

JOURNAL

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INSTITUTE OF CANADA



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CONTENTS

Editorial	140
Post-War Residential Construction, by O. J. Firestone	141
Private Enterprise Housing, by F. W. Nicolls	145
The Construction Industry in our Post-War Economy, by A. S. Mathers	147
A National Housing Set-Up, by Harold Lawson	150
The Engineer and Low-Cost Housing, by Robert F. Legget and Griffith P. Taylor	151
Prairie Slums, Unlimited, by Eric W. Thrift	154
Co-Operative Housing, by Samuel Henry Prince	156
Prefabrication, by Bruce H. Wright	159
Housing in Saskatchewan, by Lyman Sande	161
Apprenticeship and Apprenticeship Training, by Fred J. Hawes	162
The Provincial Page	163
The Periodicals Shelf, by Anthony Adamson	164
Obituary	165

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READERS OF THE JOURNAL MAY BE SURPRISED TO HEAR THAT ALREADY QUITE AN INTEREST is being taken in War Memorials. Our advice has been sought three times in the last few weeks, and a Dunkirk Memorial has just been completed by a church in Toronto. Our advice in each case was that, if a monument in masonry were contemplated, the very best architectural advice should be obtained. We expressed the hope, however, that memorials after this war might take a different form from the last. We English speaking people seem to be quite incapable of expressing either Victory or Sorrow in a monument that may at the same time be a great work of art. The Cenotaph in Whitehall was conceived in simple form and was of modest scale. In its setting in the heart of Empire it could hardly be improved, but the thousands of cenotaphs erected in the British Dominions are but feeble imitations of the original. The Vimy Memorial is a fine monument designed on a great scale and in a romantic manner that, happily for our civic squares, did not admit of reproduction in miniature by lesser craftsmen. Sentiment is so bound up with all our last war monuments that no one has dared criticize them individually, be they large or small, good or poor. We offer the suggestion that when the time comes to consider these matters that city planning boards be given the job of placing memorials and that their design be approved by a joint board appointed by the local chapter of Architects and the Society of Sculptors. Town planners should already have sites under consideration.

It is perhaps too much to hope that cities and towns will spend their money on memorial parks and playgrounds, hospitals, concert halls or other useful additions to our city life. To our way of thinking a city park marked by a simple tablet of dedication would be a thousand times more appropriate than the most impressive cenotaph. It would be a memorial that all might use, and in the using, would remember the valour and the sacrifice which it commemorates. If such a suggestion could be considered and approved in advance, city planners could prepare for it as an important element in the city pattern. Most of our Canadian cities are under "parked" by at least fifty per cent.

The articles in this issue by Mr. Bruce Wright and Messrs. Legget and Griffith Taylor should produce a lively discussion in the pages of the Journal for which we will gladly provide space. There are two schools of thought in regard to prefabrication—a minority who are for it, and those who are against it. It may well be that, if the urgently necessary volume of post-war construction is vastly ahead of the ability of the building industry to accomplish, that we shall see prefabrication in some buildings taking the place of old and well tried methods of building. We look, ourself, with some misgiving at the thought of the individual house rolling off the assembly line as a house, and delivered C.O.D. or charged to our D.A. At any rate we expect to see no diminution in the production of that "delicious morsel" as we vaguely remember Ruskin described a brick.

We have just returned from a week in the U.S. where we visited some dozen or so housing schemes. We hope to write something about that experience in the Journal, but in the meantime, we would like to add this note of warning to any group considering a revision of building codes to meet what they consider to be the LOWER requirements of low cost housing. It seems to be the opinion of all the housing experts we met that, while every economy should be practised by large scale operation and the elimination of frills, the buildings should be fire-proof and of the best material and construction available. The absolute minimum maintenance costs for grounds and buildings should be the goal of every municipality embarking on a housing project and that can only be achieved by raising, rather than lowering, our building by-laws.

POST-WAR RESIDENTIAL CONSTRUCTION

Its Significance for the Canadian Economy

By O. J. FIRESTONE

There is hardly any doubt that house building can and will probably play an important role in Canada's post-war economy. A large residential construction program would not only satisfy the great demands for proper housing accommodation but could also make an important contribution to the full employment concept upon which our ideas of the post-war world are based.

In evaluating the economic effects of a great residential construction program the following questions arise: What part of construction expenditures will go to contractors, to the construction material supplying and transporting industries, and to the on-site labour force? What employment will be provided on the site,—that is, the amount of labour involved to build a house—and what amount of labour will be provided off the site,—that is, in the material supplying industries from the mines and forests to the factory?

Demand for Housing in the Post-War Period

In the absence of any official estimate, private estimates of requirements for post-war housing vary considerably. According to estimates attributed to Mr. F. M. Babcock¹ Canada would require between 750,000 to 1,000,000 houses in the decade following the conclusion of the war.² Mr. H. G. Cochrane of the Department of Munitions and Supply in Toronto has suggested that housing requirements in Canada in the post-war period might reach the number of 1,200,000 units. Mr. Cochrane made his estimates by adjusting American calculations to Canadian conditions.

