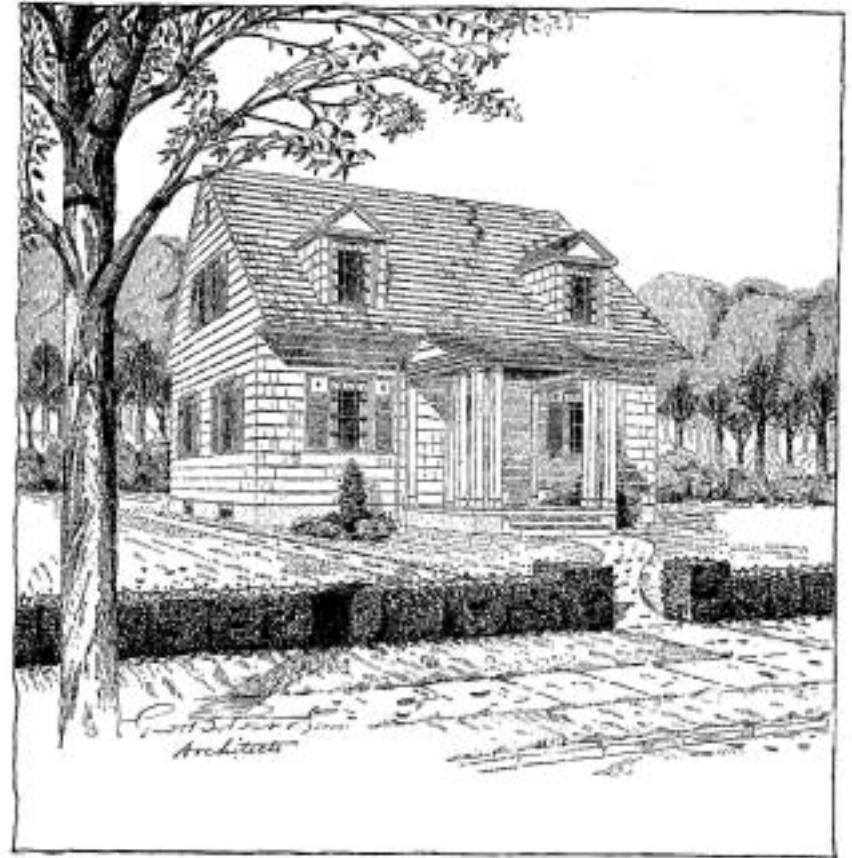


INDUSTRIAL HOUSING PROBLEMS

BY
LESLIE H. ALLEN



ONE OF THE HOUSES FOR WAGE-EARNERS BUILT BY
FAIRBANKS, MORSE & CO. IN THEIR COMMUNITY
DEVELOPMENT, БЕЛОIT, WIS.

GEO. B. POST & SONS, ARCHITECTS.

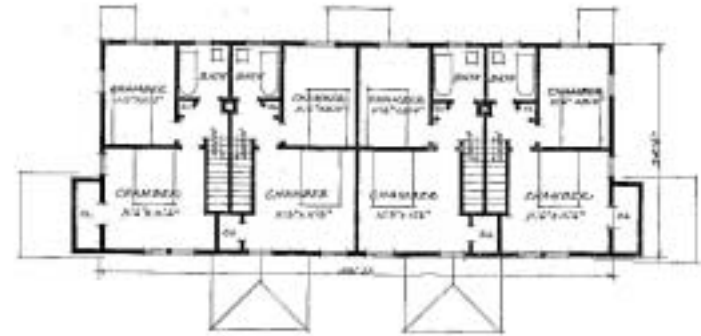
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BOSTON, MASSACHUSETTS



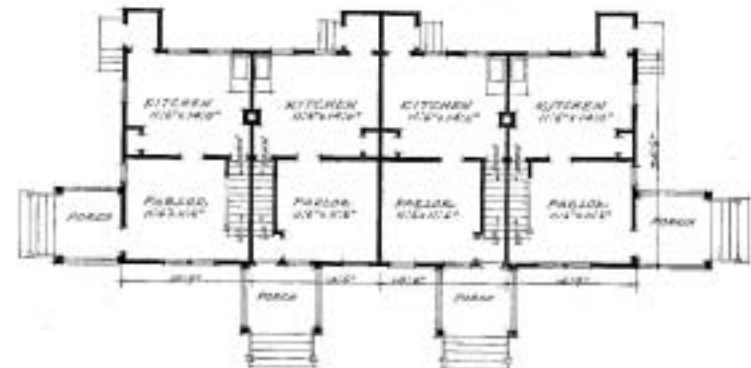
-FIRST FLOOR PLAN-

-SECOND FLOOR PLAN-

-TWO FAMILY SIX ROOM HOUSE-
-FOR THE OAKVILLE COMPANY-



-SECOND FLOOR PLAN-



FIRST FLOOR PLAN

FOUR FAMILY-FOUR ROOM HOUSE



Introduction

NOT long ago we were asked by one of our clients to undertake the construction of a small village of workmen's homes around a new cotton mill and storehouse which we were then building. Shortly afterwards we took a contract for one hundred reinforced concrete houses at Donora, Pa. The Construction of this work involved several unusual features and has aroused a good deal of interest in engineering circles.

This housing work has led us to study the industrial situation and to realize the national importance of good housing and the great shortage of houses for the working classes in our manufacturing centers. It also opened up to us a new field for large building contracts.

This article by our Mr. Leslie H. Allen (who is a member of the National Housing Association and chairman of the Industrial Housing Committee of the American Concrete Institute) outlines the present industrial situation in its relation to housing, and discusses the points to be considered and problems that arise in the initiation and management of a housing enterprise. We have published it with the intention of furnishing to our clients and others in readable form a statement of the best practice in this field.

ABERTHAW CONSTRUCTION COMPANY

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By Aberthaw Construction Company

BOSTON, MASS.,
Dec. 1, 1917.

Preface to the Second Edition

Owing to the friendly reception of this booklet and the large demand for it, it has been found necessary to prepare a second edition. We have taken this opportunity to make a few changes in the text and to include illustrations of some of the work of well-known architects who have specialized in the industrial housing field.

Out thanks are due to Messrs. George B. Post & Sons, R. Clipston Sturgis, Schenck & Mead, George F. Marlowe and George H. Schwan for permission to publish pictures of their works, and to the "Architectural Forum" for the use of the plates.

