of a properly housed working force. The truthful figures of labor turnover constitute sufficient and convincing proof.

In munition plants, Government arsenals and shipyards, the records of employment offices are showing a tremendous waste of capital and energy due to the constant shifting of men. Millions of dollars are being spent almost uselessly in employment efforts, traveling expenses and "breaking in" costs, only to see the workers, many of them newly trained mechanics, pass on to other and apparently more attractive places of employment.

Thousands of workmen, who for years have held steadily to their work, have joined the class of "floaters"—lured always by better wages and better living conditions. This is not the time, nor is an architectural publication the place, to discuss the wage question and its effect on the stabilization of labor—but the question of living conditions, which bears so importantly upon the labor problem, is one which the architects of America are called upon to solve!

Granting, then, the need for proper housing, the next question which presents itself is, "What constitutes proper industrial housing?" Many solutions are being offered, some having considerable merit—others verging upon the ridiculous. Unfortunately, the actual construction percentage is at present in favor of the latter type, owing to hasty and ill-considered action on the part of those in whose hands the decision has been placed. Certainly, as this question is considered, the ultimate conviction must be that the housing of workmen is in itself at once a science and an art worthy of the best intellectual and creative ability. It is not a science that can be learned easily, nor can the possession of the knowledge necessary properly to design and execute an industrial housing project be

assumed—even by those possessed of wide architectural and building experience.

The reasons for this are: First, that the properly designed industrial village must take into consideration an intensely human element, familiarity with which is the result only of long experience and study of social problems; and, second, that from the practical standpoint the designer must be possessed of peculiar knowledge of building materials and methods most suited for the construction of large and varied groups of dwellings, together with diversified architectural knowledge which will tend to fit the design to the human and geographical requirements which differ in each individual problem.

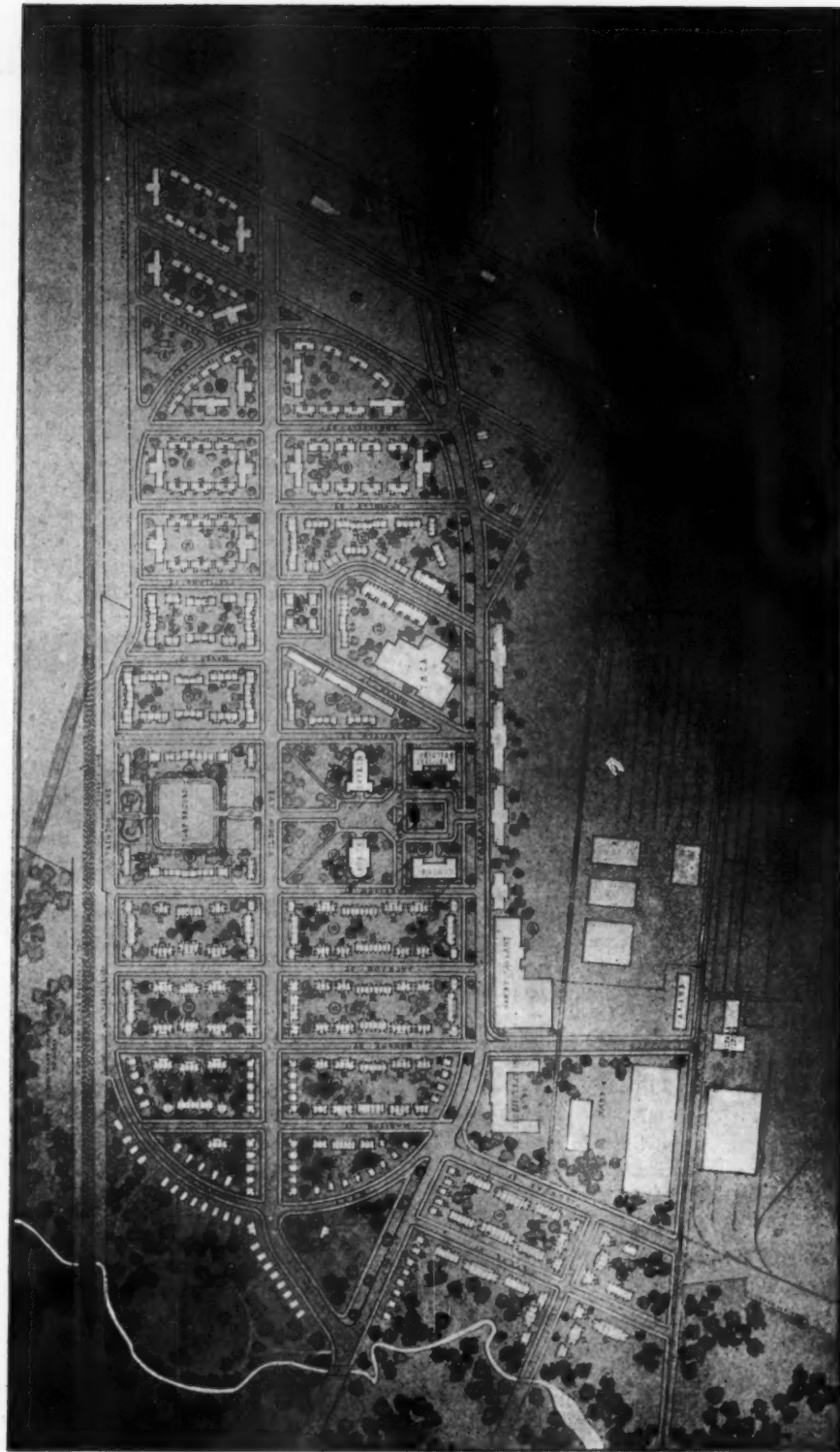
The proof of this statement can be found to-day in many of our industrial centers, where housing for workmen has been provided in unsightly rows of dwellings, possessed of no architectural merit, sometimes unnecessarily extravagant in cost, and usually not fitted for the occupancy. Many of these developments have become but slum districts. In fact, in this country the term "factory town" is graphic in its opprobrium, and the message it carries is one of unhappiness and unattractiveness. How different is the connotation of the terms "Port Sunlight," "Letchworth" and the "garden cities of England!"

Do we realize that at this time a national precedent is to be established in the matter of housing workmen—a precedent which is to direct vast building activities during a century to come, having an economic influence which is almost beyond conception? Good housing in its effect on the stabilization of labor and on the relations of labor and capital is a factor in national industrial progress which the Government, the manufacturers, and the financial interests of America, cannot afford to ignore!

Demonstrating, as it does, the existence of a comparatively new art (which is worthy of dignification as an important branch of contemporary architecture) great interest attaches to the work which has been done at Bristol by architects who have been pioneers in the development of good industrial housing in America.

The designs shown herewith, in town planning and structural features, show so clearly a recognition of the human element, together with factors of economy and utility, that this presentation is truly

PLAYGROUNDS, PUBLIC BUILDINGS AND PARKING DIVIDE THE VILLAGE OF BRISTOL, PA., INTO HOUSING FOR UNSKILLED LABOR (TO RIGHT) AND MECHANICS AND FOREMEN (TO LEFT)



In this group individual houses are for foremen and superintendents, while grouped single houses are for mechanics and skilled laborers.

Note housing blocks at extreme right are for single laborers, nearer park are located houses for married unskilled laborers.

HOUSING DEVELOPMENT AT BRISTOL, PA.

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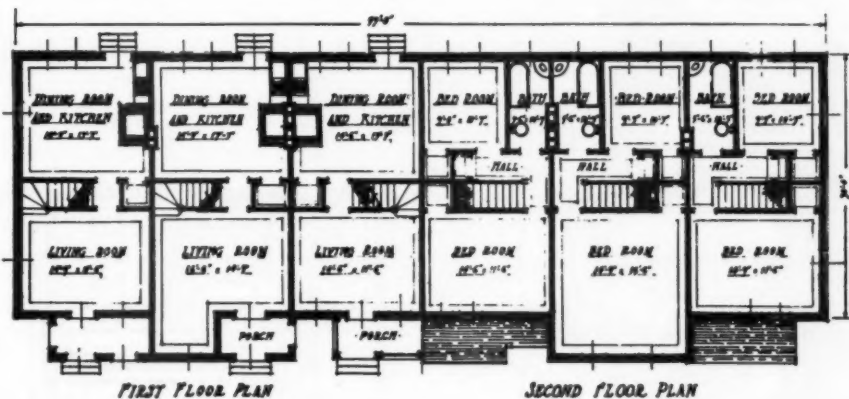
significant in its indication of a scientific departure in the broad field of American architecture.

THE BROADENED FUNCTIONS OF THE ARCHITECT

Before considering the work which has been done at Bristol, it might be well to take cognizance of the broadened functions of the architect when properly related to an industrial housing problem. In order

the responsibility, can a housing project be successfully and economically consummated.

The Merchant Shipbuilding plant, in common with many of the new shipyards throughout the country, is located in a small community where few available houses were to be found when the plant was made ready for operation. In selecting the site for a shipyard it is necessary to find a large



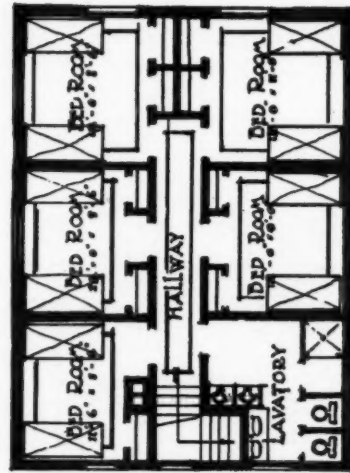
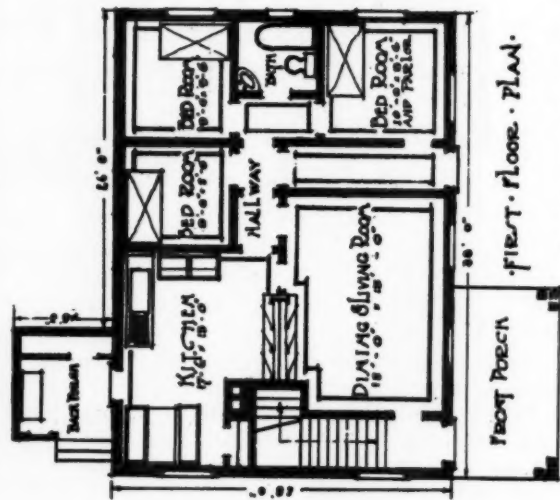
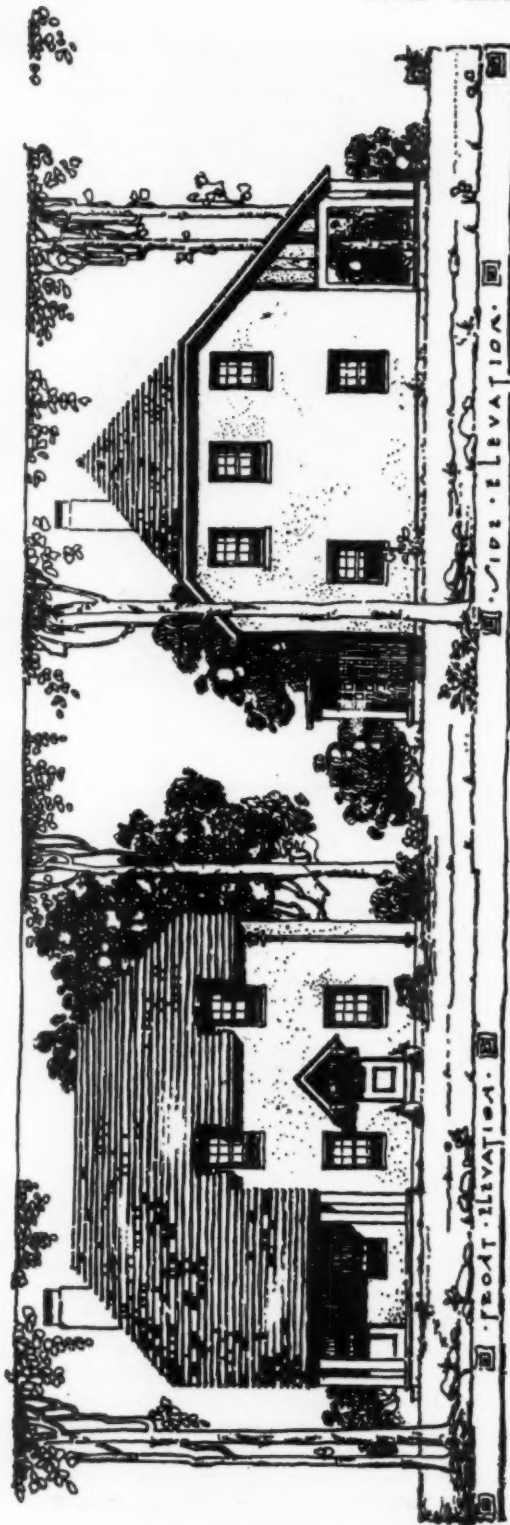
A SIX-FAMILY GROUP, INDIVIDUAL FOUR-ROOM HOUSES. BRICK VENEER AND CLAP-BOARD CONSTRUCTION WITH ROOFS OF SLATE

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that a project involving the construction of a number of houses, as well as other community improvements, shall be carried out with greatest economy and least waste effort, it is necessary that there shall be one head for the entire enterprise. This head is logically the designer, provided his knowledge and organization are sufficiently broad to handle all supervisory features, including engineering and material purchases as well as design and construction. In this manner only, by definitely fixing

tract of land, located on deep water, convenient to freight transportation lines connecting directly with raw material districts.

In view of the fact that no other industrial enterprise requires so many square feet of ground in ratio to the value of product it will readily be seen that land for a shipbuilding plant must be purchased at low cost. Large tracts of cheap land on deep water are not usually to be found in densely populated communities. Therefore, a housing problem



SECOND FLOOR PLAN.

1906.

FIRST FLOOR PLAN.

A Boarding House, in which the second floor is devoted to Boarders, two in a room, accommodating 10 men. On the first floor is located a large Dining Room and Kitchen for serving meals to the Boarders, and also a separate apartment for the House Keeper and his family, consisting of three rooms and bath, with private entrance.

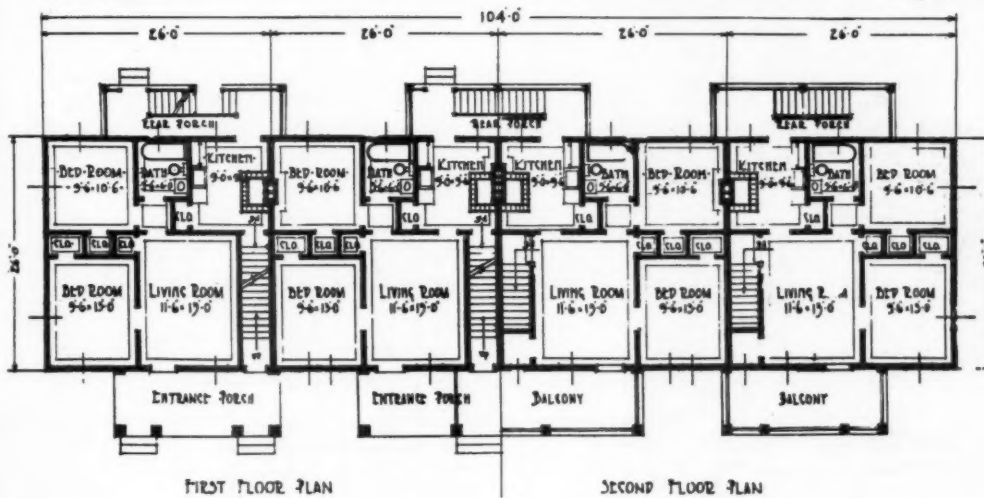
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is almost invariably connected with a new shipyard operation. Incidentally it may be noted here that failure to recognize this problem and to class housing for human machinery as a necessary plant investment is threatening the success and hampering the production of many American shipyards to-day.

Recognizing the housing problem in its early

seau for approval, and at that time he called in Perry R. MacNeille, the New York housing expert, to advise on the project. Mr. MacNeille investigated conditions at Bristol and reported that inasmuch as the Merchant Shipbuilding plant was to be a permanent institution the housing should be permanent and of good character, avoiding the



Eight of these 8-Family, 4-Room Apartment Houses, somewhat similar to the four-family house, are planned for this development. They offer the attractive features of privacy and the elimination of all waste space

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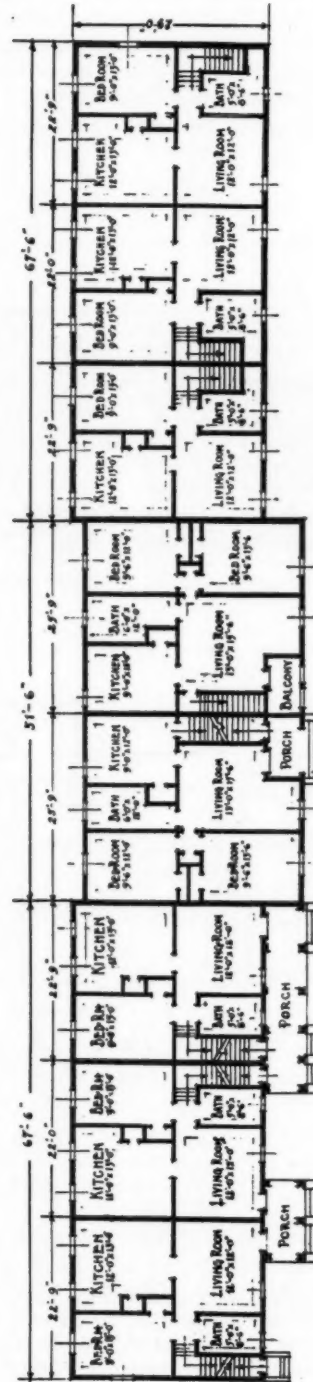
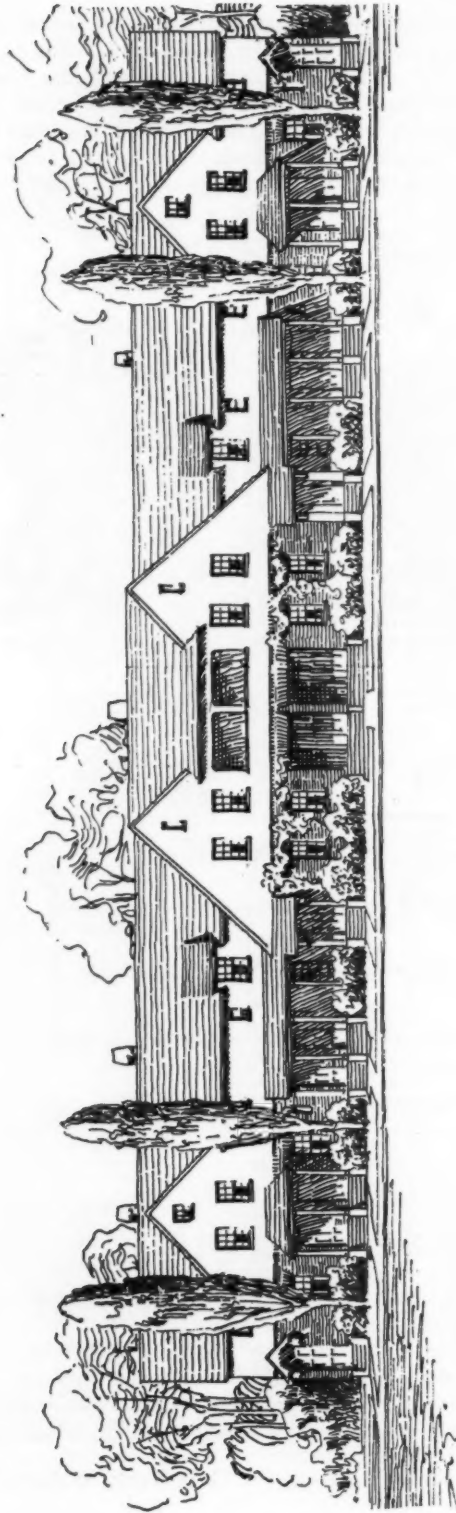
stages, the Merchant Shipbuilding Corporation decided to construct an industrial village to house a large number of its employees. The first plans drawn up were laid along the lines of a construction camp containing many barracks of similar design, monotonously located in rectangular formation.