These figures cannot be taken as any definite indication of housing needs in this country after the war unless they are based on the assumption that it will be possible to provide satisfactory housing units on conditions which the majority of Canadians can meet. In other words, a great number of houses will be built only if Canadians can earn enough to pay for them. Mr. F. W. Nicolls, Directors of Housing, has repeatedly emphasized that there are two factors of deciding importance in any large scale post-war residential construction program: (a) the need for housing, and (b) the ability to pay for the houses. Mr. Nicolls pointed out that "if building costs are high and we are unable to produce houses that the people who need them can afford to occupy, then our potential market is not nearly as great as we imagine. On the other hand, if we produce houses at a capital cost that will enable the people who need them to occupy the houses, then the demand will be away beyond the most generous estimates. The backlog of housing in Canada is not caused by our inability to produce houses but by our failure to build houses for the people who need them, within their ability to pay for them."

Ever since the depression in the early thirties it has become obvious that housing conditions in Canada are not what they should be and what they could be. During the period 1931 to 1939 residential construction was below the average of the period 1921 to 1930. We realize what this means if we consider that residential building activity in the twenties did not suffice to assure satisfactory housing conditions for all Canadians.

Thus, a backlog of residential construction came into existence with which we have not been able to catch up. The lack of adequate housing was considerably felt during the last decade especially, since an increase in population of over ten per cent. took place during 1931 to 1941 without proper accommodation being made available for these additional million or more Canadians.

In 1935 it was felt that the housing situation deserved serious consideration. A Housing Committee set up by the House of Commons studied housing conditions in this country and made several recommendations favouring financial assistance for new housing and home improvement. The Committee stated that "a national emergency will soon develop unless the building of dwellings be greatly increased". In recognition of the serious housing situation and the great need for providing employment for Canadians, the Dominion Government introduced a number of measures designed to alleviate both the housing shortage and the acute unemployment. In the field of residential building The Dominion Housing Act, 1935, The National Housing Act, 1938, and The Home Improvement Loans Guarantee Act, 1937, played an important part. During the seven-year period October 1, 1935, to September 30, 1942, 23,369 housing units were financed under The Dominion Housing Act and The National Housing Act. This involved loans by the Dominion Government amounting to approximately 19.4 million dollars and by the lending institutions amounting to approximately 58.1 million dollars. It was estimated that borrowers contributed approximately 19.4 million dollars, so that approximately a total of 96.9 million dollars was spent on residential construction including expenditures for building sites.

In spite of the valuable contribution by these Housing Acts to house building in Canada, need for appropriate housing has by no means been met. In 1939, Dr. A. E. Grauer of the University of Toronto stated: "The phenomenal growth of urban population in Canada in the past thirty years would of itself have imposed a severe strain on housing accommodation. . . . But on top of this growth came four years of war when the resources of the nation were turned into new channels, a further period of expansion marked by considerable immigration, especially into urban centres, and eight years of severe depression resulting in almost complete cessation of building activity. The inevitable result is a housing problem of unusual magnitude and acuteness."³ Housing conditions have become still worse since the outbreak of the present war. Mr. C. Major Wright, a housing expert on the staff of the International Labour Office emphasized that because of priorities of material for construction for war purposes it was not possible to ameliorate current Canadian housing conditions. "The general effect of war controls is to discourage investment in the construction of dwelling houses; the building of large houses, for example, has almost entirely ceased. Licensing was designed to prevent the investment of capital in buildings and is having the desired effect."⁴ Thus, the need for a big residential construction program in the post-war period is clearly indicated.

The volume of residential construction after the war will greatly depend on whether we will be able to produce housing accommodation for income groups which have hitherto not been able to acquire houses of their own. This will again depend on our ability to reduce house building costs and to finance and encourage large scale house building development. Another factor will be our ability to maintain income levels at the height which they have reached during wartime. Let us assume that we shall be able to meet these basic requirements essential to any large scale building program after this war, and that in the peak year of house building one hundred thousand residential units will be built. This would involve an expenditure of approximately four hundred million dollars. The great majority of houses will be in the lower brackets between two and four thousand dollars in order to satisfy the need of people with low incomes. The rest will probably consist of houses between four and ten thousand dollars in order to meet the requirements of the middle and higher income groups. In the following it is attempted to outline how such an expenditure would affect the Canadian economy.