ABERTHAW CONSTRUCTION COMPANY

BOSTON, May 1, 1918



Preface to the Third Edition

While conducting research into the history of the Marktown Historic District in East Chicago, Indiana, I came upon a reference to this text. I obtained a copy via the East Chicago Public Library and their Interlibrary Loan Program. When the copy arrived I found it to be an outstanding reference point in relation to the architectural, social and industrial history of the of nation during the great transition between an agricultural society to that of an industrial one.

I also found the copy to be literally falling apart in my hands. The paper did not age well, nor did the glue do the copy and justice. As a result I have taken the liberty to reprinting and reproducing the text as closely to the original as possible.

MARKTOWN PRESERVATION SOCIETY

EAST CHICAGO, May 1, 2003

Industrial Housing Problems

By Leslie H. Allen.

Labor Turnover

It is reported from Bucyrus, Ohio, that one manufacturing concern recently brought 150 employees to the city by great effort; after a few days thirty remained, the other 120 left having failed to secure comfortable homes.

In Derby, Conn., one company was compelled to sub-let to out-of-town concerns over \$800,000 of work, which could easily have been done in the city if it had been possible to bring more mechanics to the city and house them.

Six cement companies, who recently analyzed their labor turnover for a period of three years, report an average of 103% per annum. A prominent public service corporation near Philadelphia, confessed recently to a labor turnover of 1100%, and, although this is exceptional, a turnover per annum of 400% is not uncommon.

These cases are typical of widespread conditions. During the past two or three years employers of labor in all of our big industrial centers have experienced such great difficulty in getting and keeping employees that much attention has been focused upon the employment situation. The results of many investigations have shown that one of the prime causes for the shifting population and large labor turnover of many industrial plants is the utterly inadequate housing accommodations available for the industrial worker.

In years gone by wages were low and the cost of turnover was hardly considered, for there was always a long line of new men waiting for a job, and, because of this excess of supply of men over demand, a man was not so ready to throw up his job and

seek another. He would put up with the poor housing conditions for the sake of having any job at all. But in the present labor situation, with demand far exceeding the supply, the workman will no longer be content with the disgraceful housing conditions he has had to put up with. He rightly objects to sleeping six or eight in a room big enough for two; turning out of his bed in the morning just in time for the night-shift man to take his place; and as fast as manufacturers bid for his services by putting up decent houses (as many are now doing) he is going to leave the old insanitary overcrowded centers to go to the new villages where he can live decently and comfortably with his wife and family.

The Effect of Present Crisis

Very little is being done at the present time to remedy this state of affairs owing to the fact that the present abnormal prices of labor and building materials have shut off the supply of houses. Heretofore the demand for houses has been supplied by the speculative builder and the real estate operator. But at the present time he can no longer afford to build --- in many cities he cannot get construction loans, and even if he does he cannot hope to sell in the open market at present prices and cannot be sure of any return on his money by renting, having in mind a possible trade depression during the reconstruction period which will come at the end of the war, so that, while the demand for better houses continues, the supply is getting less and less. In view of the probability that the labor situation will not change for four or five years after the close of the war, the manufacturer is faced with the very serious problem of how best to compete in the labor market for his needs, with the knowledge that housing is an important factor in which he will get no help from local investors as in former years.

He has long felt that the housing problem is one to which he ought to have serious attention. He has disliked doing so, and for good reason, but the present crisis is forming upon him the con-

viction that he has got to tackle it, and that in the future he ought to control it.

The Effect of Bad Housing on Industry

Apart from any consideration of this subject from the humanitarian or sentimental side, the industrial employer is beginning to realize the tremendous importance of these conditions in their relation to production.

He is finding out that men who are housed in unhygienic and unsanitary dwellings are not so healthy, not so efficient, lose more time through sickness and are more stupid and troublesome in the plant.

Statistics computed in Chicago and elsewhere have proved conclusively that the areas having maximum density of population coincide with those having the highest percentage of tuberculosis and other contagious diseases, crime and social evil.

The output of the plant is seriously affected by the prevalence of sickness which is so often caused by the insanitary surroundings of the workman's house and the overcrowding inside. With open privies or cesspools in the back yards, and wells within twenty feet, typhoid is an ever imminent danger; with overcrowding and lack of opportunity for personal cleanliness, tuberculosis and other diseases flourish; these reduce the regularity of the men's attendance at work and the production of the plant.

We are at last beginning to realize that people who live in pigsties are likely to be and to act like pigs. If we want respectable and intelligent men and women to work for us in our plants, we must see that they have decent, healthy and comfortable homes.

The interest of the employer in the health of the employee is being shown in the better sanitary accommodations in the factory, the provision of drinking-water fountains, shower baths, rest rooms and hospitals, and in recreation parks and club rooms, athletic associations, etc., and in some cases in the sale of wholesome food for the workers to eat during their dinner hour. And in

doing so he has recognized the importance to his plant of happy, healthy employees. The provision of decent houses for them is but a short step further.

The human tool is not unlike the machine tool in this respect, -- the better it is housed and cared for the greater will be its efficiency and its output.

And so it is that we find in city after city and in many rural communities industrial plants are putting out large sums of money in building model villages or model homes for their working people. It is being recognized that in order to secure good workmen and to hold them it is necessary not only to provide work for them to do but to provide good houses for them to live in. It is no longer safe or good policy to leave this matter to chance or to the irresponsible real estate speculator.

In February last the writer was discussing this matter with a textile manufacturer who said there might be some point in what was said, but he did not feel it was important enough in his plant, as the supply of houses took care of the demand. In September the writer saw him again. Fifteen per cent of his machinery was idle because his help would not stay. He stated that the cost of the houses he should have built in the spring would have been returned to him in the profits on the output of his idle machinery.

The Employer's Responsibility

Many experts think that it is undesirable for the manufacturing corporation itself to own houses and sell or rent them to the worker, if this can be properly taken care of by other parties. In spite of this, many corporations have been doing this successfully and maintaining harmonious relations with their work people. At the present time, with prices of building work at their present level, the employer is being forced into this field. No longer can a manufacturer build a large plant and find houses springing up all around without any effort of his. The workers are the motive power of any factory plant, and the employer who builds a new

plant today without building houses near by finds himself like a locomotive without fuel. Even in large cities such as Bridgeport, Akron, and many others, the manufacturers themselves have had to combine to raise the necessary capital to take care of and remedy the housing situation.