These plans were submitted to Admiral Rous-

waste and dissatisfaction incident to temporary barracks construction.

Pursuant to this report Mann & MacNeille were asked to design a suitable workmen's village, and their plans are now being carried out, approximately one-half of the small city being nearly completed at this writing.

Under the direction of C. H. Pratt, in charge of



FIRST FLOOR PLANS SECOND FLOOR PLANS

A group of 16 families are housed in this apartment building, which gives the appearance of a row of one-family dwellings. The apartments consist of three and four rooms and bath, with individual front entrances, porches and cellars. The exterior is of brick veneer on the first story and of stucco on the second story. The roof is covered with slate.

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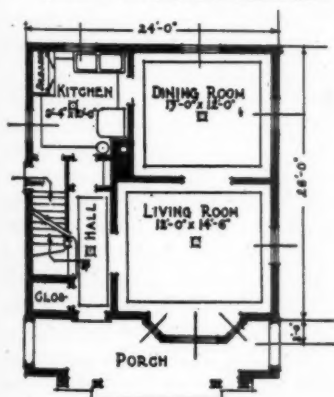
the drafting force of the Merchant Shipbuilding Corporation, the working drawings were made from Mann & MacNeille's designs. The necessary general and engineering supervision was carried out under Wilson F. Smith, Resident Engineer, Emergency Fleet Corporation.

The new village of Bristol lies adjacent to the Merchant shipyard on the Delaware River approximately twenty miles north of Philadelphia. In this village it is planned to house 3000 single and married men, and to provide all necessary community

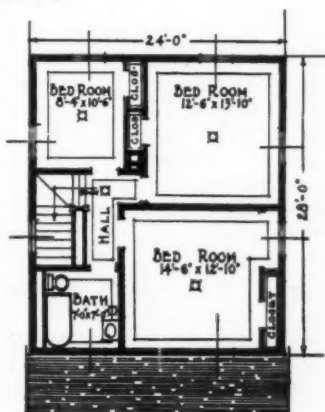
facilities, including schools, churches, stores, restaurants, parks, playgrounds and other activities. Of these men who are to be housed a large number are of the common labor type, married and single, while others are of the grades of skilled labor, mechanics, foremen and superintendents, who must be properly housed with their families.

TOWN PLANNING FEATURES

The first problem was naturally that of town planning, and, as will be seen by the accompanying



FIRST FLOOR PLAN



SECOND FLOOR PLAN

A six-room and bath foreman's house at Bristol. First floor features are large porch and entrance hall, living and dining-rooms *en suite*, side entrance for deliveries and access to cellar.

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illustration (page 600), great care was exercised to give full consideration to the human element and to geographical requirements. Having decided upon various types of housing for the different classes of labor, the village was roughly divided into two sections, one for the common labor and one for the higher grade occupancy. This division was then made in a natural manner, and with due regard to the avoidance of any resentment which might be felt by tenants, by providing parking, playground and public buildings and grounds as the natural division between the two sections of the village. This open space also acts as a fire-break.

It was decided to place the common labor at the end of the village nearest to the plant in order to avoid the passing through of the better section of the village by laborers going to and returning from work. This thought was carried out in more detail by placing the boarding houses for single common labor at the extreme end nearest the plant so that the single men would not pass through the family section of the common labor group.

The street layout was arranged to carry by most direct routes to the plant, at the same time giving easy access to the centrally located community buildings and stores. A central artery, Wilson Avenue, was provided for general traffic, and Trenton Avenue (paralleling the railroad), West Circle, Farragut Avenue, Taft Street and East Circle were laid out to form a rotary means of communication throughout the entire village. The various cross streets were then laid out, the peculiar design of the streets near the building designated as Y. M. C. A. (now being used as a temporary restaurant) being due to the fact that this building and some boarding houses nearby had been constructed before the town layout was designed.

The housing provided for single workmen is of the types shown in illustrations on pages 607 and 610. It will be noted (at the extreme right end of the town planning illustration) that the blocks for single workers were laid out with small units (twenty-man houses) along the streets and the larger units (sixty-man houses) at the ends. These buildings are placed in hollow squares, with parking in the center of each.

Next to these, and nearer the park and playground, were placed the apartment houses for married laborers. These buildings are of the various group apartment types, shown on pages 603, 604, 612, and are arranged in a similar manner.

On the opposite side of the large public space were then placed the individual house groups (as shown in illustrations on pages 601 and 614, designed for the occupancy of married skilled laborers and mechanics. Finally, at the western end of the village the single houses for foremen and superin-

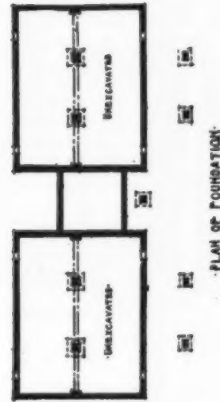
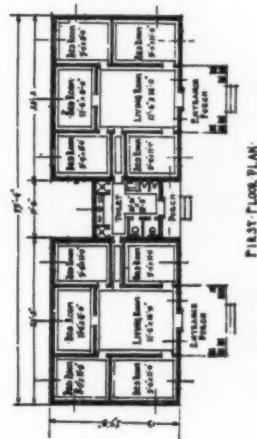
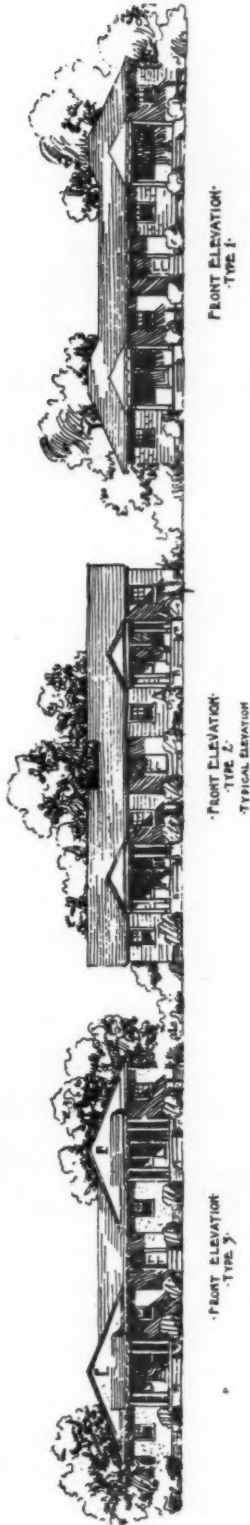
tendents (as shown in illustrations on pages 602, 605 and 609) were located, each with its individual plot of ground.

The progression in design and placement in ratio to nature of occupancy and income of tenant is exceedingly interesting and worthy of comment. First, the single common laborer, nearest the plant and occupying the least expensive quarters; next the married common laborers in attractive apartment groups, offering economy in accordance with income; next the mechanics in individual houses, but built in group form to attain economy, and finally the high grade apartments and individual houses for foremen and superintendents, whose income is larger. In this order the ratio of cost of construction and land increases. For the single common laborer the cost of construction runs approximately \$225 per man, with a small unit of land per occupancy. For the married laborer the cost runs approximately \$2,200 per family, with a small unit of land. For the mechanic the individual group house is provided, with more land, at a cost of \$3,500 per family, and for the foremen and superintendents, with larger land allotments, the costs run from \$4,000 to \$5,500.

DORMITORIES AND BOARDING HOUSES

The dormitory, as shown in illustration on page 607, has three elevations for the same floor plan, in order to avoid monotony of design. This building is arranged to accommodate twenty single men, and is undoubtedly one of the best designs which have been produced for the housing of single workers. The care with which the human element has been studied will be noted throughout all these designs, commencing with this building for single common labor. Each wing of the building is arranged to group the bedrooms around and give entrance to a living room, where the men can have a place to smoke, play cards and give vent to the gregarious inclinations of the ordinary man. A much better plan indeed than to be forced to sit in the bedroom or seek the saloon for a gathering place.

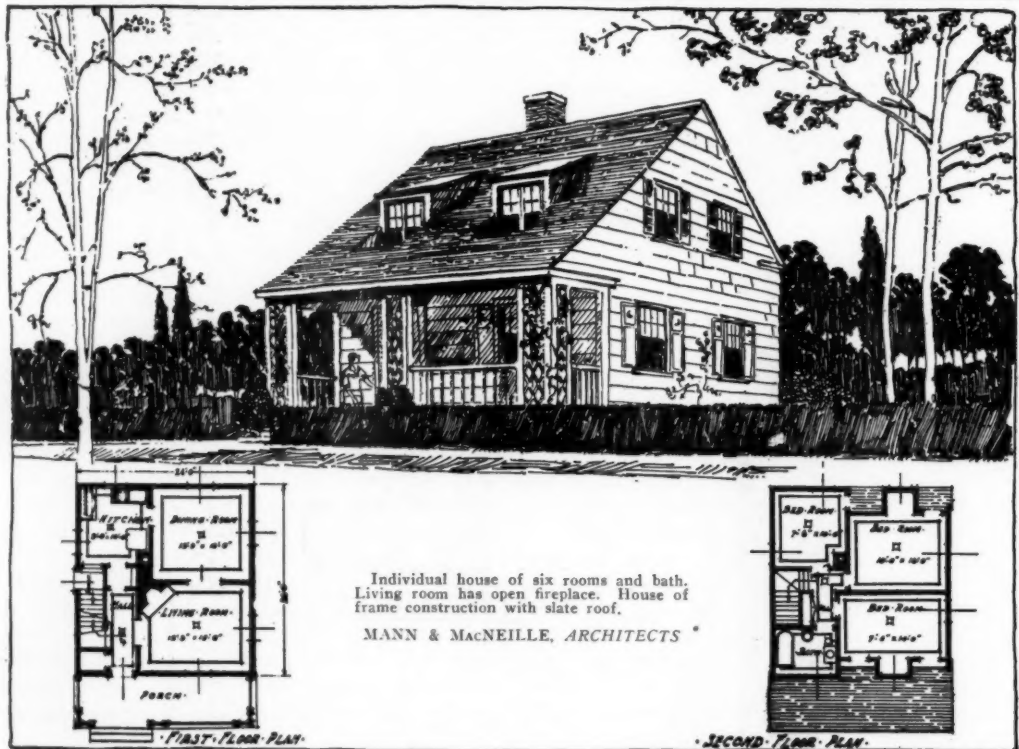
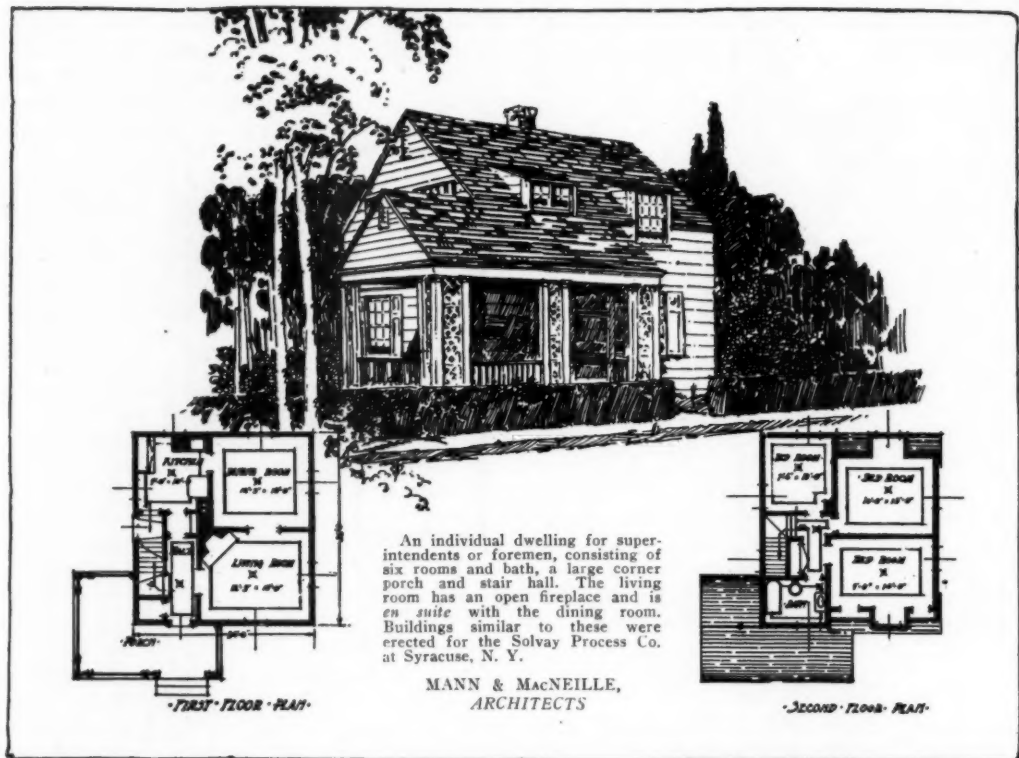
Lavatory and toilet facilities are centrally arranged, and a special feature is an entrance from outside to the lavatory, where men, coming home grimy and dirty from a hard day's work, may enter directly and wash before going into the living quarters. This plan offers a distinct human advantage which might readily be overlooked, *i. e.*, the creation of small groups, which will shift until congenial "crowds" are gathered under the same roof. Watch the men in factories at noon-hour, when they have brought out the dinner-pails and have naturally drifted into groups (and the same groups each day) around a recognized leader. Think of the grouping which has resulted in "frat-



That the evolution of housing for common labor has been greatly influenced by intensive study of the human factor is shown in this absolutely new type of common labor housing. At Bristol 42 of these buildings have been constructed. Ten men are accommodated, two in a room, in each wing of the building. A living room and porch is provided for each group, and a central lavatory serves the entire occupancy of 20 men. Entrance from outdoors to the lavatory is provided so that men can come in directly to wash after work.

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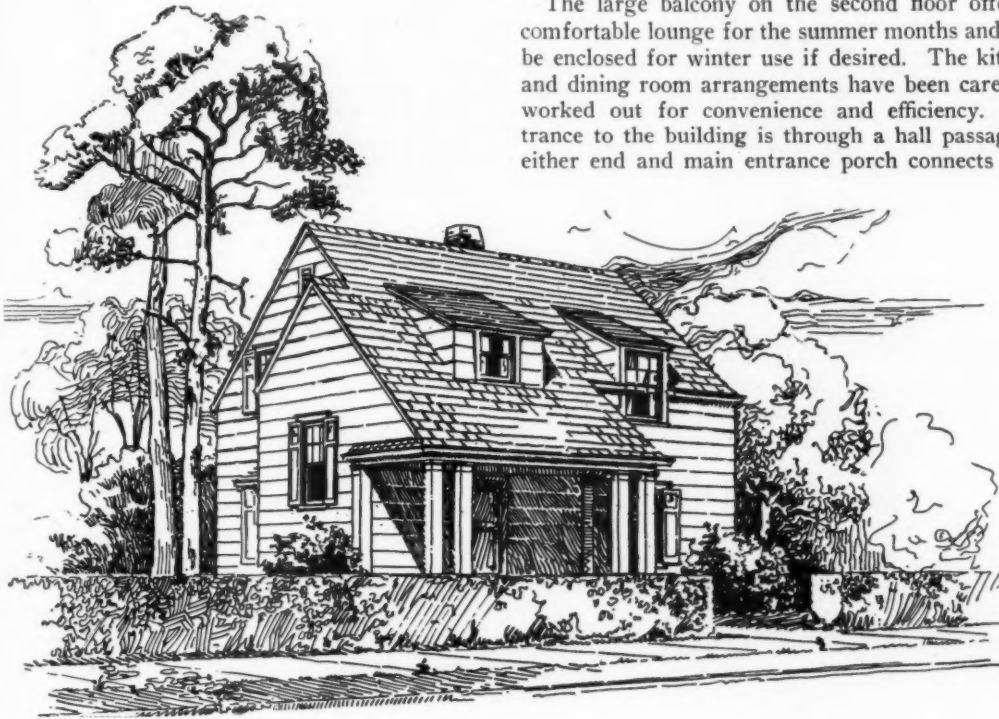
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houses" at our colleges and of the grouping in club lounges and recognize the human instinct which the architects have subtly and properly recognized as having a distinctly good influence on labor stabilization!

At the ends of blocks made up of these small units are the large boarding houses containing accommodations for sixty men each. These buildings (as shown on page 610) are of two-story

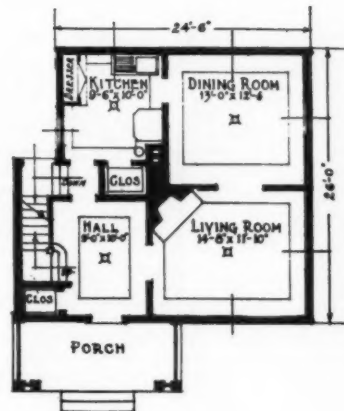
frame and stucco construction. They contain, in addition to sleeping quarters for sixty men, dining room and kitchen (which feed not only the tenants but tenants of adjoining smaller units), lavatories, and on the second floor a two-room and bath apartment for the housekeeper. This apartment has a private stair entrance and helps greatly in solving the maintenance and operation problem. Both rooms can be used as bedrooms or one for a living room if desired.

The large balcony on the second floor offers a comfortable lounge for the summer months and may be enclosed for winter use if desired. The kitchen and dining room arrangements have been carefully worked out for convenience and efficiency. Entrance to the building is through a hall passage at either end and main entrance porch connects with

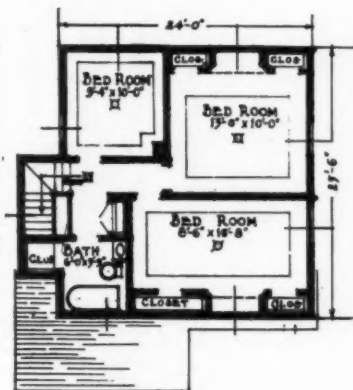


Seven room house for superintendent. Living room has open fire-place. Separate entrance for deliveries and to cellar. Frame construction, red slate roof.