Material, Labour, Overhead Expenses and Profits in Residential Construction

It is difficult to determine what the average house built in Canada costs, from what material it is made, and what facilities it provides. A study recently completed for the Housing Administration, Department of Finance, analysing over 23,000 housing units built during the last seven years, provides us with an approximate picture.⁵ For the purpose of assuming the impact of construction expenditure upon the construction industry proper (contractors, craftsmen, semi-skilled and unskilled construction labour) and upon the construction material supplying and transporting industries it is necessary to break down construction costs into cost of materials, cost of on-site labour and overhead expenses and profits. The above-mentioned study gives the following ratios which were obtained from a survey of the experiences of a number of building contractors: cost of materials 55 per cent., cost of labour 35 per cent., overhead

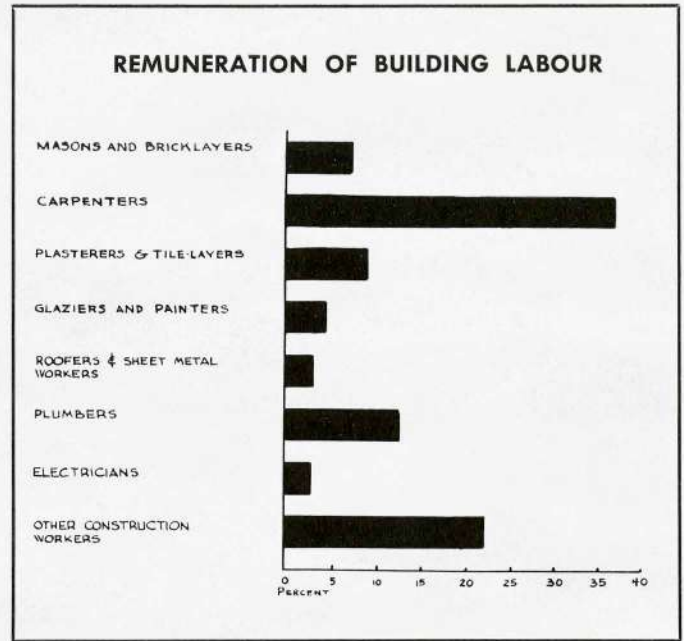


CHART 2

Table 1

SHARE OF THE CONSTRUCTION MATERIAL SUPPLYING AND TRANSPORTING INDUSTRIES IN EXPENDITURES FOR MATERIAL FOR THE AVERAGE HOUSING UNIT BUILT UNDER THE DOMINION HOUSING ACT, 1935, AND THE NATIONAL HOUSING ACT, 1938¹

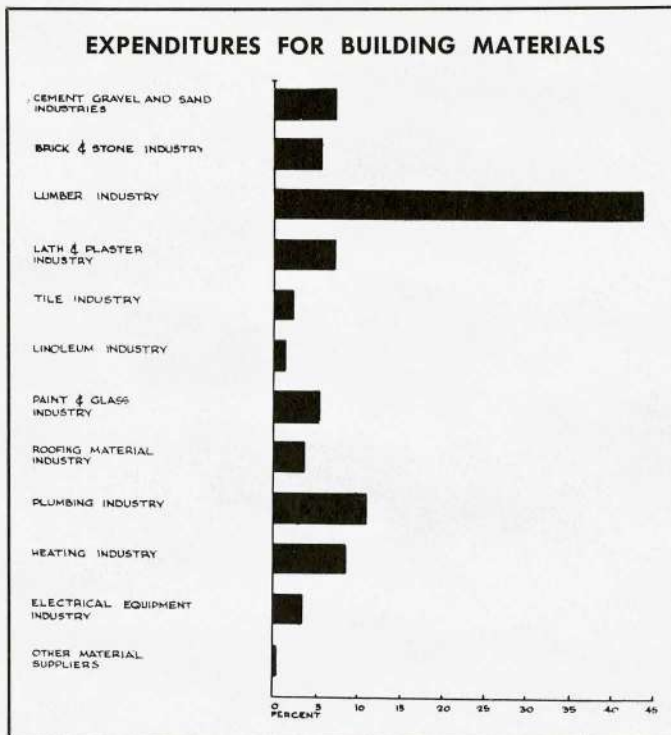


CHART 1

TYPE OF CONSTRUCTION MATERIAL	EXPENDITURE FOR CONSTRUCTION MATERIALS	
	DOLLARS	PER CENT.
Cement, gravel and sand industry.....	156.69	7.27
Brick and stone industry.....	123.04	5.68
Lumber industry.....	948.23	43.76
Lath and plaster industry, including manufacturers of insulation material ²	158.68	7.32
Tile industry ³	45.91	2.12
Linoleum industry.....	28.12	1.29
Paint and glass industry.....	123.52	5.70
Roofing material industry ⁴	80.88	3.73
Plumbing industry.....	238.98	11.03
Heating industry.....	184.62	8.52
Electrical equipment industry ⁵	74.42	3.43
Other construction material supplying industries.....	3.36	.15
Total Expenditure.....	2,166.45	100.00