It is not absolutely necessary that the manufacturer or corporation should conduct real estate and building operations in their own name. It is easy to organize a separate corporation with a separate board of directors to carry out such work. Sometimes, when civic spirit runs high, other citizens or financiers in the town or village can be interested to a certain extent. But at the present time, when houses do not appear to be a remunerative investment, it is not likely that they can be induced to share the risk of such an investment. The employer, however, has got to build to hold his men, and if he cannot do so at a fair profit it is wise to write off a portion of the sum invested as a charge against operating expenses, the amount written off being considered as a part of the cost of securing the men needed to operate the plant.

The question may arise as to whether it is best to pay a low wage and bear part of the employees' housing expense as is usually done in rural communities or pay a high wage and let the employee pay the full cost of his housing, but the answer to this problem does not fall within the scope of this article and cannot be discussed here.

The manufacturer locating a new plant is faced with the fact that the factors which reduce the price of land must be paid for by increased expenditure in other directions, one important item of expense being the cost of attracting help from distant labor markets. In many cases the amount sunk in housing without financial return may properly be charged against the low price of land.

Mr. C. L. Close, Manager of the Safety, Relief, Sanitation and Welfare Department of the United States Steel Corporation, has said in a recent article:

"The housing of employees requires the expenditure of large

sums of money. That money must be taken out of the business. As part of the capital of the enterprise it must yield returns to those who have invested it. But money invested in building houses for employees will not bring any such return as money employed in the manufacture and sale of products of industry. Therefore, a board of directors is compelled seriously to consider how far it can properly withdraw capital for the construction of industrial houses and villages. It is easy to say that the diminished returns on this capital are made up by larger returns on the remainder of their capital, due to better work done by more contented workmen. We firmly believe this, but it is not a thing which can be demonstrated by the books of account."

"Behind all housing problems lies the most important one of all. An industrial enterprise must be so conducted that all shall earn enough to provide proper working conditions for all its employees, to pay fair wages, and to return a reasonable profit to those who have invested their money in it."

We all agree on the last necessity. We are coming to see that the importance of the other two is almost equally great.

Housing Standards

When the manufacturer has decided to build, he is faced with the problem of selecting the type of house he shall build, its size, number of rooms, materials of construction, amount of land per house, and so on. On these subjects there are many differences of opinion as there are experts studying them.

A set of standards has been drawn up for use of architects on government work, which represents the best judgment of the National Housing Association on the minimum requirements to be insisted on in any houses built wholly or in part with government funds. The standards, though not compulsory, cover the whole ground in a very satisfactory way. Those intending to build cannot do better than to follow them. They have been printed in pamphlet form by the publishers of the Architectural Record.

The Skilled and Unskilled Workmen

In order to arrive at some working basis to govern the laying out of new work, it will be well at this point to consider the essential needs of workman's family in the light of present-day needs.

It must first be recognized that we have two classes of workmen to be considered: (1) The unskilled workmen, mostly foreigners or negroes, uneducated, unused to American houses and American standards of living, earning a very low wage, and (2) the skilled men, mechanics, machinists, etc., earning a higher wage, mostly Americans, living according to American standards, demanding more and willing to pay more for the comforts than the foreigner does not consider essential. The result of a failure to distinguish these two classes is that at the present time nearly all the homes built are American houses for skilled workmen, and the need for better houses for unskilled labor has remained unsatisfied, resulting in overcrowding getting worse and worse. Here and there, as in Philadelphia and Washington, a most excellent attempt has been made to solve the problem of housing the unskilled, low-paid workman. Such examples have not been copied, and only serve to show up more sharply the mistakes of other cities.

Housing Essentials

The essentials of a modern city house may be summarized as follows:

- Watertight roof, walls and floors.
- Bedroom for parents.
- Bedroom for male children.
- Bedroom for female children.
- Living-room for cooking, eating and general day use.
- Private toilet-room with sanitary water-closet and sewer connection.
- Suitable heating arrangements.
- Running water supply fit for drinking.
- Uninterrupted daylight and ventilation through windows in every room.

Sink in kitchen, with running water and waste.

Further additions required by the American family and considered necessary by them:

Cellars.
Closets.
Bathtub with running water.
Window screens.
Separate parlor.

Desirable improvements which usually are added:

Porches and piazzas.
Lavatory bowl.
Hot-water supply to bath and bowl.
Window shades.
Window blinds.
Dining-room separate from parlor or kitchen.
Electric lighting or gas piping.
Wall-paper.
Laundry tubs.

Need for Economy

Any attempt such as the above to divide essentials from luxuries must come in for a good deal of criticism, as there is bound to be a difference of opinion upon the details of such a list. The classifications suggested will at least serve to indicate the lines upon which the planning of a house should be studied in view of the need for strict economy in designing and building necessary to bring buildings down to a cost that will be remunerative.

It is generally agreed by economists that the workingman cannot afford to pay more than one-quarter of his monthly wage in rent. This means that the man earning an average of \$12.50 a week cannot afford to pay more than \$150 per annum. Assuming that a housing operation ought to pay at least 10% gross per annum, this gives \$1,500 for purchase of lot with sewer and street im-

provement and the building of a house. At the present time a four-room house of good construction cannot be built for this money and it is therefore necessary to plan with the very strictest economy.

Many of the workmen whose homes we wish to build have come from countries where four walls and roof are considered sufficient shelter from the elements to make a home. Although we do want to see them housed in a better manner than this, yet it is not necessary to give them a six-room house, large cellar, furnace heat with running water, laundry tubs, lavatory bowls, picture mouldings, and all the other comforts and luxuries that are required by higher-paid workmen. We do want to house the lowest man in a sanitary and hygienic home, but it is not necessary that this home be furnished with all the conveniences and appurtenances that are being considered necessary in the American home. We should give him a house that will not harbor vermin, that will not be damp or unhealthy, a house in which every room has a proper amount of light and ventilation and direct sunlight, and that has a decent privacy in its sanitary accommodations and sufficient bedrooms for the sexes to sleep apart.

The various types of dwellings now in use are as follows:

- (A) Single houses of five to seven rooms.
- (B) Two-family houses of four to seven rooms.
- (C) Terrace or row houses of four rooms and up.
- (D) Apartment-houses or tenements, two rooms and up.
- (E) Boarding-houses for single men.
- (F) Hotels.