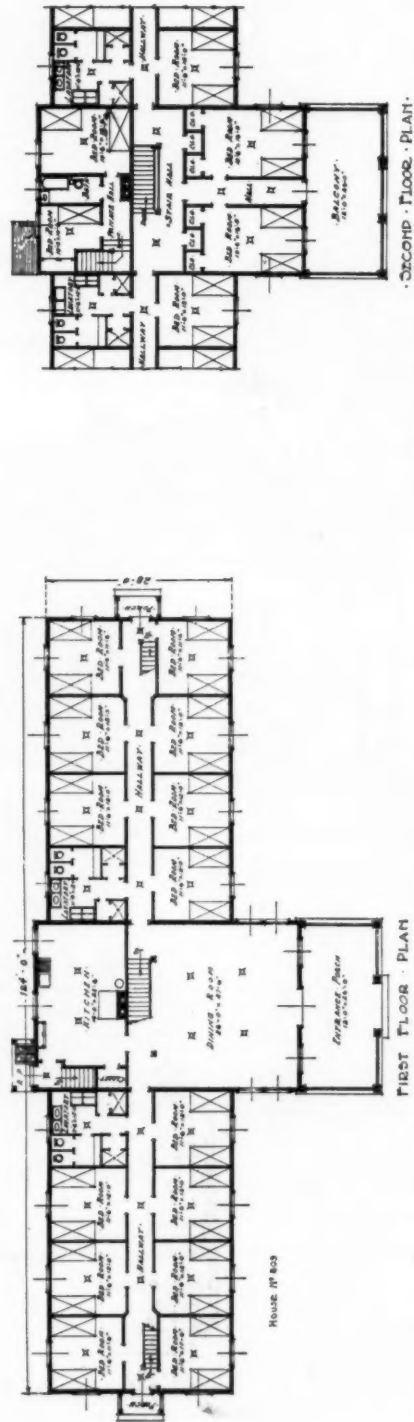
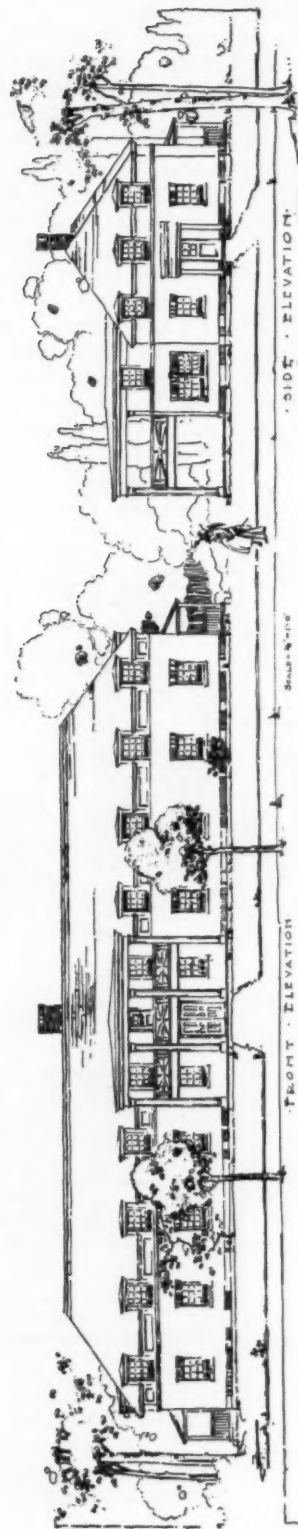
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FIRST FLOOR PLAN



SECOND FLOOR PLAN



Fourteen of these sixty-men boarding houses built at Bristol. Special features are. Large public dining room and kitchen for regular meal service. Two men occupy each room and each man is provided with metal clothes-locker, chairs and chiffoniers. Lavatories are fully equipped, including showers. On the second floor a special apartment of two rooms and bath with private entrance is provided for the housekeeper.

MANN & MACNEILLE, ARCHITECTS

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the dining room. This building offers features of economy and convenience, space saving, sanitation and comfort. Its design is attractive and carries out the unity which characterizes the entire operation.

APARTMENT AND GROUP HOUSES

For the housing of married common labor, attractive buildings are provided (see page 603). Each

ing of individual houses (see page 601) is used to provide living quarters for married mechanics. The preservation of unity of mass is an attractive feature of these designs, while variance in the numerical grouping avoids monotony. These houses are also carefully designed to avoid usage in common of any part of the building. The combination dining room and kitchen, which has met with much favor abroad, has been incorporated in this design. De-



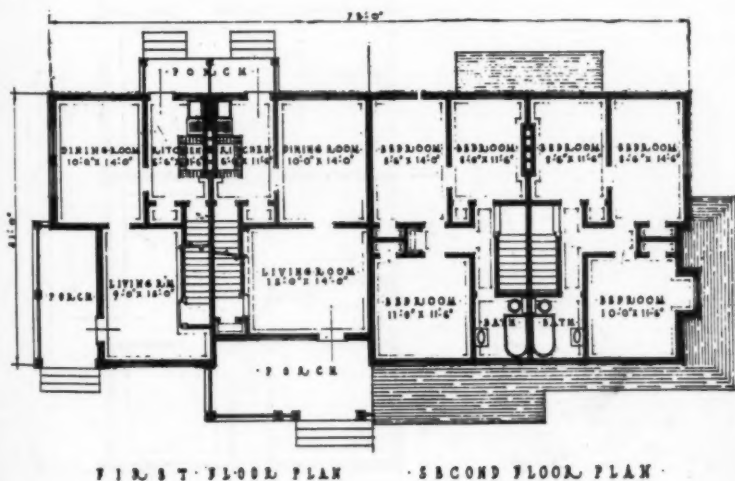
apartment is a complete unit, the public hall being wisely avoided by separate front and rear entrances planned for each apartment. Combination is made, according to choice of tenant, of dining room and kitchen or dining and living rooms. Separate front porches are also provided for each apartment. In this manner, by avoiding use in common of any portion of the building much tenants' friction is prevented.

On the other side of the central division, group-

signs of apartment and group housing are remarkably compact and allow no waste space.

The designs for single houses and high class groups for superintendents and foremen speak for themselves. Every possible provision for comfort within the range of economy has been made.

In general, the construction at Bristol has been of frame, owing to the need for haste in production, but the exteriors of the building have been

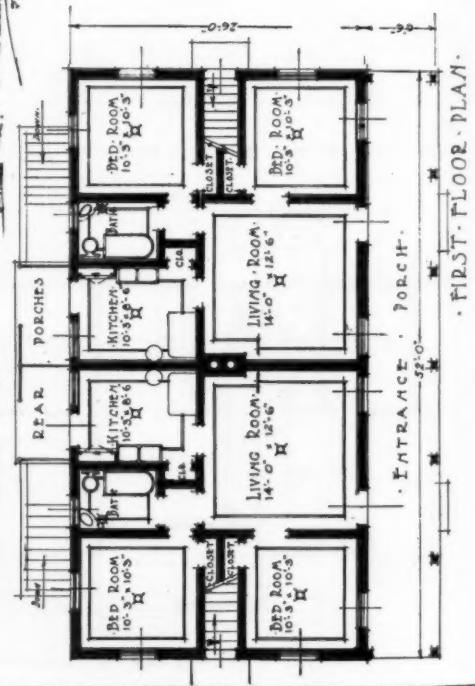
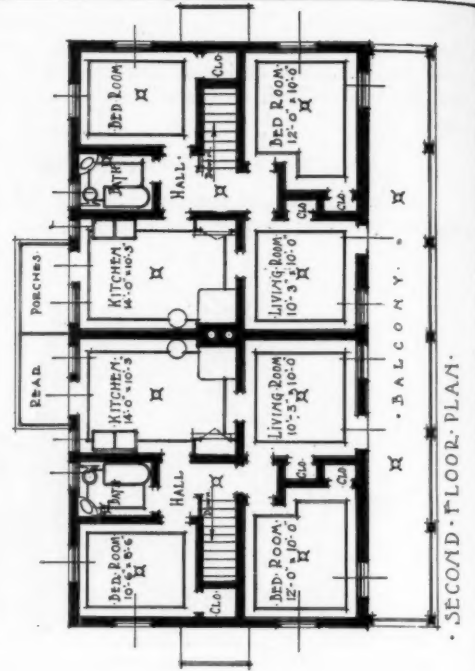
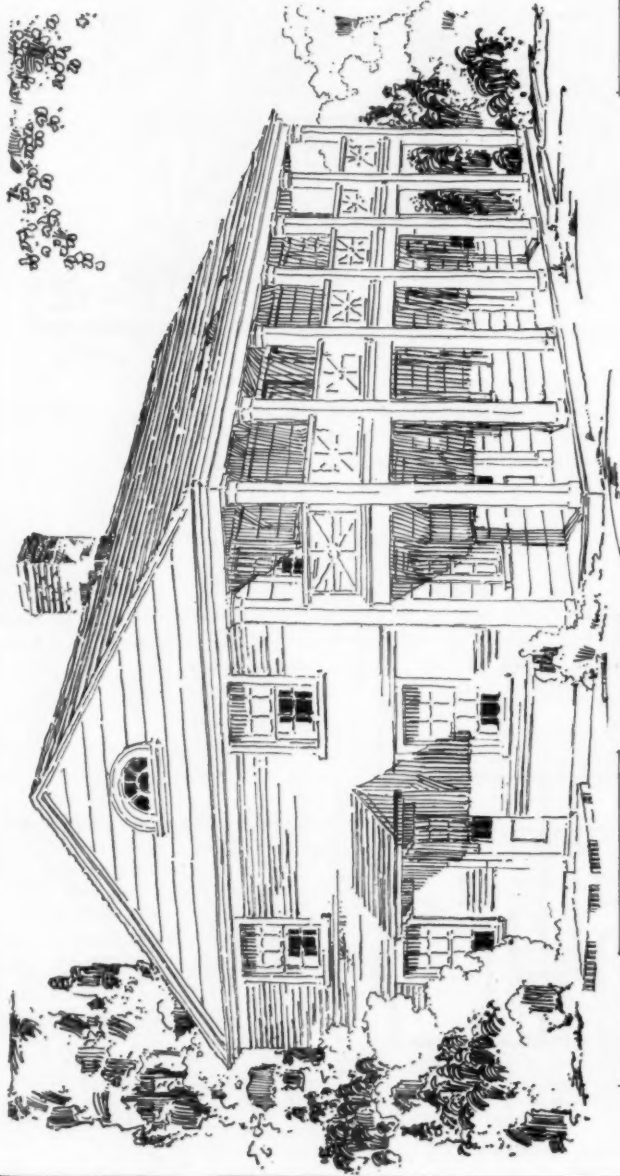


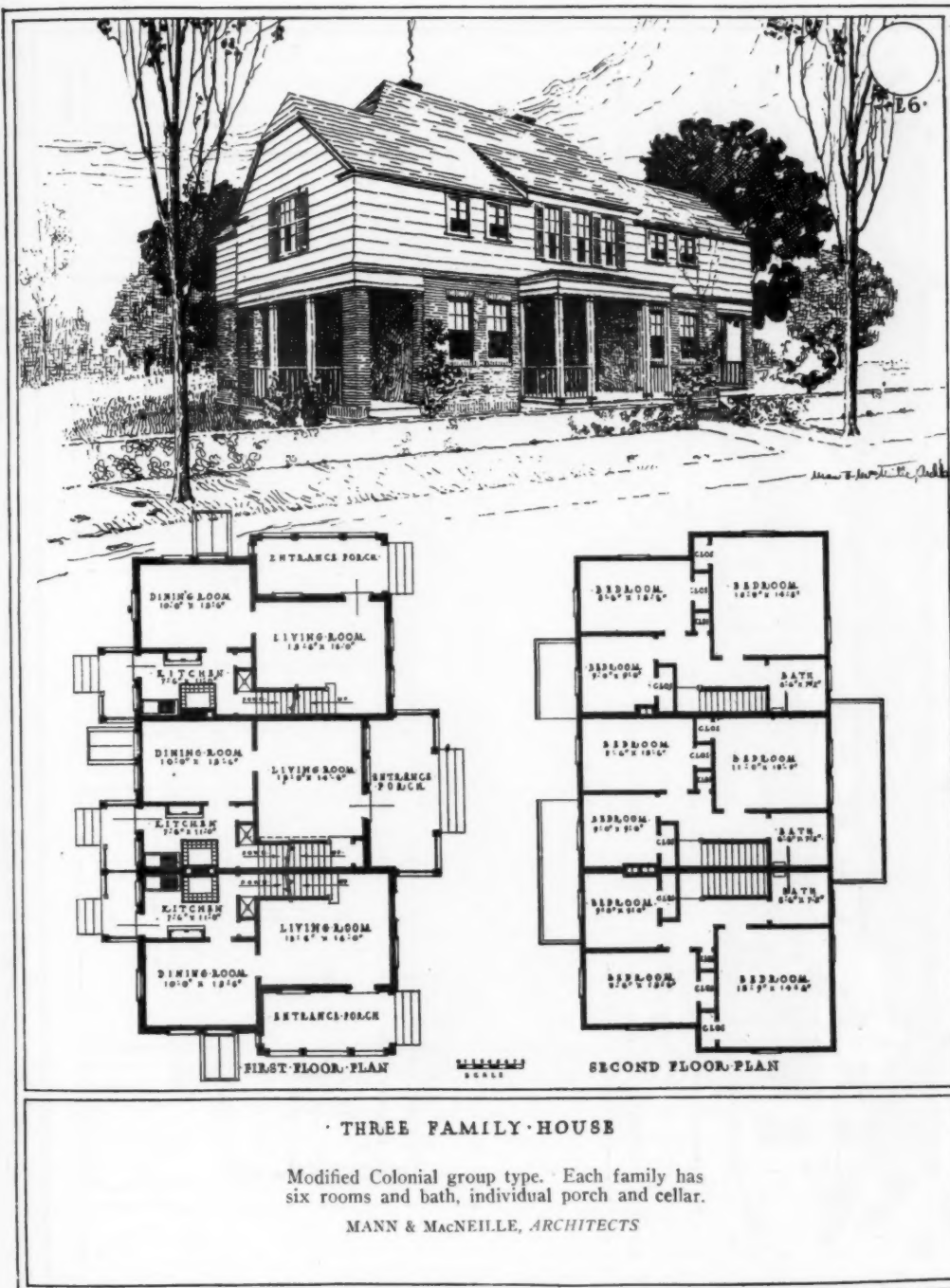
A group of four one-family dwellings of Dutch Colonial design, each house having two stories and containing six rooms and bath. From a large porch, entrances lead into living rooms. Each house has individual cellar and hot-air furnace.

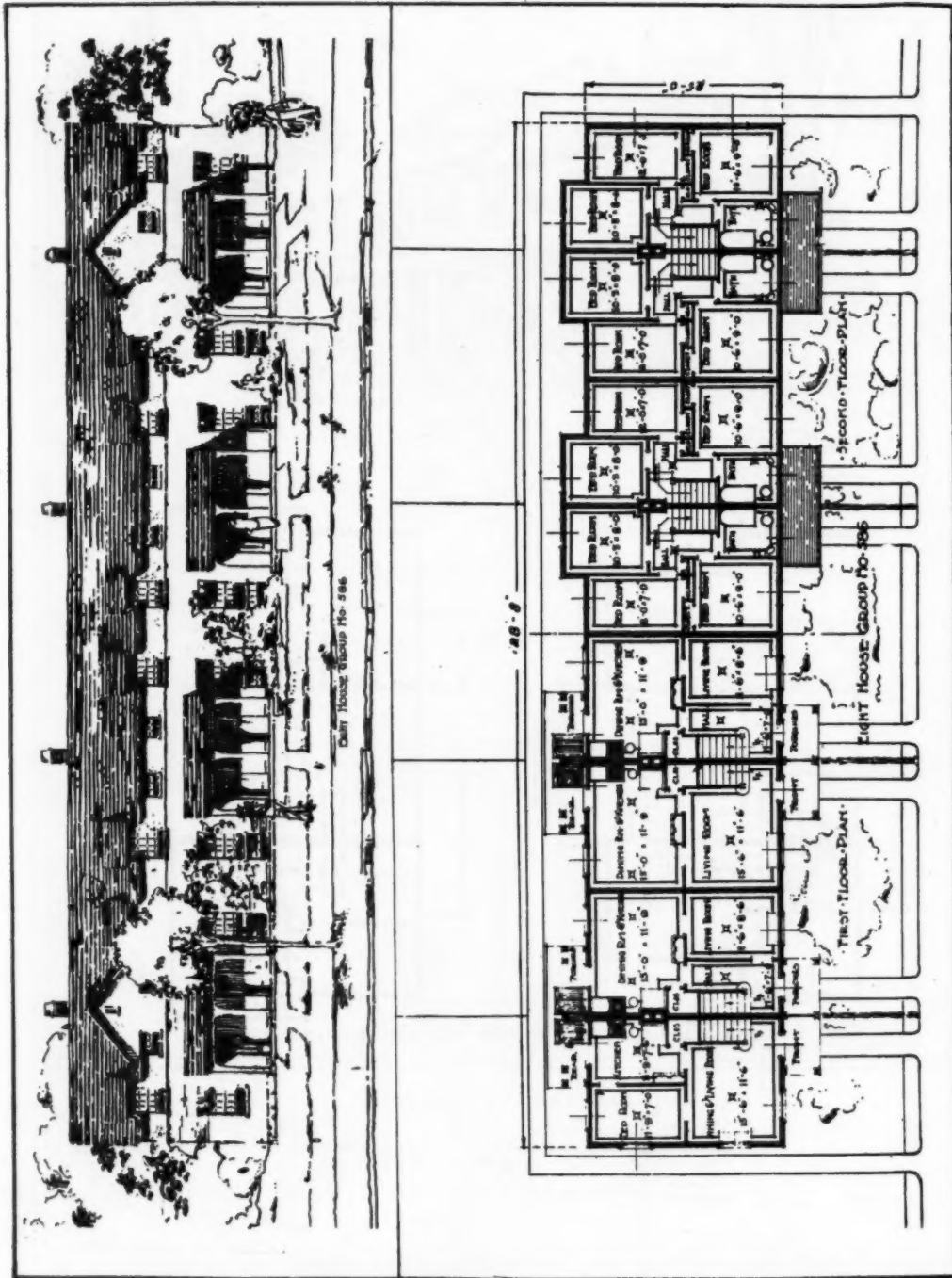
MANN & MacNEILLE, ARCHITECTS

A four-family, four-room-and-bath apartment house of inexpensive construction offering features of entire segregation of families through individual entrances; porches and cellars; all bedrooms are corner rooms.

MANN & MACNEILLE,
ARCHITECTS







A group of 8 one-family houses, containing 5 and 6 rooms in variety of planning. Some have combination kitchen and dining-room. Houses similar to these were designed and erected for the Solway Process Co., Detroit, Mich.
MANN & MACNEILLE, ARCHITECTS

THE AMERICAN ARCHITECT

made fire-resistant as far as practical by the use of Portland cement, stucco and slate roofs.

A point of great practical value is that the wooden shells of the buildings were first constructed and used to house the construction gang, thus avoiding the expense of special construction camps. As rapidly as other buildings are completed these semi-temporary structures are being made permanent by

the placing of stucco exteriors and the construction of porches and partitions. In many of the housing developments now under way a construction camp has been built and must of necessity be abandoned at the completion of the work, thereby adding considerably to the cost of the operation.

The features of the engineering and mechanical installation must be the subject of a later article.



WORKINGMAN'S COTTAGE AT BEAULIEU, HAMPSHIRE.

M. E. WALKER and A. W. HARWOOD, ARCHITECTS.

(Courtesy *The Architectural Review*, London.)



Y. M. C. A. BUILDING, BAYONNE, N. J.
SHATTUCK & HUSSEY, ARCHITECTS

A Needed Supplement to Industrial Housing—Part I

By CHARLES R. TOWSON, Secretary Industrial Department International Committee Y. M. C. A.

WITH the quick massing of Industrial workers around war industry, housing has become more than ever a vital factor in production. The place of housing as a factor in production usually has been realized by the operating officials of industrial corporations far in advance of the directors and other officials who are not on the ground. This accounts, in part, for the lack of adequate housing and for some of the failures in production in the shipyards, munitions and other war plants. The word of the operating officer is not heeded quickly enough. Too many presidents and directors, and even Congressmen, lack a keen sense of the relation between the living conditions of workers and their production. The managers, on the other hand, know that the old labor camp methods—the makeshift “shacks,” the low-grade barracks system, or anything short of comfortable and convenient homes for the workers and their families—will prevent securing and holding sober, capable and dependable labor. Good housing may be made as profitable to industry to-day as the newest labor-saving devices; it is as

important as efficiency methods, and soon it will be as essential as a proper wage scale.

Heed is being given to this subject as never before, and it is a good sign of the times that some of the best brains in architecture and engineering are being devoted to industrial housing. It is worthy of note that, especially in that large industrial field to which the Government has come into such close relation since the war began, new standards of housing have been adopted, or rather the standards which existed largely in the minds of the idealists and seers have been realized, so that in many places surprisingly attractive architecture and durable construction have become features of the housing plans. This is one of the constructive by-products of the war, and the results will be lasting, for these newer housing standards will doubtless be maintained after the world's war is over.