- (1) Table based on statistics available in "The Labour Value of the Building Dollar", a study prepared for the Housing Administration, Department of Finance, by O. J. Firestone, Ottawa, 1943.
- (2) The lath industry will depend on the lumber and steel industry for the supply of wood and steel to manufacture laths. The plaster industry will depend mainly on the sand and lime manufacturers for the supply of the material required.
- (3) Some orders going to the tile industry will go to the brick manufacturers since there is some overlapping between tile and brick manufacture.
- (4) The roofing industry will depend on the lumber and sheet metal industry, the asphalt and asbestos manufacturer for the supply of the material required. For the construction of flat roofs, tar and gravel will be required.
- (5) This industry covers a number of manufacturers of wires, sheet metal, electrical fixtures, accessory manufactures, plastics and rubber manufactures, etc.

expenses and profits 10 per cent. It was estimated that the average house financed under The Dominion Housing Act, 1935, and The National Housing Act, 1938, costs \$3,939.⁶ Of this sum 393.9 dollars went to contractors, 2,166.45 dollars went to the construction material supplying and transporting industries, and 1,378.65 dollars went to the remuneration of on-site workers. Table I gives a classification of construction material for the average housing unit according to the different types of industries. Table II gives a breakdown of remuneration paid to the on-site labour force engaged in building one housing unit according to different construction trades.

The Economic Effects of a Post-War Housing Program

Figures contained in Tables I and II can only be taken as indicative of the economic effects of expenditure for residential construction. If we make allowance for new materials which will probably be used after the war in house building it may suffice for our purpose to accept the major sample of 23,000 housing units as an illustrative example of the disbursement of expenditure for construction purposes after the war. It is assumed that ten per cent. of construction expenditure after the

Table II

REMUNERATION PAID TO THE ON-SITE LABOUR FORCE ENGAGED IN BUILDING AN AVERAGE HOUSING UNIT UNDER THE DOMINION HOUSING ACT, 1935, AND THE NATIONAL HOUSING ACT, 1938¹

CONSTRUCTION TRADES	REMUNERATION OF ON-SITE WORKERS	
	DOLLARS	PER CENT.
Masons and Brick-layers.....	100.66	7.30
Carpenters	510.58	37.04
Plasterers and Tile-layers.....	125.45	9.10
Glaziers and Painters.....	66.51	4.82
Roofers and Sheet Metal Workers.....	43.55	3.16
Plumbers	181.55	13.17
Electricians	40.08	2.91
Other semi-skilled and unskilled construction workers ²	310.27	22.50
Total Remuneration.....	1,378.65	100.00

(1) Table based on statistics available in "The Labour Value of the Building Dollar", a study prepared for the Housing Administration, Department of Finance, by O. J. Firestone, Ottawa, 1943.

(2) Some overlapping might occur because there does not exist a clear-cut definition of skilled, semi-skilled and unskilled construction workers.

war will go into new materials, for example, use of plastics and plywoods in house building which have been developed in recent years and which will be used in post-war residential construction. It is assumed also that ten per cent. of remuneration paid to on-site labour will go to a new types of craftsman or mechanic who will have to handle new materials.

We are thus able to give an indication of the economic effects of a construction expenditure of four hundred million dollars which is assumed to represent the cost of one hundred thousand housing units. The lumber industry would get the greatest proportion of the expenditure for house building, namely 86.6 million dollars. It would be followed by the plumbing industry with 21.8 million dollars, the industries producing new material with 22 million dollars, the heating industry with 16.9 million dollars, the lath and plaster industry including manufacturers of insulation materials with 14.5 million dollars and the cement, gravel and sand industry with 14.4 million dollars. The balance would be made up by a number of small industries such as the

Table III
ESTIMATED POST WAR DISBURSEMENT OF EXPENDITURES FOR CONSTRUCTION MATERIALS

TYPE OF CONSTRUCTION MATERIAL	EXPENDITURE FOR CONSTRUCTION MATERIALS
	DOLLARS
Lumber industry.....	86,636,000
Industries producing new material (Plastics, etc.).....	22,000,000
Plumbing industry.....	21,846,000
Heating	16,874,000
Lath and plaster industry, including manufacturers of insulation material.....	14,498,000
Cement, gravel and sand industry.....	14,388,000
Paint and glass industry.....	11,286,000
Brick and stone industry.....	11,242,000
Roofing material industry.....	7,392,000
Electrical equipment industry.....	6,798,000
Tile industry.....	4,202,000
Linoleum industry	2,552,000
Other construction material supplying industries.....	286,000
Total expenditure	220,000,000

paint and glass industry, brick and stone industry, roofing material industry, electrical equipment industry, etc. (see Table III).

Expenditure for remuneration to on-site workers would be distributed among carpenters (46.7 million dollars), plumbers (16.6 million dollars), craftsmen handling new materials (14 million dollars), plasterers and tile-layers (11.5 million dollars), masons and brick-layers (9.2 million dollars), and glaziers and painters (6 million dollars). The balance would be made up by roofers and sheet metal workers, electricians and semi-skilled and unskilled construction workers (see Table IV).