The single house is the ideal residence for the American family, but beyond the means of the low-paid unskilled workman. A single house with five or six rooms with 3,000 feet of land cannot be built for less than \$3,000 except in the cheapest kind of frame construction, and even at this price it would call for a higher rental than he can afford to pay. For higher-paid men in the plant the

single house is very desirable.

The two-family house is often built for workers who wish to purchase their home. Though not suitable for the unskilled worker, they are quite attractive to high-paid men who like to buy a two-family house so that the rental received from one-half of the house will help to pay the carrying charges and amortization of the whole house. In some cases these are built side-by-side with a party wall and in some cases one tenement is built above the other. The first-named is preferable, as there is more privacy.

One of the most successful houses for the unskilled worker is that known as the "Philadelphia" type of house, of which many thousands have been built in Philadelphia, Washington, and other large cities. The typical four-room Philadelphia house is two rooms deep and has a living-room and kitchen downstairs, two bedrooms and bath upstairs. It is built in long rows or terraces with party walls in between. These can be built on as narrow a frontage as 13' 6" (a 15' frontage is desirable) on a lot of 900 square feet. The cost of both land and building is much lower than the preceding type. Houses built when prices were normal have been rented for as low as \$12 a month and have shown a fair profit.

The building of houses in terraces is comparatively new in this country except in Philadelphia, although it is very common in European countries. It allows for a very little land per house unless the lots are very deep, but is desirable in many other ways. Each family has a direct entrance from the street without any common hallway and is not interfered with by other tenants overhead. The cost of heating the house is less owing to there being fewer outside walls. In a house two rooms deep each room has a proper amount of light and ventilation, and these houses have proved very successful wherever they have been used.

A recent variation of this type of house is the three-room two-family terrace house with one family on each floor. These are generally in demand by married couples without children.

The multiple dwelling or tenement house, housing from ten to fifty or more families, is undesirable from many points of view, and yet in crowded cities where land values are high is practically the only solution.

Apartments of all sizes can be provided, the most common arrangements being three rooms (kitchen, living-room and bedroom) or four rooms (kitchen, living-room and two bedrooms). Each apartment should have its own private toilet and its own water supply.

Although city laws do not in every case require it, multiple dwellings ought in every case to have fireproof stairways and fireproof cellars, and care should be taken to see that every room and also the halls and stairs are properly lighted. In English cities the stairs are often built outside the building and each apartment is approached from balconies. This is in many respects a good way of building, and has been copied here in a few New York City buildings. This type of plan eliminates the common wall and inside stairs, which are frequently dark and difficult to keep clean and supervise.

There is always some demand in a large manufacturing center for small apartment-houses of two or three rooms with bath, etc., for married couples without children. They are not so desirable in homes for the workingman, and yet there are some mechanics who prefer them just as so many well-to-do people in our cities are content with and prefer this class of dwelling.

In rural districts many mills have built small boarding-houses large enough to take care of from eight to a dozen boarders. The advantage of a small boarding-house are that one man and his wife can run them, and the mill has no further responsibility. The men also prefer this sort of lodging to big company houses. The big disadvantage is that it is difficult to exercise any supervision over this sort of boarding-house, and they may be misused or overcrowded. This far outweighs its advantages.

The old style of mill boarding-house or hotel taking in a large



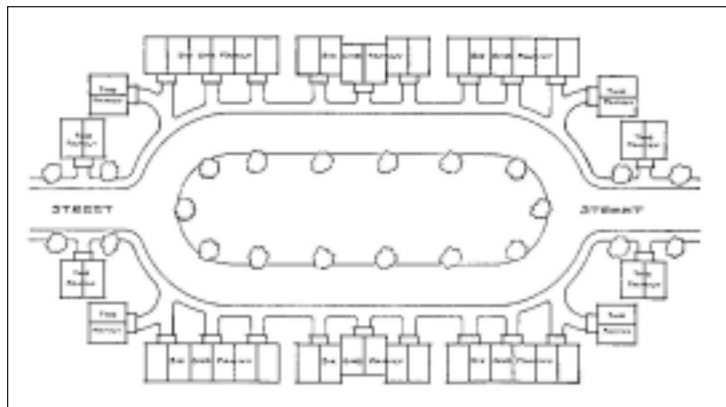
INDUSTRIAL VILLAGE

GOODYEAR COTTON MILLS, INC. KILLINGLY, CONN.



ONE HUNDRED REINFORCED CONCRETE HOUSES

AMERICAN STEEL & WIRE Co., DONORA, PA.



IT IS NOT IMPOSSIBLE TO DESIGN AN ARTISTIC REINFORCED CONCRETE HOUSE WITH FLAT ROOF. THIS DESIGN OF FIFTY-TWO FOUR-ROOM HOUSES AROUND A VILLAGE SQUARE GIVES ONE SOLUTION OF THE PROBLEM.

number of employees has gone somewhat into disfavor. Under proper regulations this is a much better method of housing than in boarding-houses or by allowing the families to take lodgers, but it is difficult to popularize it among the men. It will generally be found that the single worker prefers to lodge with a private family if he can possibly do so, but if this is impossible or if he is prevented by the owner and can be induced to take up his quarters in a large boarding-house, he can be very comfortable housed at a very moderate cost. One that we have recently built takes care of sixty men at a charge of \$1.50 per man per week. This building has a large dining room and kitchen, etc., board being furnished at moderate cost.

The good points of the boarding-house for fifty to sixty men are that one efficient married couple with three servants can run the place without difficulty. A higher type of tenant is required to handle a proposition of this kind, but they can be secured fairly readily. It is easier to arrange for proper inspection and supervision, as in most cases these are run as "company houses."

A boarding-house for more than sixty is too big a proposition to be handled this way, and would have to be run like a hotel with a manager and regular hotel staff.

In London (England) and in Liverpool, the Boston House Trust and other organizations have been operating hotels for five hundred or more single men successfully for many years, but up to the present time none have been built in American manufacturing centers.