No housing plan in industry is adequately conceived which does not have regard to the working and leisure conditions as well as to the living conditions of the workers. While a housing plan may not of itself necessarily involve the surroundings

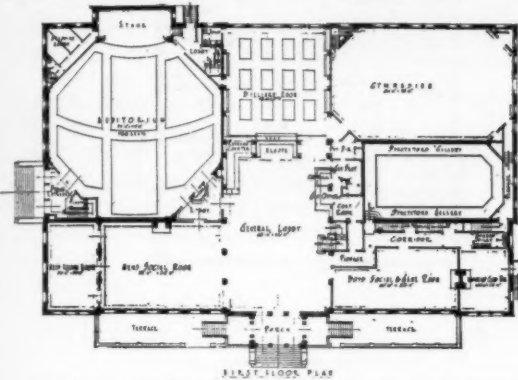
THE AMERICAN ARCHITECT

which affect the social, recreational, educational and other phases of individual and community life, yet the real success of any housing plan is as certainly affected by this social, educational and moral environment as by the design of the houses and by the rents. Therefore, to make the housing plan most effective tenants must be assured of those school, church, recreational and other privileges which are necessary to a normal individual and community life.

It is in this connection that the Young Men's Christian Association renders its most important service to the housing movement in industry. This service is now being greatly expanded especially in war industries. Of course it is true that in the aggregate many thousands of workers are housed

plants of the Standard Oil Co., International Nickel Co., Tidewater Oil Co., the Babcock-Wilcox Co., Vacuum Oil Co., and Pacific Coast Borax Co., all of whom contribute toward the erection and maintenance. The Pueblo and Bayonne Buildings are much alike in exterior design.

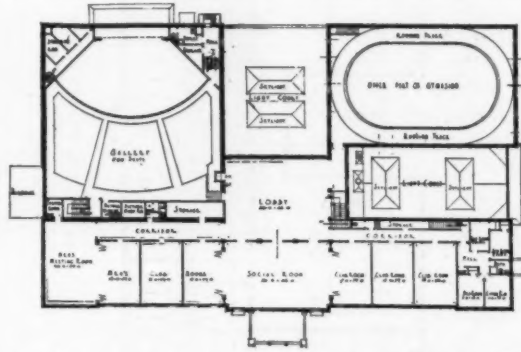
The general principles of construction in these buildings are stated in the outline,* which illus-



Y. M. C. A. CLUB BUILDING, COLORADO FUEL & IRON CO., PUEBLO, COL.

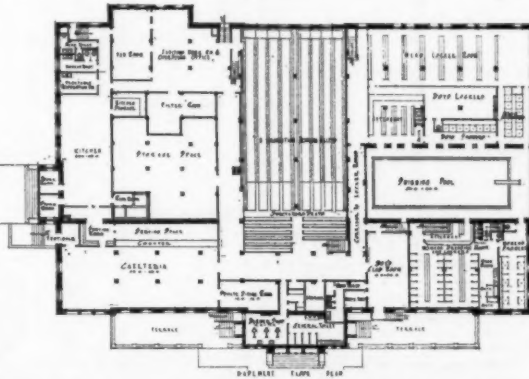
in the Association hotels and dormitories, most of which are in the cities.* But an increasing number are being built in communities where there is a special industry or groups of industries, and the association is proving of great value as a supplement to the housing system in those communities where the recreational, social, religious and educational agencies are limited or wanting.

Herewith are illustrations of two of the newest buildings designed for large industrial communities in Pueblo, Col., and Bayonne, N. J. In these buildings the dormitories are an important feature. Located among communities of foreign-born industrial workers, these buildings will render the double service of bachelor quarters and all-round community centers. The Pueblo Association will serve the employees of the Minnequa Steel Works of the Colorado Fuel and Iron Company. It will be used by all ranks of employees, special attention being given not only to the foreign-born workers but to their families as well. The Bayonne building will be located in the middle of a large block of land in the foreign section of the city near the



Y. M. C. A. CLUB BUILDING, COLORADO FUEL & IRON CO., PUEBLO, COL.

trates the proposals the Y. M. C. A. submits upon request to industries contemplating building. This particular proposal, prepared by Mr. W. F. Shattuck of Shattuck & Hussey, Chicago, relates to the type of buildings suitable for communities of two to five hundred families.

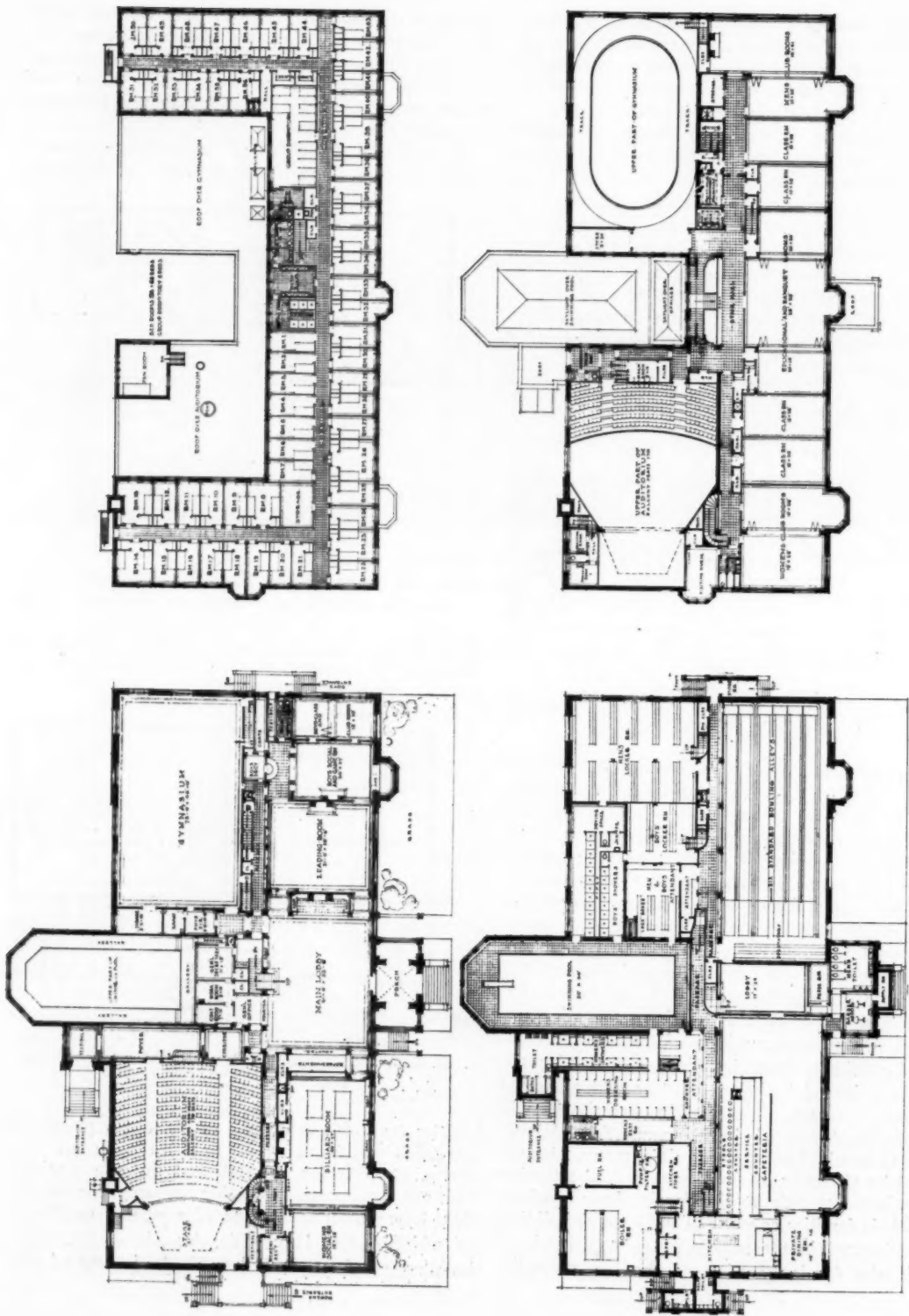


Y. M. C. A. CLUB BUILDING, COLORADO FUEL & IRON CO., PUEBLO, COL.

The several illustrations of buildings presented herewith show that no uniform type of exterior or interior is followed in the various industrial communities. For example, the textile field alone affords a score of styles of buildings, of which one at Huntsville, Ala., is shown. The building at Carney's Point, N. J., is one of the

*Associated hotels are in operation in Buffalo and Chicago, the latter caring for 1800 guests, most of them from the industrial fields.

*See succeeding issue, May 22.



Y. M. C. A. BUILDING, BAYONNE, N. J.
SHATTUCK & HUSSEY, ARCHITECTS

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twelve buildings provided by E. I. du Pont De Nemours Powder Company, in which the association is operating as a supplement to the community life. While lacking somewhat in exterior attractiveness, these buildings afford those privileges without which men are not content to remain in a place even where housing facilities are adequate, convenient and cheap. Such buildings when conducted upon a non-paternal basis and under the trained leadership of the association help to beget contentment and good-will, to stabilize labor and to increase production.

There are more than four hundred such Y. M. C. A. buildings which have been erected for the employees of the railroads and industries of the country. The aggregate cost exceeds \$8,000,000. The annual maintenance contribution from the employers amounts to more than \$750,000, and the employees give as much more. These buildings range in cost from \$1,000 to \$500,000. This investment which supplements the housing and all other features provided for the welfare of the workers is very small compared with the results obtained. For example, one Southern manufacturer employing 80 per cent colored labor who erected such a building at his plant, gives this testi-

mony: "When this work was started three years ago we had only 256 out of 1,000 regular men, that is, men who worked every day in the year except holidays. Last year we had 712, notwithstanding labor difficulties. The cost of hiring and training new men is over \$200 per man. As this plan has helped increase our regular men by 456, this means

a saving of \$90,000 to us. In three years we have also increased our tonnage per man employed 13 per cent, decreased our accidents 54 per cent and decreased lost time through accidents 49 per cent. This has been largely due to the association." For this company the Y. M. C. A. secretary was able to help in the planning of the village, houses, gardens, etc., provid-

ed for those colored workers.

In another small industrial city the Y. M. C. A. provides: The central building with dormitories for 100 men.

A branch building with dormitories.

A "hut" type building for the negro workers of one industry.

A boarding house for the white workers of another industry.

Also a six-story hotel with low-cost rooms, restaurant, etc.



Y. M. C. A. BUILDING, DUPONT WORKS, CARNEY'S POINT, N. J.

Similar buildings are also located at Hopewell, Va.; Partin, N. J., at the Government Explosive Plant, Nitro, W. Va., at Hadley's Bend, near Nashville, Tenn., and at the shell loading plant, Penniman, Va.



Y. M. C. A. COMMUNITY BUILDING, WEST HUNTSVILLE, ALA.

EDGAR L. LOVE, ARCHITECT

SECOND FLOOR PLAN

GYMNASIUM AUDITORIUM
AT GALLERY LEVEL

BOYS' CLUB
25'6" x 25'6"

FILM BOOTH

HALL

CLASS ROOM
20'0" x 11'0"

CLASS ROOM
14'0" x 13'0"

CLASS ROOM
20'0" x 10'0"

FIRST FLOOR PLAN
COMMUNITY BUILDING—WEST HUNTSVILLE,
ALA.
EDGAR L. LOVE, ARCHITECT

GYMNASIUM & AUDITORIUM
40'0" x 60'0"

BOWLING ALLEYS
18' x 12'

ALCOVE
18' x 12'

TOILET

COURT

SHOWER

WATER

TOILET

TOILET

STOR. R.M.

DOMESTIC SCIENCE
20'0" x 28'0"

DINING ROOM
5'6" x 15'0"

GIRLS' DRESSING RM.
29'6" x 31'0"

MEN'S DRESS. RM.

BOYS' DRESS. RM.

GIRLS' CLUB
20'6" x 24'0"

KINDERGARTEN
32'6" x 24'0"

OFFICE

SECY'S OFFICE

DISPENSARY

PORCH

LIBRARY
50'6" x 26'0"

620

THE AMERICAN ARCHITECT

It is important to note that the cost of operating these buildings is shared by employers and employees, and that the men pay the larger part because they have an interest in it.

With the closing of the saloons a new need has come, and the association is offering its services to furnish and operate a new type of building which will be a practical substitute for the saloon. Some of the features of these buildings are low costs, democratic conditions with as little restraint as possible, creature comforts, congenial atmosphere, intellectual stimulus, wholesome recreation, employment features, etc. The success of the "hut" type of building in the army work has suggested the use of a similar but more substantial building as a substitute for the saloon. This type of building is

being adapted also for meeting the needs in many of the war industries.

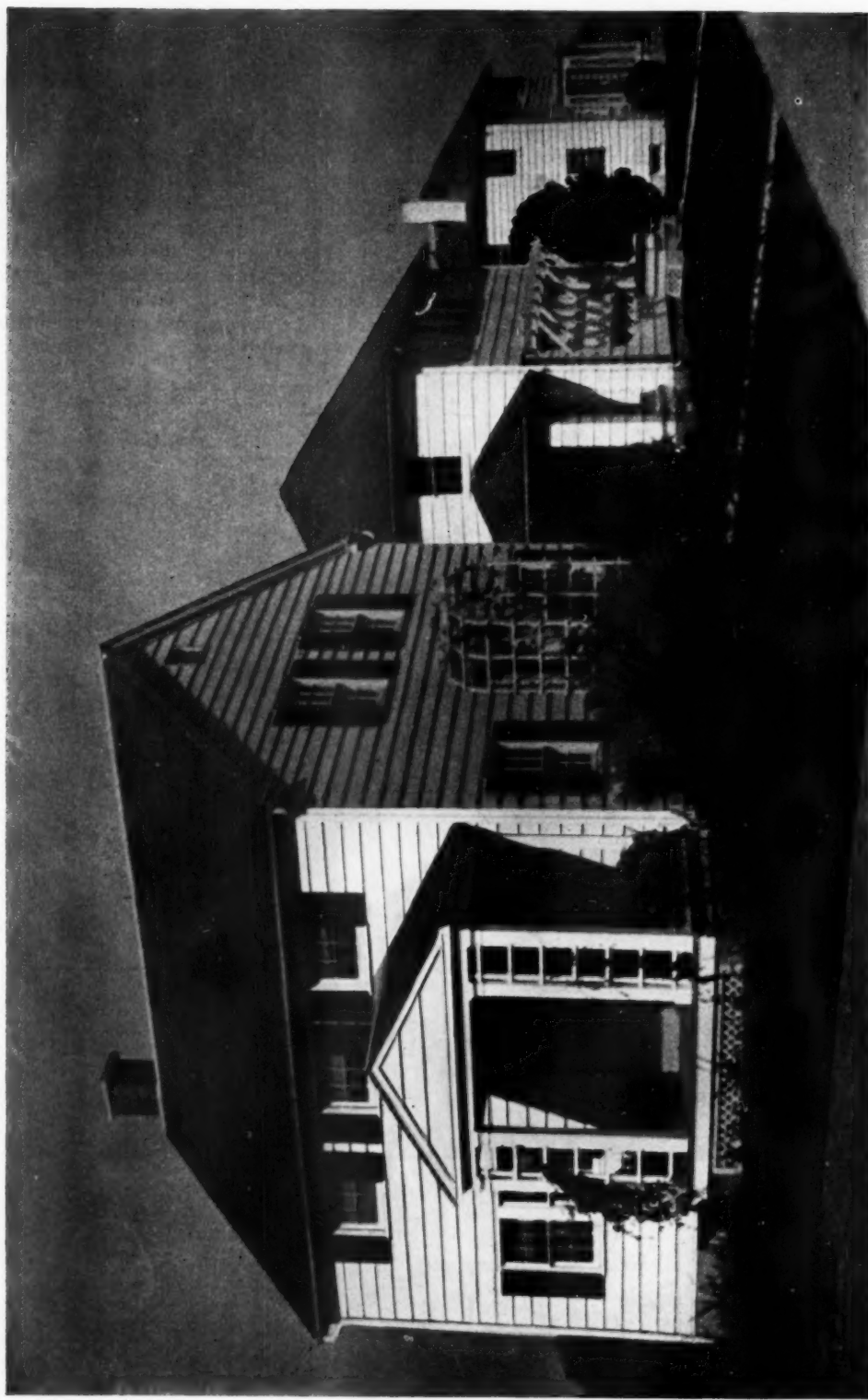
In all of these buildings the kind of work done is that which will develop strong, manly, Christian character in the highest meaning of that term. This means begetting good-will, loyalty, fairness and efficiency, and this in turn means contented, stable and productive workers who realize their place in the nation's defense. Since housing must play such an important part in winning the war, it follows that this dynamic supplement, provided through the services of the Y. M. C. A., should have an increasing place in the development of the industrial communities of the nation.

(Part II of this article, treating of specimen requirements for a Y. M. C. A. building will appear in issue of May 22.)



COTTAGES ADJACENT TO ST. PETER'S CHURCH, ST. ALBANS, ENGLAND.

(Courtesy *The Architectural Review*, London.)



NO. 18R

NO. 9R

MILBOURNE AVENUE, WEST SIDE OF BLOCK 26

INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.

DAVIS, McGRATH & KIESSLING, ARCHITECTS

HOUSES NO. 15R



HOUSES NO. 21R NO. 12 NO. 12R NO. 21R NO. 3 NO. 1 NO. 3R NO. 21
MILBOURNE AVE. EAST SIDE OF BLOCK 27. REFER TO GROUP PLAN "B".

Industrial Housing Development, for the Civic Building Co., at Flint, Michigan

DAVIS, McGRATH & KIESSLING, *Architects*

THE evergrowing need and ill-met facilities for housing the workmen in the large automobile factories of the General Motors Company, Chevrolet, Dort and affiliated industries at Flint, Michigan, crystallized in the getting together of a group of the leading, public-spirited business men of that city and in forming, late in the summer of 1916, the Civic Building Company for the purpose of supplying attractive, low-cost houses for individual owners at cost.