It is not easy to foretell what employment will be provided by an expenditure of four hundred million dollars for residential construction. Technological changes, changes of the wage scale and of prices of materials will have an effect on the field of employment provided by such an expenditure. If we, however, assume that prices and wages paid during 1942 will prevail in the post-war period, it is possible to give some indication of the employment which can be expected from an expenditure of four hundred million dollars for house building. Based on data available in the aforementioned study prepared for the Housing Administration it is estimated that an expenditure of four

Table IV
ESTIMATED POST WAR DISBURSEMENTS OF REMUNERATION TO ON-SITE CONSTRUCTION WORKERS

CONSTRUCTION TRADES	REMUNERATION OF ON-SITE WORKERS
	DOLLARS
Carpenters	46,676,000
Plumbers	16,590,000
New building mechanics.....	14,000,000
Plasterers and Tile-layers.....	11,466,000
Masons and Brick-layers.....	9,198,000
Glaziers and Painters.....	6,076,000
Roofers and Sheet Metal Workers.....	3,976,000
Electricians	3,668,000
Other semi-skilled and unskilled construction workers.....	28,350,000
Total remuneration.....	140,000,000

hundred million dollars would provide on-site employment of approximately 186 million man-hours, and off-site employment of approximately 260 million man-hours, a total of approximately 446 million man-hours. This is the equivalent of saying that the erection of one hundred thousand housing units costing four hundred million dollars would provide work for over 223 thousand persons for one year.

Professor C. A. Curtis has pointed out that the importance of construction in the business recoveries of the past and thus the possibility of using it to prevent post-war depression will inevitably bring housing schemes into the field of reconstruction efforts. In addition it is hardly probable that much of the present inadequate and unsanitary housing will be appropriate or tolerated in the "new" world. Thus it seems that housing will be a live problem after the war.⁷ It is of utmost importance for the construction industry itself to realize what its possibilities and its responsibilities will be in a post-war period. Economists of repute in the United States like Mr. Alvin H. Hansen and Mr. Guy Greer emphasize that the construction industry is one of the most backward industries in the United States.⁸ The same principle applies in Canada though credit should be given to a number of firms which, in a small way, have made laudable progress. Dr. W. C. Clark, Deputy Minister of Finance, pointed out in an address given before the municipalities of Nova Scotia in 1937 that "the ablest and most responsible elements in the construction industry have not devoted their attention to the building of houses. They have spurned a business which appeared to be turning out a hand-made product catering to the particular idiosyncrasies of a few individuals in the higher-income groups. They have overlooked the possibilities inherent in applying organizing and promotive ability, large-scale methods, adequate financial resources and modern science, to the task of providing decent and economical shelter for families in the lower and middle income groups. This task has been left to the smaller and sometimes to the less responsible elements in the industry who are confronted with difficulties which, as we shall see, are almost insurmountable and the results are—what we see around us on every hand. Even for the best brains in the industry the difficulties will, I know, be enormously great but the colossal possibilities of the market should make the rewards commensurate with the effort expended. Few needs of the human being are more vital than housing and yet the mass of

the people are inadequately housed, provided with shelter accommodation far below the standard, in quantity and quality, which capitalistic industry is supplying them in every other important field."⁹

The success of any large building program after the war will depend on the concentrated efforts of industry, financial institutions, professional classes, labour, and governments—federal, provincial and municipal. Innumerable circumstances and interests inevitably must be considered and provided for in any comprehensive schemes, and cohesion and co-ordination amongst all these factors will be a prerequisite to any practical planning. Indispensable to all plans and schemes of course is the active co-operation of the building industry and for the fruition of any great residential construction development after the war the construction industry's share of responsibility lies in preparing in good time to cope efficiently with the requirements of such a vast program.

- 1 Mr. F. M. Babcock is an American authority on housing problems. He is a former official of the Federal Housing Administration and the author of the Federal Housing Administration Underwriting Manual.
- 2 A. R. Adamson, M.P.: Address on Housing, House of Commons Debates, Official Report, February 18, 1943, Vol. LXXXI, No. 16, p. 545.
- 3 Dr. A. E. Grauer: "Housing", a study prepared for the Royal Commission on Dominion-Provincial Relations, Ottawa, 1939.
- 4 C. Major Wright: "Home for the Future," published in a special issue of "Public Affairs" on "Canadian Post War Organization," The Institute of Public Affairs, Dalhousie University, 1943.
- 5 O. J. Firestone: "The Labour Value of the Building Dollar, Some Aspects of the Results of Eight Years' Administration under the Dominion Housing Act, 1933, the Home Improvement Loans Guarantee Act, 1937, the National Housing Act, 1938, the Home Extension Plan, 1942 and the Housing Conversion Plan, 1943," with an introduction by F. W. Nicolls, Director of Housing, Ottawa, 1943.
- 6 Expenditure for the building site and expenses connected with its acquisition are not included in the figure of \$3,939 which represents construction costs only. However, allowance was made for extras which usually are ordered after the building of the house is commenced.
- 7 C. A. Curtis: "Housing in Canada," *The Canadian Banker*, July, 1942, p. 386.
- 8 Alvin H. Hansen and Guy Greer: "Urban Re-Development and Housing," National Planning Association, Washington, December, 1941.
- 9 Dr. W. C. Clark: "Housing," an address to Convention of the Union of Nova Scotia Municipalities, August, 1937.