The Manufacturers's Local Needs

The industrial manager at this point may well stop in bewilderment, not knowing how to proceed next, what size and type of house he needs to choose from this list being quite a puzzle. On this point it is impossible for any expert to offer advice until his local needs are accurately determined, and to do this the only safe way is to institute a careful survey of the housing conditions

and needs of his locality. It is very difficult to persuade him to do this, as each man thinks he knows just what his present conditions and needs are, --- whereas, in point of fact, his guesses are often wide of the mark. The first and only impulse of many men is to build as many six-room houses as he can, adding perhaps, a few seven- and eight-room houses for good measure. Until he knows the number of married couples without children, he does not know how many small houses or apartments are needed. If he doesn't know the number of unattached single men, he doesn't know how many lodgers must be taken care of, --- and unless he has facts before him as to the present habits and environments of those men he doesn't know whether in his town the lodger evil is the moral and social menace that the social reformer alleges it to be. He must know, too, the size of the different families with children, whether they are properly housed at present, and must have some facts before him on birth rates, death rates, sickness, and infant mortality, etc., compared with other cities, before he can be sure that his town needs improvement and what improvement it needs.

The only way of getting these facts is by a careful survey by an expert at this sort of work.

Suiting the House to the Needs of the Occupant

There should be in every home enough bedrooms for the parents and the children of either sex to sleep apart. A good-sized bedroom should be provided for parents (and infant children) and two smaller bedrooms, large enough to accommodate two persons each for the other children. All families, of course, are not of the same size, and some larger and smaller houses will be needed; but as a rule it will be found that the larger demand is for the four-room, five-room and six-room houses.

It seems to be a matter of habit in many quarters to build nothing but six-room houses; this is a manifest hardship to those who do not need so many rooms. If a man cannot afford to rent a six-

room house and does not need the accommodations and yet finds that the six-room house is the only accommodation he can gain, he has to take in lodgers to help pay the rent. From the social standpoint the lodger is generally considered to be a menace and an unmixed evil. We have found that where we built four-room houses these were often taken up first of all by the employees.

Where houses are built to sell, however, there is not so much demand for the smaller houses and this six-room house is as a rule the smallest house that one can count upon selling without difficulty.

The size of the bedroom should be sufficient to give at least 400 cubic feet of air space per inmate. All bedrooms should open onto a hall and not into each other or into a living-room.

Next, there must be provided at least one living-room (having an area of not less than 135 square feet) for working, eating, washing, and general use. There is much controversy on the subject of separate dining-rooms and separate parlors, which add much to the attractiveness of the house but also to its expense, and it is not always possible to provide them for the unskilled laborer.

The foreigner does not use a kitchen, dining-room and parlor; what he needs is one large kitchen. It is found that where three living-rooms are provided, two of them are invariably used as bedrooms for the lodgers. It is the habit of most foreigners and indeed of many Americans to live in their kitchens, and this room should be large and well lighted and ventilated.

The toilet-room must be planned so that it does not open directly into a living-room or bedroom, but off the stairs if possible. There is no justification at the present day for the existence of the old-style out-closets or privies. Water-closets connected to cesspools are sometimes satisfactory, but very undesirable, especially in cities. It is much wiser to figure on the construction of a sewer at the time the house is built, as cesspools, unless properly looked after, are a potential source of danger to the water supply and a menace to the public health.

Some comment will naturally be made on the suggested omissions of the cellar. We are told that the family needs a cellar for the storage of coal and canned fruit, and that it costs no more to build it than to leave it out, as the foundation walls are the same in either case. In investigating the contents of laborers' cellars the writer has never found large supplies of food or fuel. The laborer is too poor to buy more than two or three hundred pounds of coal at a time, and never lays in stocks of food in advance; instead of this we usually find in his cellar a miscellaneous assortment of most unsanitary rubbish and junk, which is not only undesirable but constitutes a serious fire menace. Statistics show that over 80% of dwelling-house fires start in the cellar in such rubbish piles.

The argument that it costs no more is nearly true where sand and gravel soils are encountered, but in clay or other hard digging the extra cost of digging the cellar mounts up considerably. Cellars are not needed for furnaces where the tenant cannot afford the fuel for them but derives his heat from his kitchen stove.

Where the cellar is omitted a space should be left under the floor, ventilated by gratings in the outside walls which can be closed in cold weather.

In houses of this class the tenant usually furnished his own stove, and as his stove has no hot-water front, a system of hot-water piping is of no use to him. Some owners prefer to install the stove with water front and hot-water piping in spite of the increased cost of the house, but all these things help to put up the cost and the resultant rent to a figure higher than the tenant can afford. For the same reasons washbowls in the bath-room, and laundry tubs, though useful, are not necessities. There should, however, be an enameled iron sink in the kitchen, and a bathtub should be provided even if the tenant has not learned how to use it. There should be a proper supply of running water, and fit for drinking, and a water closet with the sewer, and a cast-iron enameled bath.

Materials of Construction

Very little change has been made in recent years in construction methods and materials, the chief alteration being towards the reduction of fire risk and conflagration hazards.

The standard form of wall construction for rural districts continues to be wooden framing. Where city laws do not forbid it, this is used in the cities. The frame is usually lathed and plastered inside and covered with rough boarding paper and shingles or clapboards outside. Cement stucco on wire lath is coming into vogue for exterior finish --- at a slightly higher cost; this when put on satisfactorily requires less maintenance and no repainting, but requires expert workmen to make a satisfactory job. In a few cities brick walls are more frequently used, furred on the inside and lathed and plastered. A few houses here and there have been built with hollow tile, stuccoed outside and plastered inside directly on the tile; and some experiments have been made in concrete houses, although nowhere yet has Edison's dream been realized. The most noteworthy instance of concrete houses are the hundred houses at Donora, Pa., built for the American Steel & Wire Co. by the Aberthaw Construction Company. These houses, built with Lambie steel forms, have 6" reinforced concrete walls, stuccoed outside and furred and lathed and plastered inside. The forms, however, give such a smooth surface that it is intended on the next job to leave the concrete exterior surface bare, rubbing any irregularities and leaving a smooth concrete surface of even texture and color.

Although no exact cost data can be given at the present time on the foregoing material, the following figures are, however given in order to indicate the relative costs of these materials based on present prices. As prices do not vary consistently, these figures may not hold good for very long. In certain localities where clay for tile-making is abundant that the prices of tile would be cheap and would indicate that this is the cheapest material to use. In other places where there is a good gravel supply right on the ground

the relative cost of concrete would be reduced.