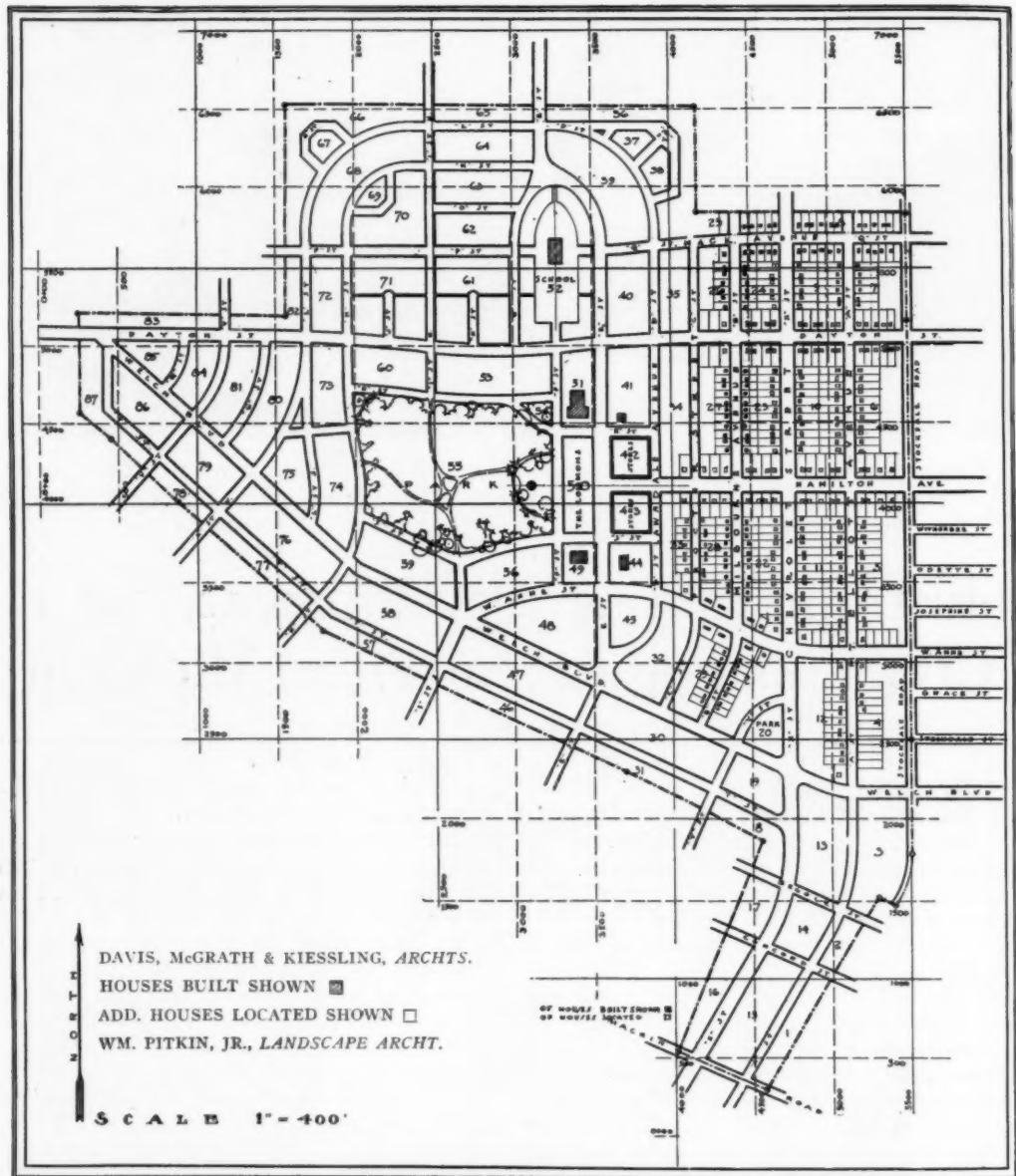
No considerable acreage being available within the city limits, their first line of action was to acquire a number of farms adjacent to the city limits, forming a tract of 400 acres, a mile long in each direction. This tract was generally quite level and, except for about 22 acres of woodland in the middle of it, was open fields.

Mr. William Pitkin, Jr., landscape architect, of Rochester, N. Y., was then employed to lay out the tract, with due regard to connecting with existing streets in the city proper, to the extension of street railway lines from the city, to determining upon such provision for sewage disposal, rainwater surface drains and water supplies as would be most

expedient for the immediate construction of houses; then, collaborating with the architects of the houses, a scheme was determined upon for the community center, reserving locations for stores on two blocks and other sites for three churches, school, library, fire house and a community assembly hall, all about a long village green, or common, at the end of the wooded section reserved for a park. The balance of the property was divided into 1600 house lots, none being less than 50 x 100 feet, and those on the main avenues leading up to the community center being not less than 60 x 150.

As the first houses to be built were to be of minimum size and number of rooms, the site developed was that along one of the minor streets, paralleling a more important one across the lower side of the tract and along a short cross street at the extreme end, and having immediate sewer and drainage possibilities. To make the most of these streets and their improvements, all lots on both sides of each street were to be built upon except the corner lots of the main avenues, thus insuring full returns on all cost of their improvement.

This provided sites for 220 houses, and twenty-



PLAN OF 400 ACRE TRACT, SHOWING HOUSES BUILT AND LOCATED

INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.

DAVIS, McGRATH & KIESSLING, ARCHITECTS

THE AMERICAN ARCHITECT

nine different house plans were made, two of which were double, five-room houses. These plans are susceptible of seventy-two variations by reversing, turning about so that the entrance is to the side and the living room end to the street, an exterior of 10 inches to the weather siding or shingles, 6 inches to the weather siding, and all in turn with the colors of Old Virginia whitewash, wasps nest gray, and cream; and also in the use of green or brown blinds and batten shutters.

Thus, to arrive at the most economical yet attractive type of small individual house, consistent with

the first floor. The houses, therefore, ranged from five to eight rooms and bath, and varied in size from 460 to 650 sq. ft. ground area. Grade entrances common to the cellar and kitchen, with a recess for refrigerator, were provided. Each house has a sitting-out porch in proportion to the size of the house, either at the entrance or off the living room. The stairway to the second story is generally from a small hall, provided with a coat closet. In some of the houses this stairway is in an alcove off the living room. Two of the house plans have fireplaces in the living room. All bedrooms, living



HOUSES NO. 15R

NO. 26

NO. 15

NO. 8R

MILBOURNE AVE. EAST SIDE OF BLOCK 29.

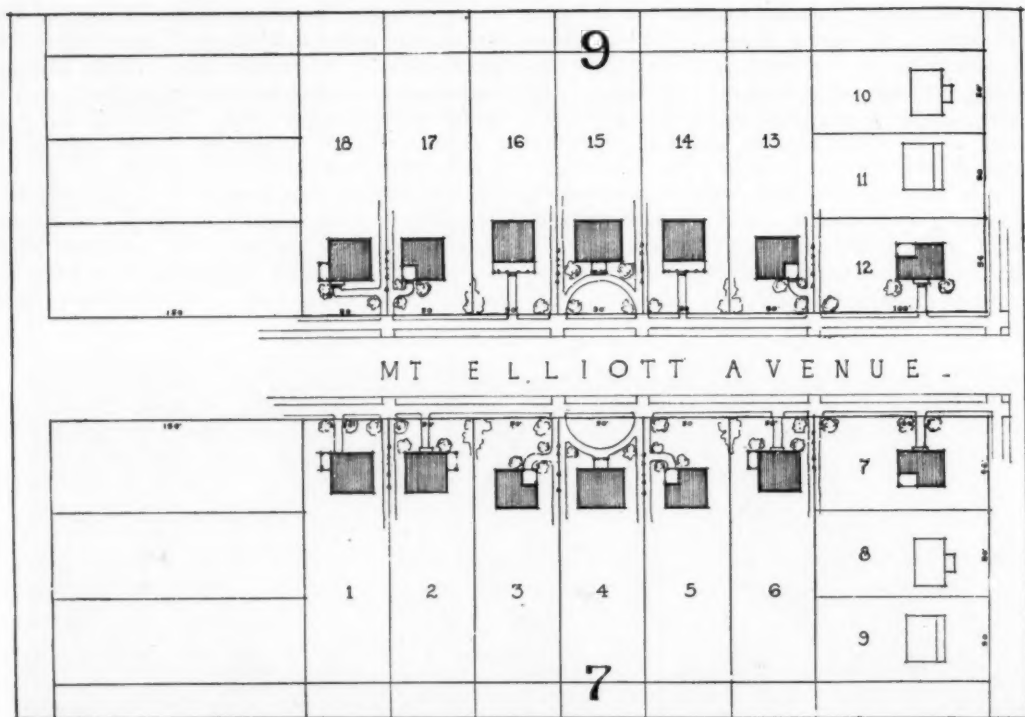
the normal local market for materials, wood construction, as expressed in the old New England village type, was resorted to, with plans nearly square; story and a half to two stories in height, permitting of simple roof lines, without dormers except on gambrel roofs; close eaves; no balustrades on porches, using flower boxes in their place and under group windows. All roofs are shingles throughout, weathering to a uniform gray.

Each house has a cellar under entire house, a living room, dining room, and small kitchen on the first floor and two to four bedrooms, with closets, bath room and linen closet on second floor. Some of the houses have an additional bedroom on

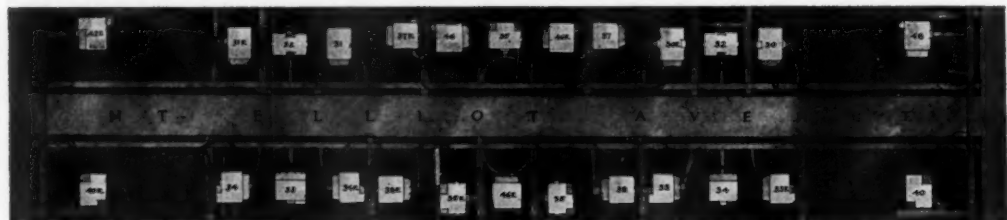
rooms and kitchens have windows on two sides, affording cross ventilation. The story heights are 7 feet 8 inches for first story and 7 feet 6 inches for the second. A hot air furnace and kitchen stove are provided, served by one large flue. Each kitchen has a sink and every bath room a water closet, lavatory and bath tub, all supplied with hot and cold water. Electric wiring and lighting fixtures were also provided.

The greatest asset to each individual house and the community as a whole, however, is derived from the proper grouping of the houses in relation to each other and the street. This was accomplished by placing the service side, or that blanketed by a

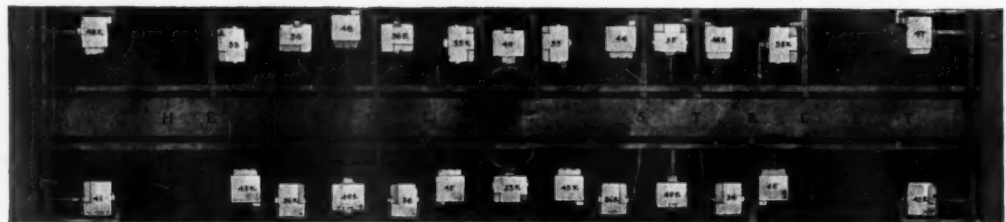
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GROUP PLAN C



GROUP PLAN D



GROUP PLAN E

INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.
DAVIS, McGRATH & KIESSLING, ARCHITECTS

THE AMERICAN ARCHITECT

stairway of any two houses, together not less than 12 feet apart, giving ample width for a service drive common to both, thus leaving a larger openness of lot on the more important, living-quarters side of the house. This makes a unit of two, with the added interest of setbacks from the street, varying from 20 to 30 feet and marked by groups of two, three or five houses setting back the greater distance and others being kept forward. Each street block is further studied to give an agreeable composition in roof lines individual to itself, as shown in accompanying views. The group charac-

Since the actual construction of the houses was not begun until open weather early in the spring of 1917, only 133 of 220 houses located were completed by December of the same year. These consisted of 25 five-room houses of five different plans; 46 six-room houses of 9 different plans; 44 seven-room houses of 8 different plans; 6 eight-room houses of 3 different plans, and 6 double houses of 2 different plans. These houses were built at an average cost of \$2,500 per house, there being a difference of about \$1,000 between the highest and lowest cost house. They have been sold, inclusive



HOUSES NO. 18R

NO. 15

NO. 13R NO. 8

NO. 26

NO. 8R

NO. 13

NO. 15R

MILBOURNE AVE. EAST SIDE OF BLOCK 28.

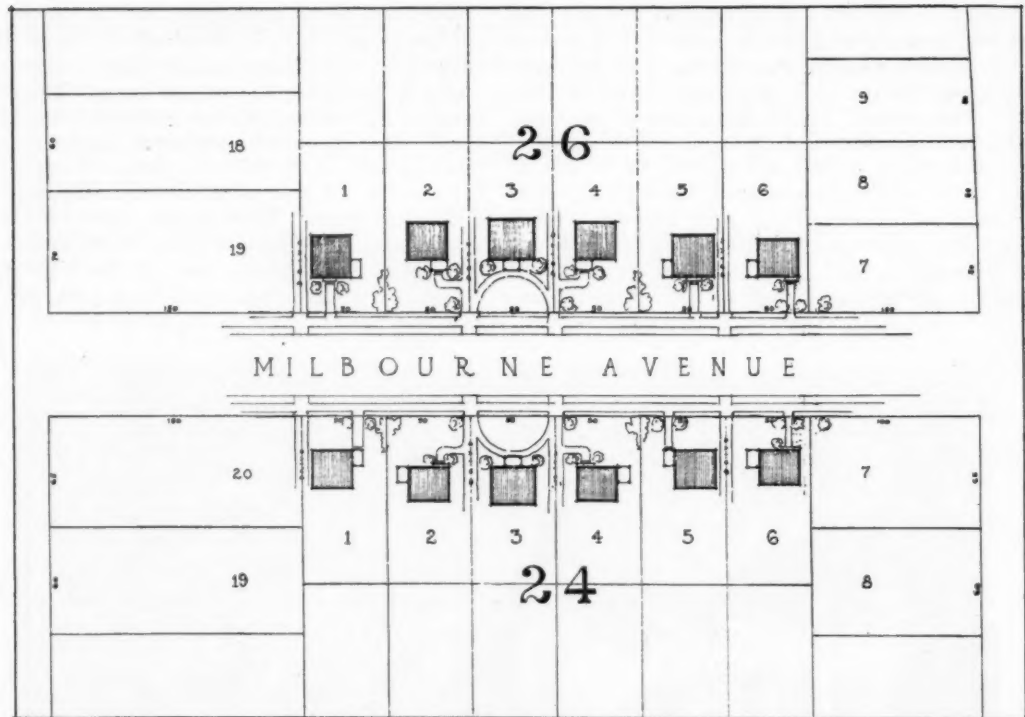
ter is also emphasized by harmony of material and color scheme.

With the above different variations in individual house plans and grouping possibilities, it becomes very evident that, with only a limited number of different plans, an endless variety of street effects can be obtained without the chaotic regularity of so many of the "go as you please" housing operations.

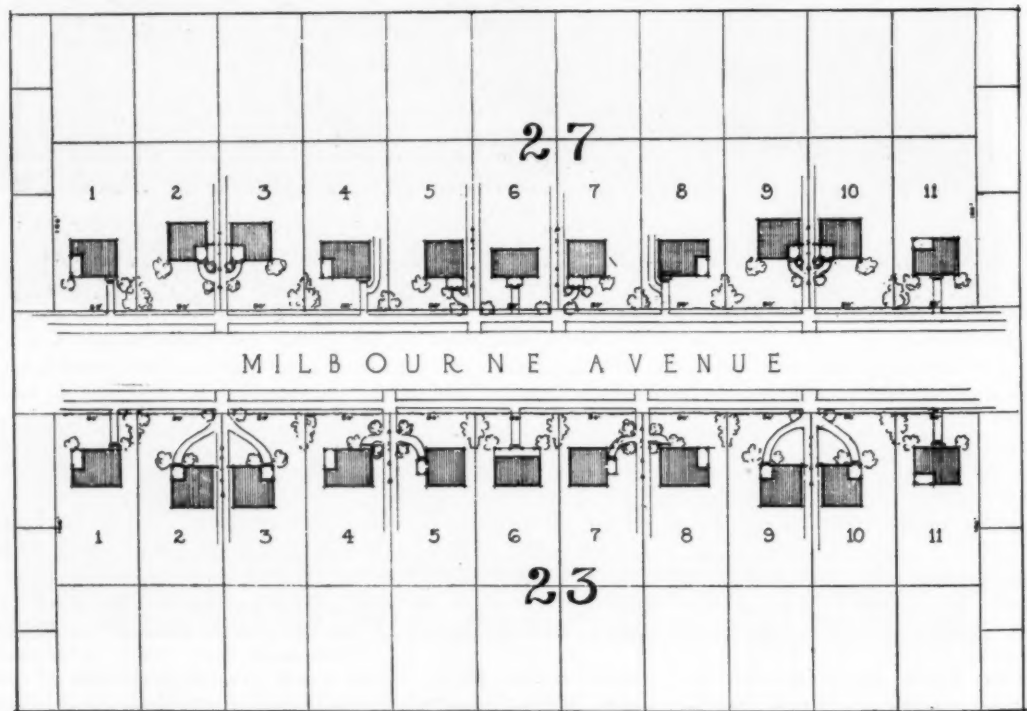
Then, again, where the grades of the lot permit a fall to the rear, the houses are kept low in the front, having only two steps at entrances and the usual 22 inch of foundation wall exposed in the rear. Planting, in the form of a couple of bunchy shrubs, flanking the entrance porches or corners of the house, and a tree here and there to break up the masses of houses, has been done, adding greatly to the attractiveness of the development.

of lot and improvements, at prices ranging from \$2,750 to \$3,750 for the single houses on a 10 per cent down and 1 per cent a month rental basis.

After the construction of first houses had advanced sufficiently, 200 more houses were located on the balance of the lots in this same section, along the more important streets paralleling the one already built upon and along the main avenues leading to the community center. To develop this, 21 more house plans were prepared on similar lines as the first lot, except that there was a general expansion of 10 to 20 per cent in the dimensions of the rooms; porches were made more ample; half windows in second story were made three-quarters high. There was a greater proportion of group-window houses to meet the anticipated objection of blinds and shutters, a covered back porch for each



GROUP PLAN "A"



GROUP PLAN "B"

INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.

DAVIS, McGRATH & KIESSLING, ARCHITECTS

THE AMERICAN ARCHITECT

house, and a greater number of houses with fireplaces, and some sleeping-out porches.

Of the houses then located there were 6 houses of five rooms and sleeping-out porch; 40 houses of 6 rooms; 100 houses of 6 rooms and sleeping-out porch; 32 houses of 7 rooms; 17 houses of 7 rooms and sleeping porch; 11 houses of 8 rooms. The same grouping effects were developed further by the introduction of small double garages common to adjacent houses, in such form as to be subordinatedly consistent with the simple house lines.

These houses were designed to cost from \$3,000 to \$4,000, but owing to the general quietus in pleasure car output, these last houses, together with

the balance of the first 200 houses located, have not been started yet.

While in this instance all-wood construction was the logical type to use, other prescribed conditions for other localities might dictate the use of all brick, all concrete, or tile exterior wall construction. The same simple units will lend themselves in all cases to equally interesting *ensembles*. There is, nevertheless, little question, even with the present unfavorably high cost for all-wood construction, but that it offers the lowest first cost proposition, for the detached house. For semi-detached and solid group houses on higher-priced and smaller lots, all masonry construction would have precedence.



HOUSE NO. 13R

NO. 8

MILBOURNE AVE. BLOCK 28.

THE AMERICAN ARCHITECT



HOUSE NO. 34



HOUSE NO. 33



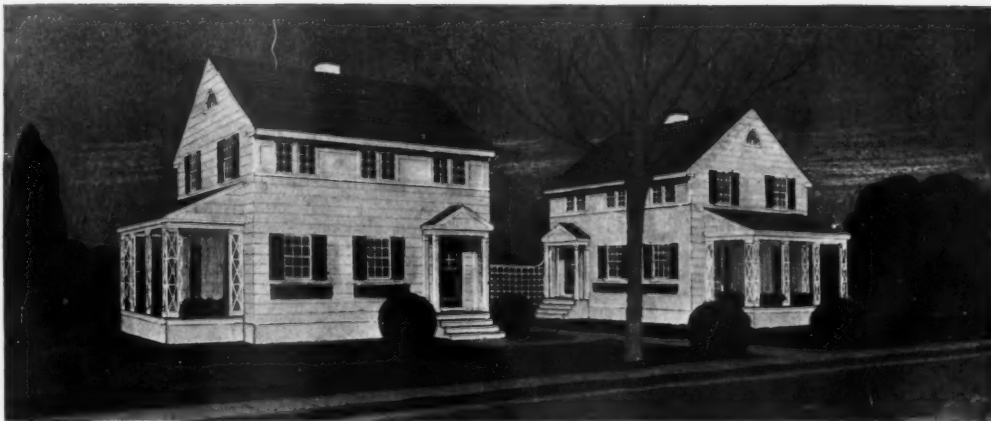
HOUSE NO. 31

TYPICAL HOUSES—INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.
DAVIS, McGRATH & KIESSLING, ARCHITECTS

THE AMERICAN ARCHITECT



HOUSE NO. 50



HOUSE NO. 37



HOUSE NO. 36

TYPICAL HOUSES—INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.