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NOTICE

The special issues of the *Journal* during the past year have been well received and the Board has invited material from Brazil which will appear in the next issue and from South Africa, Australia, New Zealand and Soviet Russia. These latter will not appear until the New Year. If any member has suggestions for future issues we shall be glad to receive them.

We are particularly interested in any suggestions from members as to necessary improvements, if not wholesale rewriting of existing Town Planning Legislation. Nothing is more urgent for our whole national programme of post-war reconstruction.

Editor.

PRIVATE ENTERPRISE HOUSING

By F. W. NICOLLS, Director of Housing, Housing Administration, Ottawa

In a recent issue of a publication entitled "Homes orhovels" under the heading "Authoritative Views on Canadian Housing" there is a statement that "Home ownership at present would endanger the financial position and health of the majority of Canadians" and a further statement that "the building industry can only build houses for sale or rent to one-third of Canadians, the richest."

The purpose of this article is to prove that the above quotation is misleading and not based on facts and that home ownership for a large percentage of the Canadian people is possible, desirable, and in fact essential if Canada as a nation is to occupy its proper place in the post-war era.

It has been definitely established by a nation-wide poll of the United States Home Market that "Four out of every five Americans would rather own their homes than rent them" and "The chief obstacle to home ownership today is that the prospect thinks he cannot afford the kind of a home he wants."

A poll of Canadians would probably produce a greater tendency towards home ownership—if the kind of a house the home owner wants could be built within his ability to pay.

According to the 1941 census the average annual income of the Canadian urban family amounted to \$1,680 and 77% of Canadian urban families had incomes in excess of \$1,000 per year.

The average Canadian low-income family should spend an amount not in excess of 20% of their income for shelter. This would permit the family with the \$1,000 income to spend approximately \$17 per month for rent or cost of occupying its home.

We must also recognize that many families in their anxiety to own their own home will safely obligate themselves to spend more than 20% of their income to accomplish this desirable objective.

Under the National Housing Act over 2,000 low-cost houses have been financed by loans of \$2,250. They are known as our "minimum cost house". They are occupied by families whose average income at the time of building their home was less than \$110 per month and the average cost of occupancy is \$20 per month, including interest, principal, taxes and insurance, but not allowing for repairs which, because of owner occupancy, should be negligible.

The cost of living in a house is made up of fixed charges such as taxes, interest and principal on borrowed capital and insurance, and, of course, maintenance, but we must bear in mind that maintenance of an owner occupied house, properly designed and built, is far less than that of a house occupied by a tenant.

It is not proposed to discuss the subject of taxes. This is an important subject to all home owners and one which is receiving considerable study by those whose duty it is to collect as well as those whose obligation it is to pay taxes. However, the question of interest rates is of interest to a prospective home owner.

Modern methods of financing presuppose the use of the blended payment of interest and principal. Factors commonly used are as follows:

4% interest—20 year amortization—\$6.02 per M. per month
4½% interest—20 year amortization—\$6.28 per M. per month
5% interest—20 year amortization—\$6.54 per M. per month
5% interest—30 year amortization—\$5.30 per M. per month

From the above it will be observed that a reduction in interest rates from 5% to 4½ will only save 26¢ per month per \$1,000, and a reduction from 5% to a 4% rate will only save 52¢ per month per \$1,000. On the other hand, if the period of amortization could be extended from 20 to 30 years and the interest rate of 5% maintained, the saving would be \$1.24 per month per \$1,000.

On a loan of \$2,250 this amounts to \$2.79 per month and brings the monthly cost of living in the "minimum cost house" practically within the reach of the family with the \$17 budget for shelter.

In order to safely extend the period of amortization it will be absolutely essential to have sound land planning for all such housing developments.

It is highly inconsistent to claim that in the post-war period there will be full employment at reasonable wages if we also claim that subsidized housing will be needed for a large proportion of our people.

If we are to have full employment we can minimize the need for subsidized housing (except for a small percentage of low-income families), but if we plan for a large volume of subsidized housing we are admitting that the plans for a better world to live in may not materialize.

No one wants subsidized housing if it can be avoided. Some people claim it can be avoided by increasing the income of the low-wage earner. This is a fallacy. If you merely increase wages you increase the cost of building these houses so you are right back where you started. But if you increase the efficiency of the worker his income can go up and the cost of the completed house can be lowered. Many authorities are of the opinion that this is the answer to low-cost housing.