Assuming the cheapest construction, a wood framing, wood lathed and plastered on the inside and rough boarded and shingled on the outside, as our standard or 100%, the relative costs of various houses would be as follows:

Wood framing, inside wood lathed and plastered, outside rough boarded and clapboarded and painted.....	102%
Wood framing, inside wood lathed and plastered, outside wire lathed and stuccoed.....	108 ½%
6" concrete wall, inside furred and lathed and plastered, outside rubbed smooth.....	112%
6" concrete wall, inside furred and lathed and plastered, outside stuccoed.....	116%
8" Hollow tile, inside plastered direct, outside stuccoed.....	111%
8" Brick wall, inside furred and lathed and plastered.....	115 ½%
Wood framing, veneered with 4" brick, inside lathed and plastered..	113%

The chief roofing materials in use at the present time are wood shingles, asphalted felt shingles, asbestos shingles, slate tile, "Ready" roofing, tar and gravel built-up roofings and tin roofings, the last three being used for flat roofs.

The cedar shingles, while still in common use is slowly giving place to other materials. Many cities have legislated against it, and as the asphalted felt shingle, which is a good deal more fire-proof, can be put on for about the same price, it is coming into general use. The cedar shingle is a dangerous fire risk, on account of the ease with which conflagrations spread by burning shingles flying through the air.

The asbestos shingle costs about twice as much, and is not so commonly used, although it makes a more permanent roofing.

The cost of tile and slate roofing is so much higher than the above that they have to be left out of consideration in workmen's houses.

The flat roof covered with a 5-ply built-up tar and gravel roofing is considerably cheaper than any of the preceding, but its appearance is generally objected to. In our larger cities, particu-

larly in Philadelphia, it is used extensively, and, on account of the low first cost and maintenance expense, it is very favorably regarded. Various types of ready roofing are used as substitutes for built-up roofs, but on account of the difficulty in making good water-tight joints they have not come into general favor. The tin-covered roof is being used less and less. It is more expensive than the built-up roof and requires frequent repainting and maintenance. One of the stock objections to the flat roof is that it is hot, but, as a matter of fact, this is not the case. The flat roof should have underneath it a ceiling furred down to give a hollow space of at least 18" between the ceiling and the roof surface. This dead air space provides a proper insulation against heat and cold, and is actually cooler in summer and warmer in winter than a pitched roof in which the ceilings of the bedrooms are sloping.

The objection to the flat roof on account of its lack of architectural pretensions is not an insuperable one. Conditions of this sort should be a challenge to architects to overcome.

Wood lath and plastering continue to be the customary method of finishing walls and ceilings. Plaster board covered with a finish coat costs very little more, and where speed is essential can be put on and dried out much more quickly. The various wall boards and composition boards offered as substitutes for plastering are not satisfactory for industrial houses. The cost per square foot is low, but the waste in cutting is very great unless specially offered, and the result is not so permanent.

Interior woodwork is best stained and varnished and not painted, as it is less easily soiled.

Wall-papers add nothing to the comfort or health of the tenant, but do add to the rent he has to pay, besides proving a harborage for vermin. Kitchen and bathroom walls are best painted with lead and oil, while many owners leave all other rooms bare or tint them with cold water paint.

Architectural Design

In attempting to discuss architectural design we are treading upon difficult ground. No laws or limitations as to style can be laid down, and matters of taste cannot be discussed here.

It is painfully evident in visiting any industrial town that this type of work has usually been carried out without architectural assistance or advice. It is either found that every house is exactly alike, giving a depressing monotony to the town, or else a bewildering and restless attempt at variety has been made by having every exterior different, using a liberal application of unnecessary gables, dormers, columns and brackets, scroll saw ornaments, and the like, beloved of the village carpenter and speculative builder.

The industrial town is not an easy architectural problem. The units are so small that a pleasing architectural development is not easy to obtain. It can never be obtained by the indiscriminate use of applied ornament.

Ornament may have its uses in design, but it is not indispensable. There is a very general popular misapprehension about this. A house is primarily well designed, so far as its exterior is concerned, when its general mass or bulk is pleasing, its proportions good, the placing of openings in the walls properly related to the wall surfaces, when the texture and color of the building material has been well chosen, and when the house has been well placed with relation to adjacent buildings and its site. If these things are secured, no applied ornament need be necessary; and all the ornamentation in the world cannot make the house good in design if the foregoing requirements have not been met. Cost limitations on small houses preclude useless expenditure of any kind. Ornament, as it is commonly understood, is in most cases useless expenditure. The laborer's single house is so small that, where a number are to be built, the grouping of these houses (perhaps arranging several homes under one roof as the English so frequently do) offers larger opportunities for the capable architect-

tural designer and promises more artistic results.

A study of such developments as Eclipse Park at Beloit, Wis., or Indian Hill, Worcester, Mass., will show how charming a simple scheme may become in the hands of successful architects.

In planing a house the square plan bounded by straight lines is the cheapest and most economical. As the plan changes from square to oblong, the ratio of walls to floor space increases, and with it the cost. Any departure from the right angle means increased labor and waste of material in cutting.

Porches should be so designed that they do not shut off sunlight from any room. In many row houses a continuous porch is built right across the front with the result that sunlight never enters the front room on the ground floor. As sunlight is the greatest foe of disease germs, it will be seen what a detriment this is to the health of the inmate.

Valleys and dormers in a roof not only add to its cost but to its maintenance, as these angles in the roof are the points where leaks first make their appearance.

No applied architectural ornament can equal the beauty or permanence of a careful planting of trees, shrubs and vines. The plainest of houses suitably planted with quick growing vines on permanent trellises, and with a good shade-tree in front will look far better than the most ornate building elevation and cost much less. In studying photographs of successful housing developments it will be seen that those which win the most general approval are those in which this feature has been given careful attention.

Layout of Streets

The deadly monotony of straight rows can be avoided by houses set at varying distances from the frontage line, and the appearance of the street can be much improved as well as more light and air being given to each building.

In laying out the street line it will generally be found that the streets which follow contours of the ground, provided these are not too irregular, give a more pleasing effect, and in many cases save large sums of money that would otherwise have to be expended on cut and fill, embankments and retaining walls.

Size of Lot

No general rule can be laid down as to the size of the lot that should be given the worker. Until the recent movement for home gardening was started it was not customary to find more than one garden in three under cultivation in cities. Many workmen work so hard all day that they have not the time or strength to do any gardening in the evening, and even if they do, ignorance of methods of cultivation and the impossibility of protecting their land from the raids of children in adjoining houses and the neighbors' fowls make it a very discouraging and difficult matter.