DAVIS, McGRATH & KIESSLING, ARCHITECTS

THE AMERICAN ARCHITECT



HOUSE NO. 44



HOUSE NO. 46



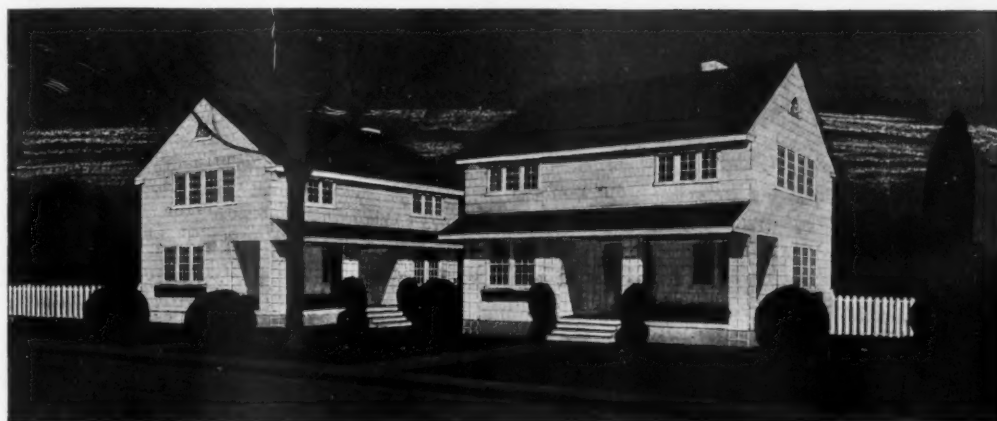
HOUSE NO. 49

TYPICAL HOUSES—INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.
DAVIS, McGRATH & KIESSLING, ARCHITECTS

THE AMERICAN ARCHITECT



HOUSE NO. 38



HOUSE NO. 42



HOUSE NO. 43

TYPICAL HOUSES—INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.
DAVIS, McGRATH & KIESSLING, ARCHITECTS

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DOUBLE HOUSES NO. 29R AND NO. 28

NO. 28R

WEST ANNE STREET, CORNER OF MILBOURNE AVENUE—BLOCKS 28 AND 22



HOUSES NO. 15

NO. 10R

NO. 22

NO. 10

NO. 15R

OSBORNE AVENUE, EAST SIDE BLOCK 26. REFER TO GROUP PLAN

INDUSTRIAL HOUSING DEVELOPMENT, FLINT, MICH.

DAVIS, McGRATH & KIESSLING, ARCHITECTS

Community Planning for Peace-Time Industries

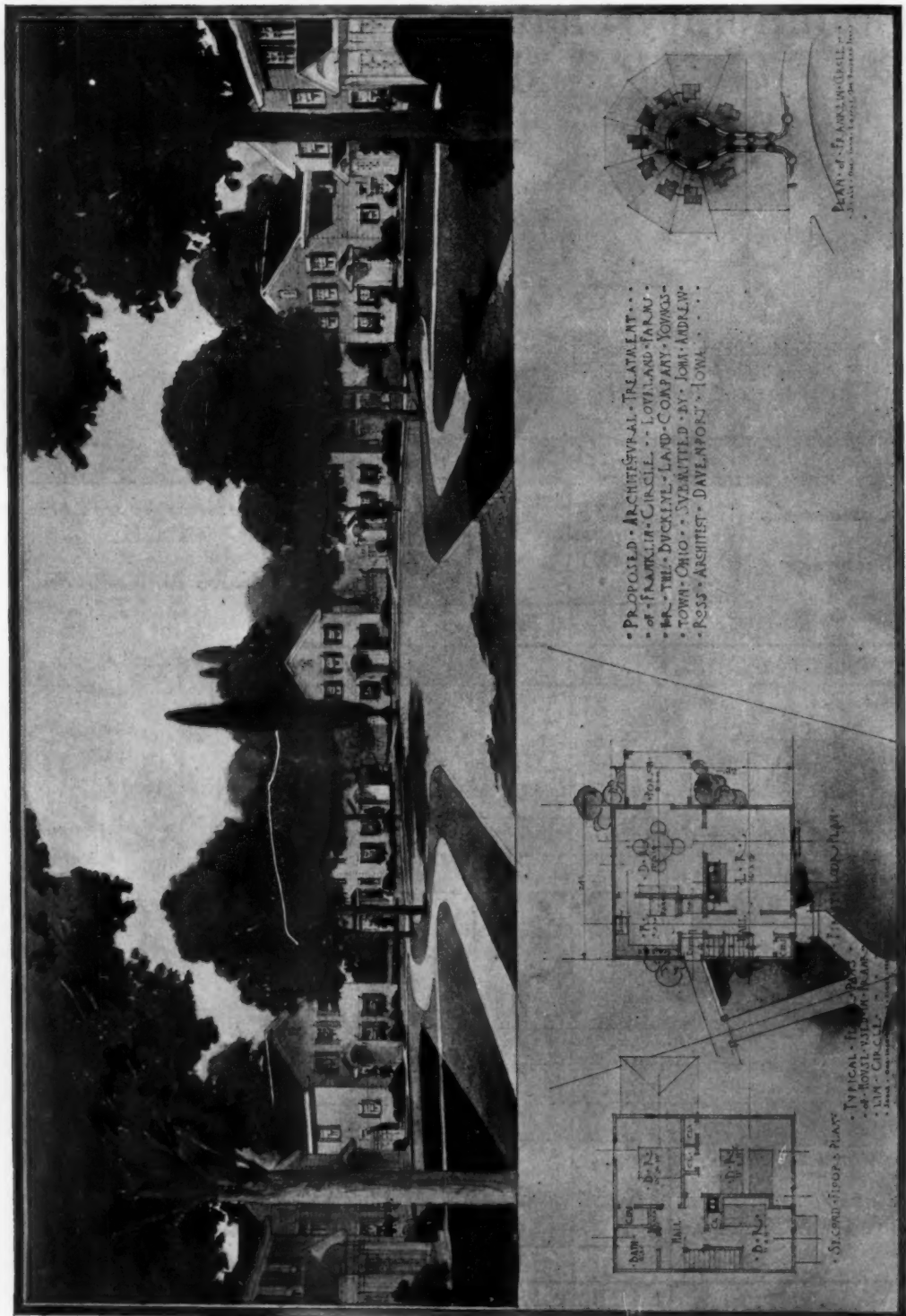
General plan for Loveland Farms, near Youngstown, Ohio, a Project comprising 242 acres developed by the Buckeye Land Company for the housing of skilled mechanics of the Youngstown Sheet & Tube Company

IN laying out an industrial village certain fundamental questions should be given consideration by the planner with regard to such physical attributes of the ground as are necessary for the greatest efficiency.

- (1) What should determine the selection of a tract of land for an industrial village development?
- (2) What size tract is desirable? (3) How im-

portant is the relation of the tract to the city plan? (4) What general principles should control the division of the property into zones—that is, the selection of areas for industrial and railroad development, of open spaces and public reservations, stores, public building sites, homes, etc.? (5) What determines the location of streets? (6) What are the best sizes and shapes of blocks and lots?

LOTS	ACREAGES		PERCENTAGES		LOTS
<i>Residential</i>	161.78		67.		<i>Number of House Lots</i> 868
<i>Business</i>	1481		6		<i>Houses per net acre</i> 5.37
<i>Total</i>		17659		73	<i>Average Lot Area</i> 188 Acres
SEMI-PUBLIC PROPERTIES					<i>Normal Lot Size</i> 50 ft. x 150 ft.
<i>Churches</i>	.71		.3		<i>Houses per gross acre</i> 3.58
<i>Total</i>		.71		.3	
PUBLIC PROPERTIES					
<i>Schools</i>	28		1		
<i>Playgrounds</i>	829		3.6		
<i>Parks</i>	68		.3		
<i>Fire Station</i>					
<i>Total</i>		11.77		4.9	
STREETS					STREETS
<i>Main</i> <i>Width 60-70-80 ft.</i>	1643		6.8		<i>Main</i> <i>Length 2 miles</i>
<i>Local</i> <i>Width 30-40-50 ft.</i>	3650		15.0		<i>Local</i> <i>Length 6.7 miles</i>
<i>Total</i>		5293		21.8	<i>Total</i> 8.7
TOTALS	242.00	24200	100	100	



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- (7) Which are the most desirable house types?
 (8) Should the tract be designed so as to be adaptable to a use other than that for which the plan was made?

The accompanying topographical survey is drawn at the scale of 100 feet to the inch, with contour intervals 2 feet apart, except on the steeper ground, where they are 5 feet apart. A uniform interval giving 1-foot contours would be better. The outline of woodland is shown, as are all important specimen trees, giving species and size. The established grades of the streets surrounding the tract are also represented.

The East Youngstown tract is a 40-acre development of the Unit Construction Company, comprising

terrace and semi-detached concrete houses. They are to be offered for rent to the lower-paid workmen at rates varying from \$12 to \$18 per month.

The principal points to be noted in connection with the physical features of the general plan are the location of the streets, with special regard to access from the surroundings as part of the city plan, and to civic and neighborhood centers, factories and parks; the location of civic and neighbor-



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hood centers themselves and the provision for recreation; the distribution, with regard to use, of the stores and houses of different types; the size, shape and proportions of lots; the building lines and other restrictions. A general point of interest is the question of the stability or convertibility of the plan, its adaptability for uses other than those for which it was made. These different points must be studied separately and together, and the final plan should represent the best solution of the whole problem of the lay-out resulting from a broad consideration of all these factors.

The general plan, giving the radii of all curves, with dimensions, is illustrated herewith.

The subdivision of 40, 50 and 60-foot streets is as follows:

40 ft.—Roadway 18 ft., including gutters; planting spaces 6 ft.; sidewalks 4 ft., with 1 ft. reservation between property line and sidewalk.

50 ft.—Roadway 24 ft., including gutters; planting spaces 7 ft.; sidewalks 5 ft., with 1 ft. reservation between property line and sidewalk.

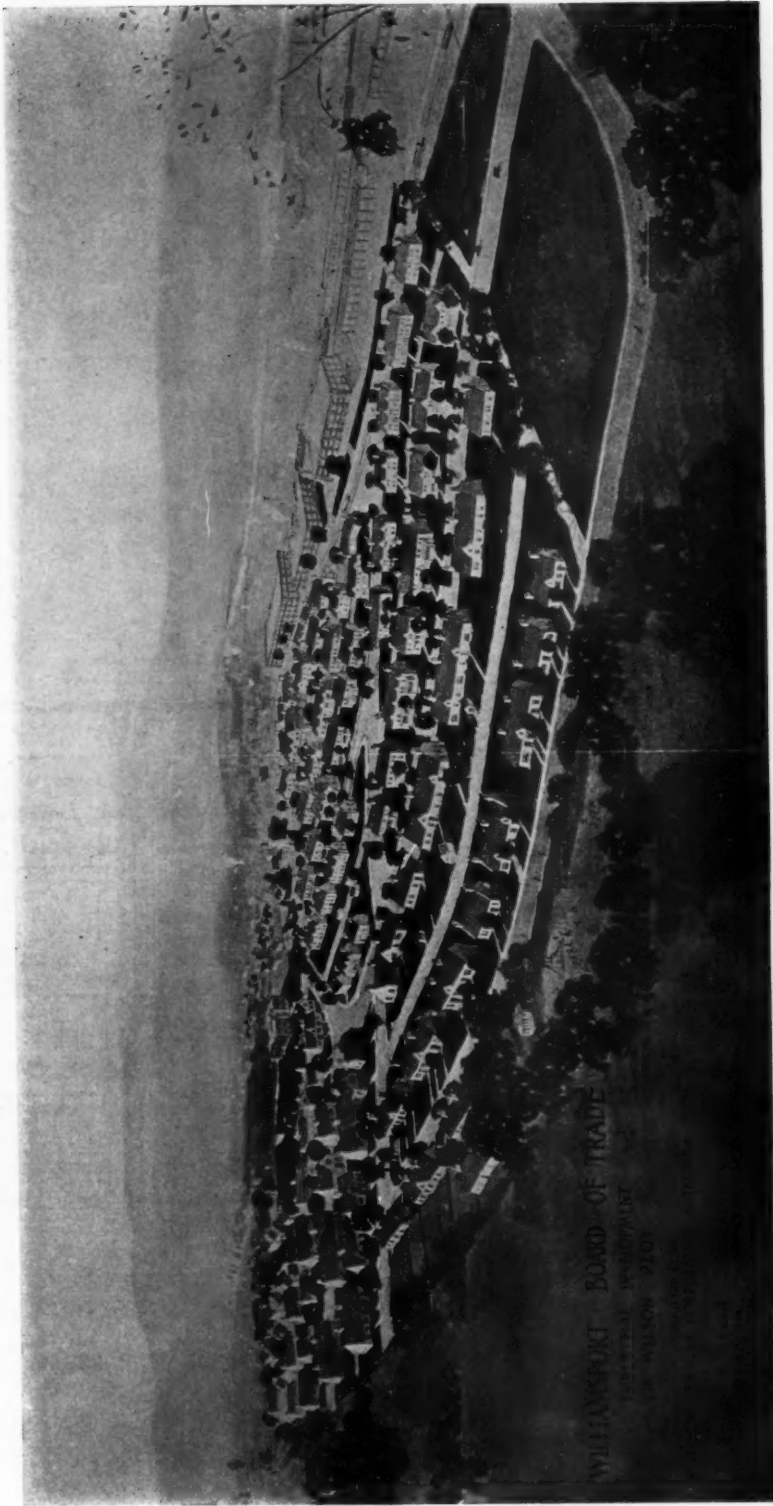
60 ft.—Roadway 32 ft., including gutters; planting spaces 8 ft.; sidewalks 5 ft., with 1 ft. reservation between property line and sidewalk.

The widths of boundary streets are as follows: Loveland Road, 66 ft.; Poland Avenue, 60 ft.; Midlothian Boulevard, 60 ft.



COTTAGES AT ST. ALBANS, ENGLAND.

(Courtesy The Architectural Review, London.)

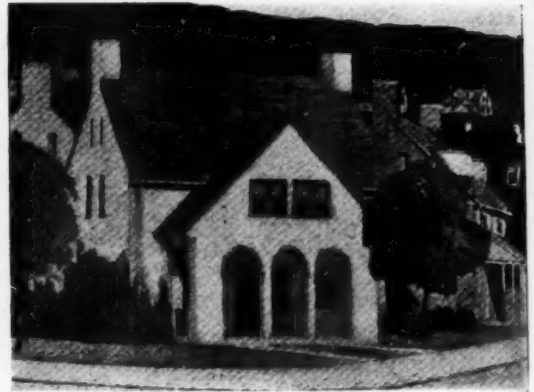


SAWYER PARK—AN INDUSTRIAL DEVELOPMENT AT WILLIAMSPORT, PA.
GEORGE S. AND LEWIS E. WELSH, ARCHITECTS

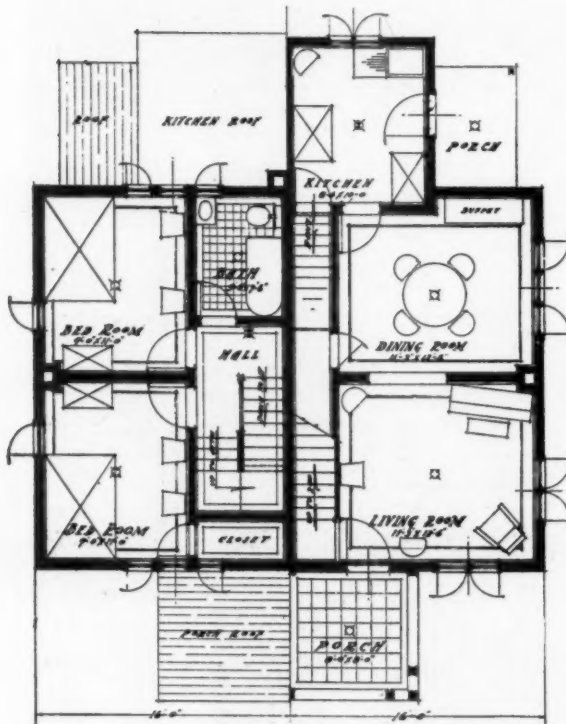
THE AMERICAN ARCHITECT



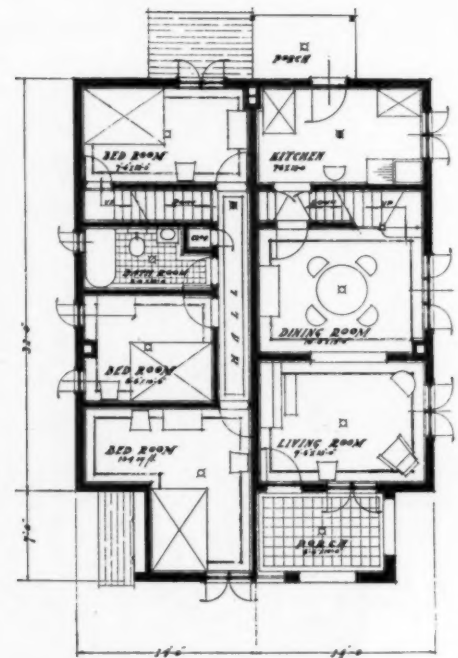
TYPE A—TWO-FAMILY HOUSE



TYPE B—TWO-FAMILY HOUSE



FIRST AND SECOND FLOOR PLANS—TYPE A HOUSE

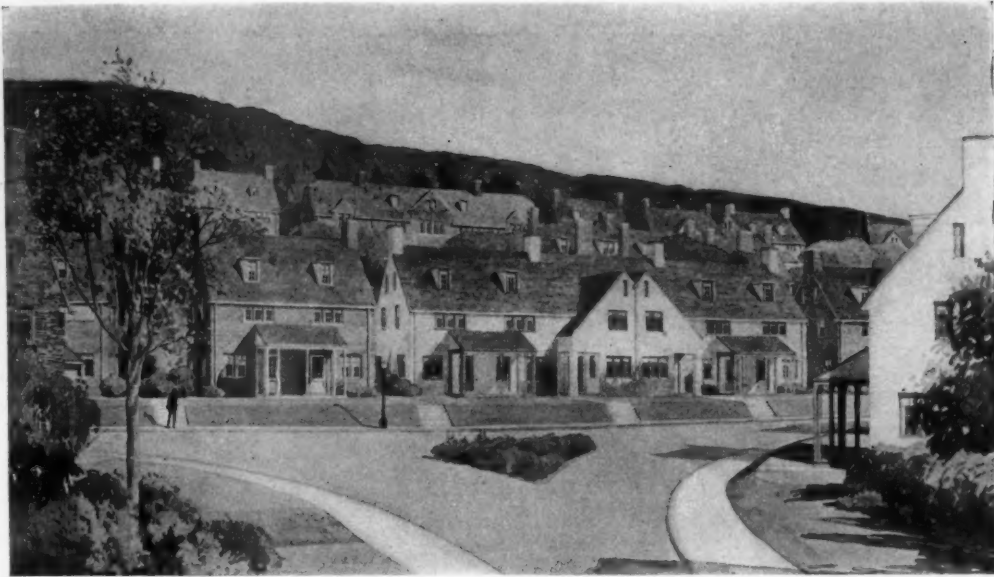


FIRST AND SECOND FLOOR PLANS—TYPE B HOUSE

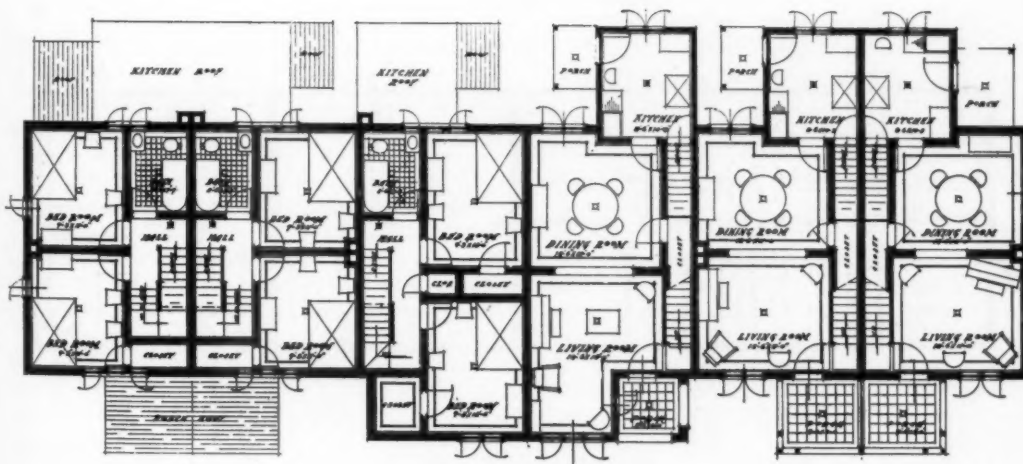
SAWYER PARK—AN INDUSTRIAL DEVELOPMENT AT WILLIAMSPORT, PA.