This is where the architect and the builder and manufacturers of material and equipment step into the picture. The greatest reward that the construction industry can offer lies ahead for the architect, builder, etc., who can solve the problem of more "house for the dollar".

It will be solved, possibly by prefabrication; possibly by integration; possibly by mass production or scientific management. The threat to architects and builders is that it may be solved by men outside of the construction industry. In fact there are signs that this is how it will be solved.

The building industry should aim at building housing by private industry that can be occupied without subsidy or bonus by families with low income. Thus every family, the head of which is ready, able and willing to work, could afford to live in a home of their own, and subsidized housing would become unnecessary except for those unwilling or unable to work because of physical or mental handicaps.

Many countries have tried subsidized housing. It cannot be considered as entirely successful anywhere. It usually does not accommodate the people for whom it was intended and has often resulted in discrimination and dissatisfaction to owners and occupants.

It has been a contributing factor in destroying the morale of the people who occupy the housing. It has created tenants, whereas home ownership is the natural aim of every family who know the benefits and satisfaction of home ownership on a sound basis.

England has plenty of subsidized housing but in the post-war period housing authorities are hoping that past mistakes

will not be repeated. H. P. Cart de LaFontaine in his book entitled "National Planning and Re-Development" says:

"It is to be hoped that in the new Britain some better method of providing housing for the lowest paid workers than operated in pre-war times will be devised.

"The housing subsidy and unemployment must be banished. The first because, in reality, it means that the State is subsidizing the manufacturer or business which pays insufficient wages to allow the workers to afford an economic rent for their homes. This is an insidious poison. It causes a lack of self-respect and class difference which is injurious to character and independence.

"If a subsidy is necessary at all, it would certainly be more honest to pay it in higher wages than indirectly, in housing subsidies. It might be feasible, to enable workers to own their homes, to supplement wages and salaries, by the amount which would be spent in housing subsidies in such a way that this could not be used for any other purpose than house purchase by instalments. Here again there would appear to be scope for initiative on the part of the Building Societies in co-operation with the Government.

"It may be objected that such a scheme would not apply to blocks of flats or communal dwellings, but, if the co-operative principle was applied, there is no reason why the flat dwellers should not, in course of time, become co-operative owners of the buildings they inhabit."

Co-operative housing in Canada has barely been touched and its possibilities are almost unknown to the public, but if properly organized and managed it has a splendid chance to assist in solving some of our post-war housing problems for both the apartment dweller and the family who chooses to live in an individual suburban house.

To the apartment dweller it offers choice and convenient location not available for single family houses; service which could be obtained only at prohibitive cost to the single family house and a saving in first cost and operation. It is a known fact that co-operative apartment ownership can reduce the cost of occupancy to owner-tenants by as much as 25%-40% below prevailing rents.

To the single family dweller it offers complete and protected neighbourhoods with a reduction in first cost and maintenance.

Co-operative projects can be successful only if properly and diplomatically handled and if the owner-tenants are of approximately the same social and economic level.

Co-operative projects must be co-operative from the start; the moment the individual profit motive enters into a scheme it is doomed to failure.

One feature which must be overcome to make home ownership feasible and practical to the low-income family is mobility. Changing conditions of employment may require a movement of labour from place to place. This movement might be hindered if workers own their own homes and could not dispose of them except at a sacrifice.

This feature can be overcome by stabilizing values; a National Building Code; standardized procedure and close co-operation between local housing authorities located in various municipalities, all of which is possible and can be made effective through proper town planning and management.

There are several things which a province and a municipality can do which will contribute largely to a successful private enterprise housing programme.

- (a) There should be a proper land plan under the jurisdiction of a competent planning commission with adequate laws to protect the plan from violation.
- (b) There should be a modern building code based on sound technical study and research such as the National Building Code Residential Section (now in course of preparation).
- (c) The municipal tax picture should be such as to inspire confidence in the prospective home owner as to the ability of the municipal officials to manage the municipality competently.
- (d) There should be foreclosure laws in effect which will enable a mortgagee to realize on his security in the minimum time and at the minimum cost.
- (e) There should be in effect protection to the prospective home builder or purchaser and the mortgagee against unscrupulous builders by "Licensing" or "Building Trust Fund Accounts".
- (f) The ratio of land cost to total improved property value should be such as would indicate that land speculation does not exist.

One of the most urgent needs of the post-war era will be for large scale rebuilding of our cities in conjunction with proper town and city planning. Great opportunities for architects lie in the provision of new housing, rehabilitating blighted areas and in town planning. The contribution of good housing to the social and economic betterment of a community is obvious to everyone. Good housing for the low-paid workers is an integral part of any social security scheme. The elimination of blighted areas means the enhancement and beautification of our cities, increases the health, vitality and happiness of their inhabitants and adds to the wealth and well-being of the country. Town planning prevents depreciation in values, safeguards investments and establishes stability. Good housing, home ownership and good citizenship are synonymous.