In some sections the English scheme of gardening in "allotments" has been tried successfully. In such cases the houses are built on very small lots of land and a reservation of several acres is provided for gardening. This is fenced in and cut up into small allotments and let out in small sections to those who wish to take care of gardens. A garden properly cultivated is a very beneficial thing, but a lot of land which is allowed to become the dumping ground of dirt and refuse is of no benefit to anybody, but rather the reverse.

In city developments it will probably be found best to give very little land to the tenant, but to use the land that otherwise would have been allowed him in the maintenance of parks and playgrounds for children and allotments for gardening.

Benefit of Large Scale Operations

Until quite recently small house construction had been entirely in the hands of the local builder, operating on the small scale. During the past year, however, with the institution of several large housing developments in which speed of construction and dura-

bility of workmanship were important essentials, large contracting organizations have taken up this class of work, so that the manufacturer can now get the same kind of service in his house construction as he has been accustomed to get in his plant construction contracts. A good deal of economy is always gained when a large number of houses are built at one time by one contractor. The money saved by purchasing direct from manufacturing firms in carload lots rather than in teamloads from a local dealer, the continuous employment of large gangs of men, the taking of cash discounts and other economies practiced by big contracting organizations are quite a help in reducing costs.

When the whole development is under the control of one responsible contractor, the disappointments so often experienced of houses built but roads not finished or sewers not completed are avoided. The grade of workmanship is better and the work is finished promptly instead of being allowed to drag far beyond the scheduled contract time.

Selling and Renting Houses

When the houses are built a most important problem presents itself for consideration in the decision as to whether the houses are to be sold to the working men or rented them. No general answer can be given to this question, but a brief statement of the pros and cons can here be given.

If the houses are sold to the workmen, there is the objection that if the workmen are fired or leave of their own accord they still retain the house though it is wanted for other workmen; also that if they sell at a profit, the increment in value which has been put into the house by the presence of the plant goes to the workman, who has not earned it. On the other hand the workman buying his own home and paying for it by installments has to make himself a steady and efficient worker in order to keep up his payments. There are usually more applications to purchase than there are houses to sell. Therefore the purchasers can be selected

from those that are the most likely to remain with the company. The difficulty of firing men is not a pressing one, as the manufacturer's problem today is rather how to hold his men than how to fire them. The employment manager is being kept busy finding new places for men who do not fit in one corner of the plant rather than let them be fired in the old way.

Where houses are rented the owner has more control over them, and can evict tenants who leave his employ. He has, however, the difficulty in strike times of taking care of his property, which otherwise would not concern him.

Labor leaders object to the immobility of labor caused by men owning their homes.

The tendency seems to be today towards the selling of the houses, and several interesting purchase schemes have been evolved by manufacturers.

The Norton Company at Worchester, Mass., have organized a housing company called the Indian Hill Company. Their system of selling is as follows:

Indiana Hill Company require from the purchaser an initial payment of 10% of the purchase price, whereupon a conveyance of the property is made. For the remainder of the purchase price the purchaser gives two notes, one for \$1,000 payable in twelve years at 5%, and another for the balance of the purchase price payable on demand with interest at 5%, both notes being secured by a purchase money mortgage.

The purchaser gives also a supplementary agreement to the effect that he will purchase in a co-operative bank five shares, and will continue payments thereon until his deposits shall have matured in the sum of \$1,000, which in local banks, at the prevailing rate of interest, takes place in about twelve years. This insures the payment of the twelve-year note according to its terms. It gives the purchaser a feeling of independence, inasmuch as he does not make periodical payments on the principal to the company, and enables him to become acquainted with co-operative

bank methods.

In consideration of this agreement the company agree not to make demand upon the demand note as long as the purchaser shall continue to make monthly payments of interest to the company and monthly payments in accordance with his agreement to the co-operative bank. The company further agree that if he shall die or become incapacitated within twelve years --- provided that at the time he shall not be over sixty years of age --- they will accept the surrender value of his co-operative bank shares in full payment of the time note. The result of this agreement is that the purchaser may be assured that at the end of twelve years, or upon his prior death, a sufficient proportion of the purchase price will have been paid so that he or his estate will then own the property free of all encumbrances except a first mortgage for not over 60% of the value of the property, so that at his option he may resort to a bank for a mortgage and be entirely independent of the company. The company give each purchaser a schedule showing the required monthly payments. The following table is a reproduction of one which was given to a purchaser of one of the 1915 houses, and illustrates very well the method of financing the purchase of an Indian Hill house:

Total purchase price	\$3,851.50	
First payment 10%	385.15	
Borrowed on mortgage, the balance	3,466.35	
Amount due in twelve years, secured by time note	1,000.00	
The balance secured by demand note	2,466.35	
Monthly interest during first twelve years	4.45	
Monthly payments to co-operative bank	5.00	
Total monthly payments during first twelve years	19.45	
Monthly interest payment after twelve years	10.30	
Total loan.....\$3,466.35	Demand loan	2,466.35
Five percent.....173.32	Five per cent	123.32
1/12 monthly.....14.45	1/12 monthly	10.30

The Massachusetts homestead Commission advocate the payment of 20% if the purchase price before deeds are passed, and the payments of the whole of the rest of the cost in equal monthly installments so calculated as to take care of interest, taxes and insurance in twenty years, more or less.

The Goodyear Company in their work at Akron plan to place two mortgages on the property. The first mortgage is for about one half the value of the property, and is carried by an insurance company. The second mortgage is carried by the Goodyear Company, and covers the balance of the purchase price. It is not necessary to make any payment down when the property is purchased. Payments are made semi-monthly, which take care of the second mortgage in twelve years and the first mortgage in three years more, the rate of interest being 6% per annum. These periods are the maximum time allowed to pay for the property, but provision is made to allow extra payments to be made if desired, as well as preliminary payments down. The purchaser has the option of taking a diminishing life insurance with the insurance company which, in the event of death, will pay one or both of the mortgages, depending upon the amount of insurance taken. The insurance company have made an attractive group insurance proposition, which brings the cost of this feature down to a very low figure, and have made the purchasing plan very popular. It is generally found that the workmen are willing to purchase quite high priced houses if the way is made easy for them by one of the methods outlined above.