GEORGE S. AND LEWIS E. WELSH, ARCHITECTS

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TYPE C—SIX-FAMILY HOUSE



FLOOR PLAN—TYPE C HOUSE

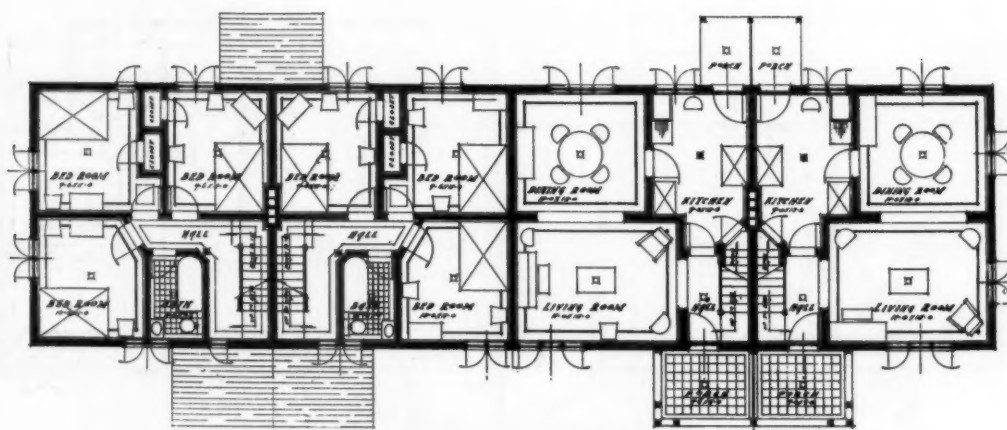
SAWYER PARK—AN INDUSTRIAL DEVELOPMENT AT WILLIAMSPORT, PA.

GEORGE S. AND LEWIS E. WELSH, ARCHITECTS

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TYPE D—FOUR-FAMILY HOUSE



FLOOR PLAN—TYPE D HOUSE

SAWYER PARK—AN INDUSTRIAL DEVELOPMENT AT WILLIAMSPORT, PA.
 GEORGE S. AND LEWIS E. WELSH, ARCHITECTS



TYPICAL ONE AND TWO-FAMILY HOUSES, LOWELL, MASS. ERECTED BY MASSACHUSETTS HOMESTEAD COMMISSION.

(See page following for plans, etc.)

KILHAM & HOPKINS, ARCHITECTS

The Massachusetts Housing Demonstration

By WM. ROGER GREELEY

MOST of the countries of the world have actively promoted good housing within their borders. Results have been uniformly helpful. Only one State in our Union, however, has dared venture into this field. Massachusetts has boldly amended her constitution so as to give herself the power to build houses for her working people. She has constructed a group of cottages in Lowell under an act which provides that such houses shall be built by the Homestead Commission and sold for not less than cost.

The work of building has been pushed through this severest of all winters, and the houses are now ready for sale. They are intended to be within reach of the low-paid mill hand. In the Fourth Annual Report of the Homestead Commission the matter was stated thus: "There are not enough wholesome low-cost dwellings. There is no prospect that present methods will ever supply enough unless the State encourages their construction. Therefore, the State should experiment to learn whether it is possible to build wholesome dwellings within the means of low-paid workers."

The commission proceeded to experiment. Several facts have been developed. First: Under the present market conditions a permanent, well-built house, with accommodations for a family of six or eight, can be built for from \$1,800 to \$2,400. Second: The price of a single house is very little more than the price of one of a group. Third: There is a lively demand for houses of this size and character. Fourth: Good land is available within easy reach of our manufactories at prices ranging from \$25 to \$100 for a lot of about 5000 sq. ft.

Aside from these general facts, there are minor points upon which light has been thrown. After consideration of every known method of construction, and a comparison of the various merits of each, the commission finally built the houses as follows:

Cellars—Complete, concrete floor.

Outside walls—Frame, boards, paper and stained cedar shingles outside; wood lath and plaster inside.

Windows—Stock, double hung, 12 light.

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Doors—Stock, generally fir, galvanized butts painted and rim lock sets.

Floors—Hard pine, oiled.

Outside finish—Cypress painted white.

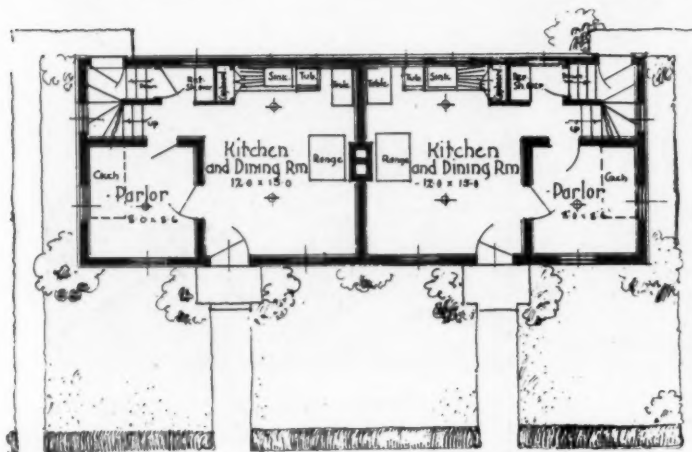
Inside finish—Hard pine, stained and oiled.

Walls in kitchen and bath room painted, elsewhere papered at average of 15c. per roll.

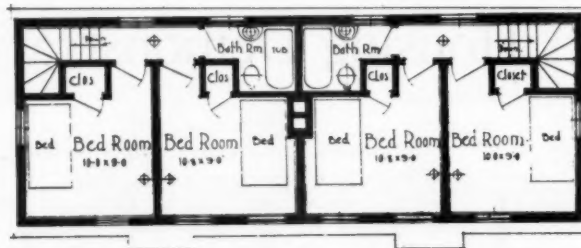
Roof—Boards, paper and slate. Surfaced asphalt twin shingles.

The houses are located in Lowell within easy walking distance of the mills. Other Massachusetts cities are asking that the State build houses within their boundaries.

It is to be remembered, however, that the expressed object of the State was not to try to supply the required number of houses, but to demonstrate what could be done in order that private capital might meet the needs of the many communities with



- FIRST FLOOR PLAN -



- SECOND FLOOR PLAN -

- DATA -	
Cost of House per family	\$1932
Area of House 24' x 16'	348 sq. ft.
Cubic Contents	9,396 cu. ft.
Cost per cubic foot	20 3/4 cts.
Cost of 5000 sq. ft. land	
Cost of Grading, Planting, etc.	
Total Cost of Homestead	
Rental Value @ 9% Gross	
- MATERIALS -	
Outside Walls	Shingles Stained
Roofs	Green Slate Asphalt Shingle
Inside Walls & Ceilings	Plaster
Floors	Hardwood

FLOOR PLANS—TYPICAL TWO-FAMILY HOUSE, LOWELL, MASS.

KILHAM & HOPKINS, ARCHITECTS

For illustration of exterior see preceding page.

Plumbing—Galvanized-iron hot-water boiler, slate sink, cement set tub, enameled-iron bathtub and lavatory, wash-down closet, sill cock, refrigerator drain, gas for range.

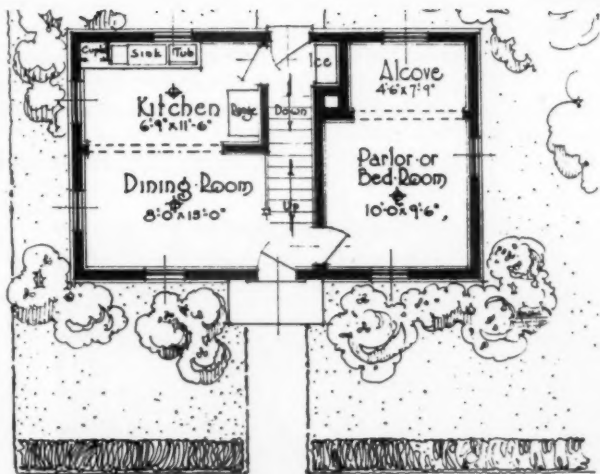
Wiring—Porcelain knob and tube, spun brass fixtures throughout.

The houses will be sold on an easy-payment plan covering a maximum of 28 years, and the price will be such as to return a slight profit to the State. All overhead expenses are included in costs.

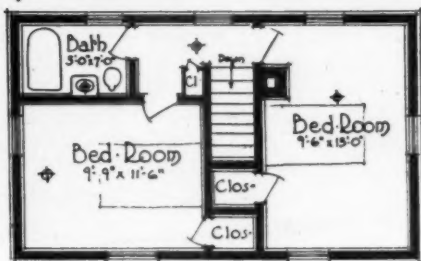
The plans and photographs herewith will give an idea of the character and size of the houses. The grading is not yet complete owing to the unprecedented weather conditions. The contractor has made a good showing considering that contracts were not signed until about Nov. 1, 1917.

assurance and an accurate knowledge of what could be done. This service the State has already performed. It has shown that a house large enough for a family of average size can be built and built well, and provided with ample land for a garden, at a cost to the purchaser of \$2,100 to \$2,500. This, translated into rental value, means \$15 to \$19 a month. This type of house at such a price meets the conditions prevailing in most of our overcrowded centers. The family whose combined income is less than \$15 a week cannot be taken care of in a new detached house with garden, but such families will be relieved, no matter how bad the conditions in which they now find themselves, by the introduction of new housing for those a little higher up the scale.

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- DATA -	
Cost of House	\$ 2360.83
Area of House	165.45 sq. ft.
Cubic Contents	11,180 cu. ft.
Cost per cubic foot	21.3 cents
Cost of 5000 sq. ft. land	
Cost of Grading, Planting, etc.	
Total Cost of Homestead	
Rental Value @ 9% gross	
- MATERIALS -	
Outside Walls	Shingles Stained
Roofs	Green Slate Asphalt Shingle
Inside Walls & Ceilings	Plaster
Floors	Hardwood



TYPICAL ONE FAMILY HOUSE
MASSACHUSETTS HOMESTEAD
COMMISSION

WILLIAM & HOPKINS, ARCHITECTS

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As in the army the promotion of a lieutenant means a moving up of non-commissioned officers, so in housing the advancement of any "low" tenants makes room for those who are still lower in the housing scale.

There is still work to be done by Massachusetts in its "Housing" laboratory. The first experiment was a distinctly urban one. Situated in the city

fares, as the houses are within walking distance of the mills. This is "intensive" use for detached houses. In fact, it includes some semi-detached units. A portion of the tract of land purchased is, however, reserved for a park and playground, and an old homestead will yield to the reviving influence of open plumbing and fresh paint, and afford large rooms and ample facilities for a neighborhood club.

The Commission has outlined two other types of development, besides this "urban" community. One is the suburban, with houses all detached and occupying lots of $\frac{1}{8}$ to $\frac{1}{2}$ acre. The locality will be within a 5-cent fare of the mills. The houses will be similar in character to the urban houses, but some may be bungalows, and the sidewalks, paths, fences, etc., will be different.

The third kind of housing is "rural." The Commission plans to have lots varying from $\frac{1}{2}$ to 5 acres, situated within a 5-cent ride of the mills, or a 6 or 7-cent ride. These houses will be farm houses, and will be studied to meet the demands of the family occupied in the middle of the day with mill work, but having a ploughed field, a cow and hens or other similar farm interests for the odd hours. With these three types the field of low cost housing will be fairly well covered.

The Commission realizes that the houses already constructed are not ideal; that every foot and every dollar has been made to work overtime, but the intention has been to provide a comfortable minimum on the principle that the poor family, coming from crowded and dilapidated tenements would feel with the rest of us that

"Be it ever so humble, there's no place like home."



ALTERNATE DESIGN—ONE FAMILY HOUSE
KILHAM & HOPKINS, ARCHITECTS

itself, the land is high in value and the lots are small, averaging 5000 square feet each. The high cost of land was to be offset by the saving in car-



COTTAGES AT ST. ALBANS, ENGLAND.

Industrial Information

Materials and Equipment Appropriate for Use in Housing Operations

CONDENSED from data and sales statements furnished by the producers mentioned below, whose original letters are on file in this office. Further data about the products mentioned or catalogues of these or other companies can be secured on application to the Industrial Information Department of THE AMERICAN ARCHITECT, 243 West 39th Street, New York City.

Brick and Tile

BRADFORD FIREPROOFING COMPANY, Bradford, Pa. Smooth hollow tile with 12-in. face or scored-back tile for plastering 3-cell 6 in. or 6-cell 8 in., also 3", 4", 10" and 12", both smooth and scored on 12" face. Three plants with capacity of 300 tons per day.

DENISON FIRE-PROOFING CO., Mason City, Iowa, offers Denison Load Bearing Tile for industrial housing because of its fire-proof, vermin-proof and permanent character. State that the cost of completed house is no greater than any other type of good construction.

NATIONAL FIRE PROOFING COMPANY, Fulton Building, Pittsburgh, Pa. "Natco" hollow tile. Have prepared two booklets entitled "Industrial Housing" and "Natco Homes for Working Men."

THE HOLLOW BUILDING TILE ASSOCIATION, 111 West Washington Street, Chicago, Ill., calls attention to the fact that hollow-tile houses can be built almost if not quite as cheaply as less fire-safe structures and result in a building of permanent character which will stand very hard usage.

Cement, Mortar Colors, Plaster, Stucco

ALPHA PORTLAND CEMENT COMPANY, Easton, Pa., has prepared plans, details and construction descriptions of concrete houses which will be sent on request.

CLINTON METALLIC PAINT COMPANY, Clinton, N. Y. Producers of mortar

colors for brick construction, roof paints and roofing cements; also tinting colors for stucco work, of which ochre is in principal demand, as it produces a yellow or cream-colored effect. Samples and descriptive literature sent on request.

COPLEY CEMENT MANUFACTURING COMPANY, 200 Fifth Avenue, New York. Saylor's Portland cement. Concrete recommended by company for housing operations because of its permanent character.

NATIONAL KELLASTONE COMPANY, Mallers Building, Chicago, Ill. "Kellastone" for stucco work. Stated by manufacturers to be waterproof, fire-proof, elastic (not cracking under ordinary building strains) and bonding to window and door frames.

PORTLAND CEMENT ASSOCIATION, 111 West Washington Street, Chicago, Ill., have prepared a booklet "Concrete for Industrial Housing," which will be sent on request.

THE KELLEY ISLAND LIME & TRANSPORT COMPANY, Cleveland, Ohio. Tiger Brand lime.

Electrical

ARROW ELECTRIC COMPANY, Hartford, Conn. House wiring supplies, porcelain and brass shell sockets in all types, switches, receptacles, etc.

HOLOPHANE GLASS COMPANY, INC., 340 Madison Avenue, New York. Special lighting units designed for home lighting. Already used in some housing operations.

NATIONAL METAL MOLDING COMPANY, Pittsburgh, Pa. Sherarduct and Economy rigid conduits, Flexsteel armored conductors, flexible metallic conduits and fittings, National metal molding, devices and fittings, bushings, switch boxes, fixture studs, outlet boxes and covers, and wall brackets.

PASS & SEYMOUR, INC., Solvay, New York. "Shurlock Sockets" to prevent theft of lamps and a complete line of brass sockets and receptacles.

SHAPIRO & ARONSON, Inc., 20 Warren Street, New York. Lighting fixtures of a type and at a price suitable for housing operations.

THE HART MANUFACTURING COMPANY, Hartford, Conn. "Diamond H" switches and electrical material which have been almost exclusively used in high class work can now be furnished at a price equivalent to less well known makes. This has been accomplished by increased production facilities.

THE HOME LIGHT COMPANY OF AMERICA, 1955 Park Avenue, New York. Inexpensive direct and indirect lighting fixtures.

WARDELL LIGHT & FIXTURE COMPANY, 77 Broadway, Detroit, Mich. Lighting fixtures for homes especially designed for the use of the modern, economical nitrogen lamps now almost universally used.

WIRT COMPANY, Armat and Lena Streets, Philadelphia, Pa. This company makes "Dim-a-lite" sockets, which it recommends for use in halls, bathrooms or bedrooms. These are some-

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what more expensive than ordinary sockets, but if comfort of occupants can be considered in relation to cost, are worthy of use.

Hardware

NATIONAL MANUFACTURING COMPANY, Sterling, Ill. Complete line of builders' hardware with the exception of door locks. Large capacity.

PULLMAN MFG. COMPANY, Rochester, N. Y. "Unit" sash balances in three sizes, K, L and M, for differing weights of sash from 4 to 105 lb. each. Recommended by the manufacturer on account of their moderate first cost and permanent character in eliminating upkeep cost.

THE AMERICAN PULLEY COMPANY, Philadelphia Pa. Pressed-steel sash pulleys in all styles ready for immediate shipment.

THE STANLEY WORKS, New Britain, Conn. Hinges, butts and wrought steel hardware of every kind.

Heating

AMERICAN PRESSWELD RADIATOR CORPORATION, Detroit, Mich., makes the following statements about Pressed Metal radiators: light in weight, occupy small space compared with amount of radiation, reduce coal consumption for maintaining a given temperature, improve air circulation and are not injured by freezing. These radiators are made from open hearth high grade copper bearing sheets.

AMERICAN RADIATOR COMPANY, 816 So. Michigan Ave., Chicago, Ill. Has developed the Ideal Arcola Boiler especially suited to use in small housing operations. Consists of a boiler and hot water radiator in one unit from which piping can be run to other radiators. Can be placed in any room where chimney connection can be secured. Of great service for cellarless houses.

GURNEY HEATER MFG. COMPANY, 180 Franklin Street, Boston, Mass. Steam and hot water heating systems. Believes that this type is preferred by the occupant due to its economy and ease of operation.

HART & CROUSE, Utica, New York, and Washington, D. C. Hot air furnaces, steam and hot water boilers and radiators.

HAYNES-LANGENBERG MFG. CO., 4000 Forest Park Boulevard, St. Louis, Mo. "Front Rank" steel furnaces for warm air heating.

HESS WARMING & VENTILATING COMPANY, Tacoma Building, Chicago, Ill. Steel hot air furnaces; recommends pipeless furnace for industrial cottages.

HOFFMAN SPECIALTY COMPANY, 130 No. Wells Street, Chicago, Ill. Venting valves for every service in steam and vapor heating systems.

HUMPHREY COMPANY, Kalamazoo, Mich. This company manufactures a complete line of gas water heaters. As industrial housing means modern sanitary methods, it recommends the installation of well-tested and well-built heaters as a part of original equipment to insure permanent economy.

INDEPENDENT REGISTER & MANUFACTURING COMPANY, Cleveland, Ohio. Independent adjustable ceiling ventilator for use with stoves or pipeless furnaces.

INTERNATIONAL HEATER COMPANY, Utica, New York. Recommend their Onepipe Heater for the smallest houses designated as types 1 and 2 and their other products for larger types. These include both round and sectional steam and hot water boilers, warm air furnaces and combination heaters for either steam and warm air or hot water and warm air.

KELSEY HEATING COMPANY, Inc., Syracuse, N. Y., can supply warm air heaters in all sizes and several types.

MINNEAPOLIS HEAT REGULATOR COMPANY, Minneapolis, Minn. Temperature controlling devices for use where economy of operation and even temperature are considered essential enough to warrant first cost.

PEERLESS HEATER COMPANY, Pittsburgh, Pa. Low pressure cast iron boilers for either gas or coal fuel.

ROCK ISLAND REGISTER COMPANY, Rock Island, Ill., makers of "Rock Island No Streak" registers. This company calls attention to the fact that many of the houses for industrial workers are of an open plan which by the use of large registers, properly placed, can be well heated at a very moderate price by the elimination of unnecessary piping.

SILL STOVE WORKS, Rochester, N. Y. Recommend warm air furnaces on account of simplicity of operation. Homestead Sterling furnaces for usual installation and Homestead Pipeless where that can be used.

SPENCER HEATER COMPANY, Scranton, Pa. Steam, vapor and hot water boilers and hot air furnaces, all burning No. 1 Buckwheat coal with a Magazine-Feed.

SYMONDS REGISTER COMPANY, 3120 Minnesota Avenue, St. Louis, Mo. Warm air registers and sheet metal specialties.

THE HART & COOLEY COMPANY, New Britain, Conn. A complete line of registers and ventilators including No. 260 grating used particularly for pipeless furnaces.

THE HESS-SNYDER COMPANY, Massillon, Ohio. Warm-air heating furnaces, cook stoves, pumps.

THE MAJESTIC COMPANY, Huntington, Ind. Coal chutes, underground garbage receptacles, "Hot Blast Furnace" especially designed for burning soft coal.

THE MEYER FURNACE COMPANY, Peoria, Ill., manufacturers of Weir all steel warm air furnaces.

THE SCIENTIFIC HEATER COMPANY, E. 152nd Street, Cleveland, Ohio. Warm air furnaces for coal, gas, or a combination of both.

THE UNITED STATES REGISTER COMPANY, Battle Creek, Michigan. Warm air registers and accessories of all kinds.

THE WATERLOO REGISTER COMPANY, Waterloo, Iowa. Warm air furnaces and registers, coal chutes.

THE WILLIAMSON HEATER COMPANY, Cincinnati, Ohio. Complete line of warm air furnaces of different types, also furnace pipe and fittings. Will supply furnaces ready for installation or take contracts including installation.

THE YOUNGSTOWN SHEET & TUBE COMPANY, Youngstown, Ohio. Pipe for heating and water supply systems and conduit for electrical work.

UNITED STATES RADIATOR CORPORATION, Detroit, Mich., maker of Capitol boilers and United States radiators, recommend steam and hot water as the most satisfactory methods of heating.

WALKER & PRATT MANUFACTURING COMPANY, 31 Union Street, Boston, Mass. Recommend warm air furnaces on account of moderate first cost and economy of operation in harmony with most housing operations. Also manufacture steam and hot water systems.

WARREN WEBSTER & COMPANY, Camden, N. J. Vapor-vacuum system of steam heating.

Lumber

THE CALIFORNIA REDWOOD ASSOCIATION, Call Bldg., San Francisco, Cal. Redwood Lumber recommended for both exterior and interior woodwork because of its durability, absence of pitch, easy working, ready taking of paints and finishes and moderate cost.

THE NATIONAL LUMBER MANUFACTURERS ASSOCIATION, 11 South La Salle Street, Chicago, Ill. Have prepared a very interesting booklet entitled "Housing and Industry," reviewing briefly some of the questions involved in this problem and calling attention to the adaptability of wood for either complete wood construction or wood framing as a base for other materials. Gives interesting facts regarding some completed housing operations.

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WESTERN WHITE PINE MANUFACTURERS' ASSOCIATION, 510 Yeon Building, Portland, Ore. Members of this association produce Western White Pine and Idaho White Pine suitable for both exterior and interior woodwork wherever it is to be painted. They also produce vertical-grain larch flooring, which is durable and relatively cheap.

WHITE PINE BUREAU, Merchants' National Bank Building, St. Paul, Minn. It is stated that white pine finds its most economical use in items of outside finish such as window sash and frames, siding, cornice, etc. Attention is called to the service which white pine has given on many old New England buildings. A copy of "White Pine in Home-Building" will be sent on request. Also the White Pine Specifications Book of 196 pages, containing Recommended Uses for White Pine in House Construction, and White Pine Standard Grading Rules.

Miscellaneous

AMERICAN WINDOW GLASS COMPANY, Farmers' Bank Building, Pittsburgh, Pa. Report that "common" window glass, chiefly single strength, has been mostly used in housing operations. Booklets giving standard sizes of glass supplied.

FLI-BAC SCREEN CORPORATION, 136A East Avenue, Rochester, N. Y., make an automatic rolling screen placed outside the sash as a permanent fixture. It is constructed of rust-proof material with a life of from ten to fifteen years.

FRANKLYN R. MULLER & COMPANY, Waukegan, Ill. "Asbestone" is a sanitary plastic fireproof material of long wearing qualities suitable for use as floor, sanitary cove base and wainscoting in kitchens, bathrooms and enclosed porches.

HARTMANN-SANDERS COMPANY, 2155 Elston Avenue, Chicago, Ill. Porch columns and porch material a specialty. Can supply all kinds of interior finish and cabinet work.

JOSAM MANUFACTURING COMPANY, 27 South Fourth Street, St. Louis, Mo. Shower, floor and roof drains.

MILWAUKEE CORRUGATING COMPANY, Milwaukee, Wis. "American Titelock Metal Shingles," metal roofing, tile, siding, cornice, ceiling and side walls, corner beads and metal lath, ventilators.

MONARCH METAL WEATHERSTRIP COMPANY, 4120 Forest Park Boulevard, St. Louis, Mo. This company calls attention to the fact that, no matter how well built a house may be, there is bound to be heat leakage through the cracks around doors and windows. This leakage can be prevented by the

use of metal weather strips and this reduces fuel consumption which is a most important consideration at the present time.

PLASTERGON WALL BOARD COMPANY, Buffalo, N. Y., calls attention to the fact that wall board is a material that has quality, is economical and lends itself to rapid construction, as evidenced by its use for many Government buildings.

SAMSON CORDAGE WORKS, 88 Broad Street, Boston, Mass. "Samson Spot Cord" recommended for use where sash cord of utmost durability is required and "Phoenix" for a low price cord.

THE ASSOCIATED TILE MANUFACTURERS, Beaver Falls, Pa., call attention to the value of tile for bathrooms, toilets and porches, not only on account of its sanitary value but also because of its psychological value on the occupant of the house.

THE CANTON STEEL CEILING COMPANY, 497 West Street, New York. Steel Ceilings and Sidewalls. Call attention to durable character and ease of erection.

THE CINCINNATI FLY SCREEN COMPANY, Cincinnati, Ohio. Rewirable metal and wood frame screens.

THE CINCINNATI MFG. COMPANY, Cincinnati, Ohio. Hollow Metal and Kalamein doors for high grade housing.

THE POWELL BUILT-IN STEEL KITCHEN COMPANY (The Berry Sales Co., Inc., 101 Park Avenue, New York, sales agents). As economy in space is economy in construction, and the further fact that in many workmen's homes one room must be used for several purposes, this company recommends its built-in steel kitchens. These consist of complete steel kitchen equipment, including stove, refrigerator, cabinet and sink, which is condensed into a space 18 in. deep and varying from 5 ft. to 10 ft. 6 in. in width. This company has developed typical floor plans showing the installation of its equipment in two, three and four-room houses having the equivalent capacity of four, five and seven-room houses of ordinary design. These plans will be sent on request.

THE SCREW MACHINE PRODUCTS CORPORATION, Providence, R. I. "Select-O-Phone" recommended for intercommunication in grouped housing operations.

THE TRUS-CON LABORATORIES, Detroit, Mich. Waterproofing paste for stucco work and general line of technical paints.

UNION FIBRE COMPANY, Winona, Minn. "Linofelt" and "Fibrofelt" for insulation in place of common building

paper. Emphasize economy in coal consumption, which is important to-day.

Paints, Stains, Varnishes

JAMESTOWN WOOD FINISHING COMPANY, Jamestown, N. Y., specializes on aniline stains soluble in water and oil, in any color and for either hard or soft woods. Also produces wood fillers, primers or coaters, enamels and varnishes.

JOHN LUCAS & COMPANY, INC., Philadelphia, Pa. A complete line of paint and varnish products for both exterior and interior work.

SAMUEL CABOT, INC., 141 Milk Street, Boston, Mass. Creosote Wood Stains for exterior woodwork and shingles; Interior Stains for interior wood work and wall board; "Old Virginia White," Old Virginia Tints and Waterproof Stucco Stains, Insulating Quilt for heat, insulation and sound deadening.

THE GLIDDEN COMPANY, Cleveland, Ohio. A complete line of finishes for both interior and exterior. Will gladly have representatives confer with architects on each special case.

Plaster and Stucco Base

BOSTWICK STEEL LATH COMPANY, Niles, Ohio. Bostwick Truss Loop metal lath. Calls attention to the value of metal lath and stucco construction as a fire preventive measure, as a means of reducing upkeep cost and its present quick availability due to the fact that plasterers are easily secured. This company has also compiled cost figures which are available to those who desire them.

NORTH WESTERN EXPANDED METAL COMPANY, 407 South Dearborn Street, Chicago, Ill. "Kno-Burn" metal lath as a base for both exterior stucco work and interior plastering.

SIFO PRODUCTS COMPANY, St. Paul, Minn. "Sifo Lath" made of crimped sheathing felt forming keys for plaster and supported and stiffened by wire. Serves in the two capacities of insulating material and plaster base.

THE AMERICAN ROLLING MILL COMPANY, Middletown, Ohio. "Arimco Iron" recommended by manufacturer for its purity and rust-resistive qualities. Product includes metal lath and all forms of plain and corrugated sheets.

THE BERGER MANUFACTURING CO., Canton, Ohio. This company has produced typical plans for workmen's stucco houses which show the method of using their many products including metal lumber, metal lath, steel ceilings, etc. Detailed information will be sent on request.

THE AMERICAN ARCHITECT

THE BISHOPRIC MANUFACTURING COMPANY, Cincinnati, Ohio. Bishopric stucco board with Elastica plaster coat for exterior, and Bishopric wall board with Elastica plaster coat for interior; also Bishopric sheathing. Cost figures and detailed drawings furnished on application.

THE CONSOLIDATED EXPANDED METAL COMPANIES, Braddock, Pa. Metal lath and expanded metal for concrete reinforcing.

THE GENERAL FIREPROOFING COMPANY, Youngstown, Ohio, manufacturer of Herringbone Metal Lath. This company recommends a construction using an ordinary wood frame with studs 16 inches on centers to which is stapled metal lath either with or without metal furring strips on the studs. This is then to be covered with stucco on the outside and back plastered between the studs. An integral waterproofing should be used on the final exterior coat. Attention is called to the fact that plenty of metal lath is available from material on hand without in any way interfering with any government requirements. Raw materials for stucco are found everywhere and the class of labor required for this work is now generally without employment.

THE SYKES METAL LATH & ROOFING COMPANY, Niles, Ohio. Metal lath for exterior stucco and inside plastering. Recommended by manufacturer on account of fire-resistive qualities.

TRUSCON STEEL COMPANY, Youngstown, Ohio. Hy-Rib metal lath for stucco and plastering generally, including solid partitions, pressed-steel construction, corner beads and base screeds.

UNITED STATES GYPSUM COMPANY, Fifth and Monroe Streets, Chicago, Ill., manufacturers of all types of Gypsum products. For industrial housing work this company recommends particularly the following: Sheetrock Wall Board, 32" and 48" wide and 3' to 10' long, for which these advantages are claimed: Non-warping, fire-resisting, non-conductive of both heat and sound, takes all kinds of wall decorations; Sackett and Adamant Plaster Board as base for either stucco or plaster and for

use as sheathing; Sackett Furring Board, offering fire-resistive qualities; Gypsum Wall Plasters; "Structolite," a structural Gypsum, and "Pyrobar" Gypsum Tile.

Plumbing

A. M. BYERS COMPANY, Pittsburgh, Pa. Genuine wrought-iron pipe for heating, plumbing and drainage lines in all sizes up to 12 inches, both black and galvanized.

CENTRAL FOUNDRY COMPANY, 90 West Street, New York. Largest manufacturers of cast-iron soil pipe and fittings for plumbing and house drainage.

NATIONAL TUBE COMPANY, Pittsburgh, Pa. Steel pipe.

STANDARD SANITARY MFG. COMPANY, Pittsburgh, Pa. Regular lines of plumbing fixtures and brass goods suitable for industrial housing operations.

THE BRUNSWICK - BALKE - COLLENDER COMPANY, 623 South Wabash Avenue, Chicago, Ill., state that "Whalebonite" closet seats are unaffected by uric acid and moisture, do not deteriorate—most durable.

THOMAS SAVILL'S SONS, 1310 Wallace Street, Philadelphia, Pa. A patented quick-opening, positive shut-off and no splash faucet, together with a complete line of plumbers' brass work.

UNITED BRASS MANUFACTURING COMPANY, Cleveland, Ohio. A complete line of plumbers' brass goods.

Roofing

BIRD & SON, East Walpole, Mass. "Neponset" twin shingles, "Neponset" wall board, "Neponset" waterproof building papers.

NATIONAL ASBESTOS MANUFACTURING COMPANY, Jersey City, N. J., manufactures asbestos asphalt slate surfaced strip shingles, asbestos asphalt slate surfaced sheet roofing, asbestos flat slates and asbestos tapered shingles and slates. These products can be furnished in various colors and are recommended by the manufacturer on

account of their long life (guaranteed for twenty years) and high fire resistive qualities.

RISING & NELSON SLATE COMPANY, West Pawlet, Vt., 101 Park Avenue, New York City, producers of slate roofing of every description, recommends slate on account of its long life and fire-resistive qualities.

THE BARRETT COMPANY, New York. Felt and pitch for gravel or slag roofs, slate surfaced shingles, slate surfaced roll roofings, smooth surfaced roll roofings. As a matter of transportation relief and present labor economy, this company suggests the use of roll roofing wherever practicable as it can be covered at any later date with other types of roofing if greater permanency or better artistic effect is desired. The company further recommends that a "Built-up" gravel or slag roof should be used on flat surfaces (2" to the foot and under). As cheaper types of roofing effect relatively little saving in labor or material these should be constructed with the view of having the same degree of permanence as the other parts of the building.

THE FLINTKOTE COMPANY, 88 Pearl St., Boston, Mass. Asphalt shingles in varieties of colors, roll roofing and roof paints. Recommend Strip Asphalt Shingles on account of light weight and low cost of application.

Woodwork

AMERICAN SASH & DOOR COMPANY, Kansas City, Mo., manufacturer of special mill work to meet architects' requirements, as well as stock doors, sash, frames, etc.

THE CURTIS COMPANIES, Clinton, Iowa. This company, which is one of the largest producers of interior woodwork, has made a very careful study of the industrial housing situation and strongly recommends standardization in design and sizes of woodwork. This, they state, can be accomplished without any sacrifice of architectural value and with the possibility of very material saving in cost. Representatives of the company will gladly consult with architects.

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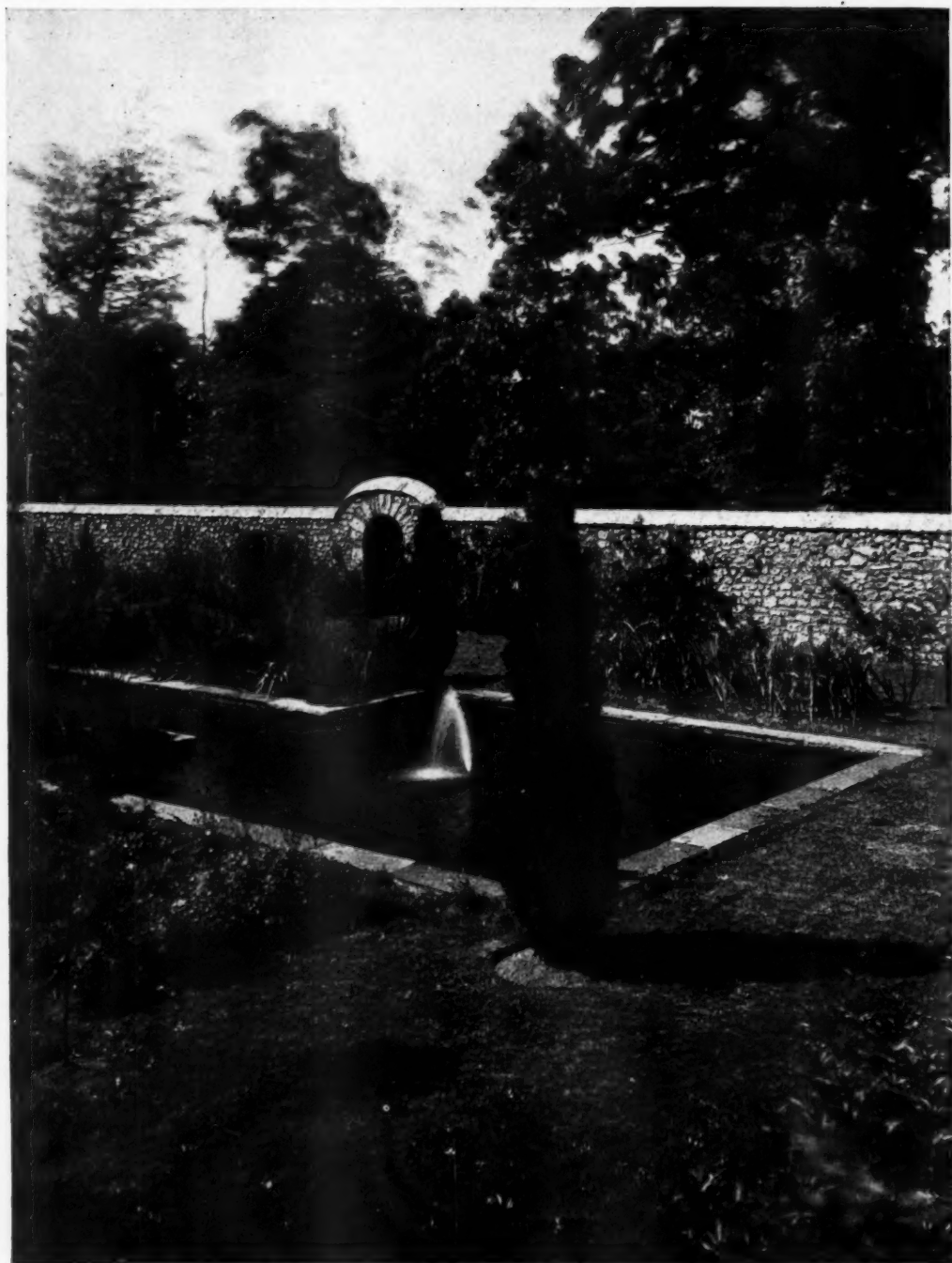
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JOHN RUSSELL POPE, ARCHITECT.

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