It is advisable to retain an option on the property where it is sold to the workmen, providing for he repurchase of the house by the company if the workman wishes to leave, some method being set up for the valuation of depreciation, etc. It seems only fair that any unearned increment should pass to the company and not be retained by the workman, as otherwise he is encouraged to speculate in real estate to the disadvantage of the factory owner.

It is very necessary that proper restrictions be placed on the

use of the property and the construction of poultry houses, stables, garages, etc.

After a man has been working hard for twelve years of more to pay off the cost of his home, it is likely that he will have gained habits of industry and thrift which will stay with him, and the man will become a permanent asset to the plant. While he has been paying for his house the tie between him and the plant has been one that he has not resented or felt that the owner is to blame for. Many owners have come to think that the system of selling houses is proving to be the best method of securing a contented body of employees around the plant.

It will always be found that very many of the employees, however, are not inclined to purchase, either because they are less thrifty or because, for one reason or another, the ownership of house property does not appeal to them, and houses for rent must be provided for them.

Some real estate companies operating on a large scale have adopted a rebate system by which if the tenant keeps his house in good repair and pays his rent promptly for eleven months he is not required to pay the twelfth month's rent. If at the end of eleven months any interior repairs are required, or if payments for repairs have been made by the company during this period, the tenant pays for these repairs out of his rebate, and whatever balance remains out of his month's rent is remitted, but if the cost of the repairs exceeds the month's rent the difference is paid by the owner. This is, of course, an inducement to the tenant to take care of his property and not vacate a place when the period for rebate is approaching.

Supervision

If a housing project is to be really successful, too much emphasis cannot be paid on the strict and careful supervision and education of the tenants. Overcrowding and the lodger evil must be prevented by proper restrictions in the leasing or selling of the

property, and a welfare worker or district nurse or friendly rent collector should make periodical inspections for the purpose of seeing that the premises are being kept clean and that the tenants are living decently. It is not essential that this worker be engaged directly by the owner of the house. In many cases it is far better if the local municipal league or other local organization can be subsidized to take care of these activities.

A welfare worker can often accomplish a great deal in the way of educating the foreigner along sanitary and decent housekeeping lines.

An interesting experiment which is about to be tried is the establishment of a "probationer's" block on the outskirts of a new industrial town. To this block are admitted tenants of negro or foreign birth, and their housekeeping is supervised by a resident superintendent. They are taught American cooking, laundry work, etc., in a welfare building, and when they have proved themselves to be good tenants and agreeable neighbors they are permitted to occupy house in other parts of the town. This experiment will be watched with a good deal of interest.

Conclusion

In this article the writer has endeavored to touch upon the many problems that are still being studied by those who have the welfare of the workmen and the manufacturer at heart. It cannot be stated that any of these problems have yet been finally and satisfactorily solved. All that it is hoped to accomplish in this article is to set forth clearly the main problems in a desire to assist the manufacturer starting a housing venture to form a correct judgment for himself.

If properly conceived and executed such work can only cause disappointment and regret to those who have invested their money in it, but if carried out properly and thoroughly good housing is one of the finest aids in cementing the good relations of the employer and the employed and of making good citizens and good

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Americans out of the splendid raw material that is continually being poured into the "melting pot." Present conditions are a disgrace to our country. It is not necessary to apportion blame for this. It is enough if we realize the fact that "evil is wrought by want of thought, as well as by want of heart" and unite to remedy the conditions.

The provision of good housing not only satisfies a local need; it makes for healthier, happier families, and renders a great national service.

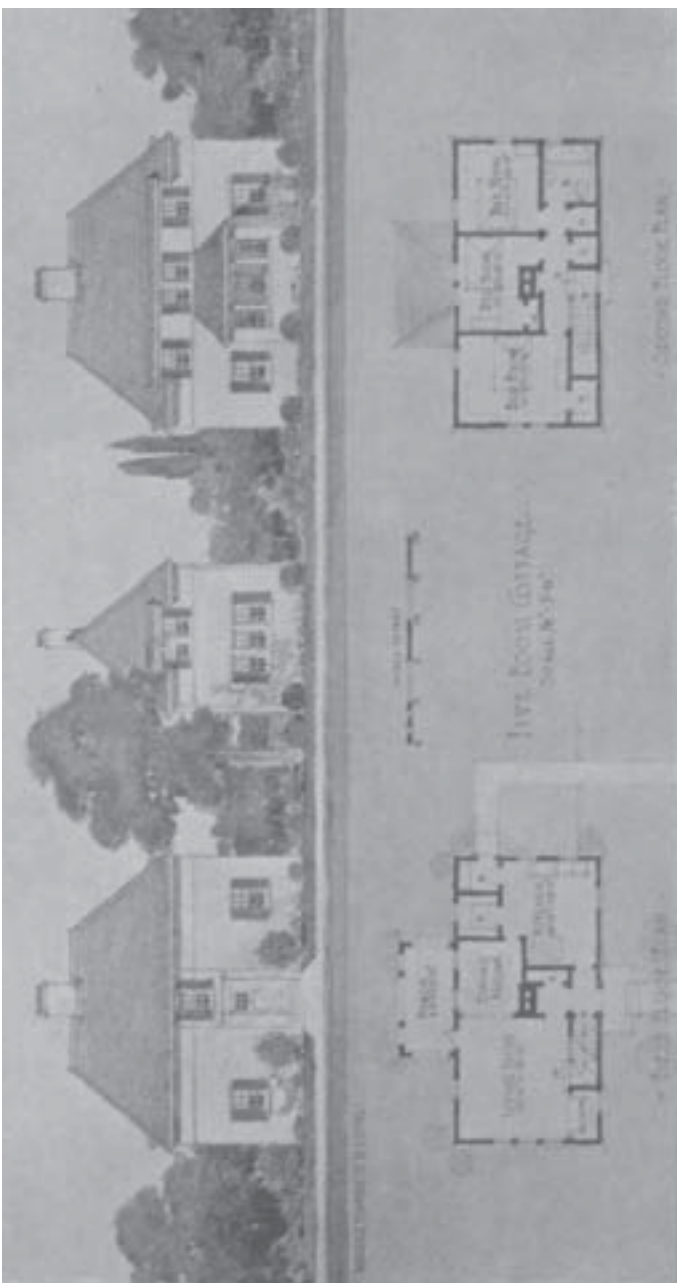


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