Until the post-war era arrives let us not lose sight of the fact that both labour and material are needed for the prosecution of the war. It is our patriotic duty to dissuade prospective house builders from building during wartime except where it is absolutely essential to create new minimum cost housing. There are several good reasons for this:

1. Some of the materials going into house construction are vital to our war effort; in the national interest these materials cannot be spared for any other purpose except to prosecute the war.
2. Some available materials are not of the quality that is desirable nor is there a reasonable choice of material and equipment.
3. Labour is scarce and in some cases inefficient.
4. The cost of construction is up at least 25% and quality is down at least 25%.
5. Capital available for building now should be loaned to the Government to assist in financing the war.
6. We will need as large a backlog of construction as is possible to help insure against unemployment in the post-war era.

(The opinions expressed herein are those of the author and are not to be considered as necessarily representing Government policy.)

THE CONSTRUCTION INDUSTRY IN OUR POST-WAR ECONOMY

By A. S. MATHERS, President, National Construction Council

We in the construction industry are extremely interested in the proposals being put forward to utilize that industry not only as a cushion to absorb employment in the immediate years following the war, but also as the springboard from which the country is to leap into the golden age of the post-war world. Needless to say we view the possibilities of this with mixed feelings both of pleasurable anticipation and of apprehension. Come what may the industry has begun to lay plans for that period. The first stage of our planning has been in the way of stocktaking in order to find out what our position has been in the economy of the country, what our prospects of business are, and finally our potential capacity in organization and manpower.

We have learned from statistics compiled from the last census that of all persons gainfully occupied in the country approximately one in ten is connected with the construction industry. Of these about one-half are employed in the field, the rest being employed in the manufacture, fabrication and transportation of construction materials and equipment. In numbers this means that about 425,000 persons are employed in the industry. These persons are almost entirely men with families. Assuming, therefore, that the average size of a family is $3\frac{1}{2}$ persons it is reasonable to suppose that of the twelve million people in Canada nearly a million and a half are dependent upon the construction industry for their livelihood. This is an important fraction of the whole population, a fraction so large that its employment or unemployment has a most serious effect upon the whole national economy.

The figures which I have given you are the average only. In times of extreme activity the number of persons so employed has risen to over 600,000 and in the depression years dropped to less than 150,000.

It is a significant fact that during the depression construction workers formed by far the largest group for which relief had to be provided.

The construction industry is perhaps more sensitive to fluctuations in general business activity than any other industry, certainly the effect of booms and depressions on employment is more marked in the industry than elsewhere. This fact is now so well known that economists have come to regard construction activity as the barometer of business generally, indeed

they have recently gone farther and are now propounding the theory that construction is not only a barometer but a controlling influence as well. They are suggesting that by controlling the construction activity at a predetermined level relative to other industry, both booms and depressions may be reduced to harmless proportions. The method of control which they suggest is the one proposed some years ago by Mr. Black of the Otis-Fensom Elevator Co. Ltd., namely, that public works of all kinds should be timed to take up the slack in private construction when that occurs. They go even farther than Mr. Black did in proposing that government undertake large public works programmes purely for the purpose of increasing the total volume of activity and employment in construction beyond anything which private demand has produced in the past.

A Billion-Dollar Programme

The Marsh Report proposes that the volume of construction required for full employment in Canada should be in the neighbourhood of \$1,000,000,000 per annum. This is a spectacular proposal for it means that the industry would have to be more than doubled in productive capacity over present figures. The number of persons to be employed under such a programme would be about 750,000.

From the point of view of the construction industry such a programme is beyond the present capacity of the industry both in organization, manufacturing facilities and manpower.

Since the present capacity is about 400 to 500 millions per annum maximum, employing 450,000 persons, and that capacity and manpower, as a factor of the total productive capacity and manpower of the nation, has not materially altered in the past fifty years, it can readily be seen that a programme of a billion dollars per annum must, of necessity, upset a balance that has existed since Confederation, unless there be a proportionate increase in population.

Assuming that with a population of 12 millions full employment in the construction industry means the employment of 450,000 persons, it is a simple matter of arithmetic to arrive at the population necessary to provide employment for 750,000. I make it 20 millions, a figure which many people consider necessary for the proper development of the country in the next decade.

Construction Labour

In the boom years of 1928-30 the construction industry was hard up for "field labour". Shortages in the skilled trades and delays in procurement of certain manufactured materials were common; in short, the industry was working at or near its maximum capacity for a relatively short time. What the effect would be were the industry to find itself working year in and year out over a long period at the same rate, I am not prepared to say, but it is a generally held opinion that it would be physically impossible to maintain the 1929 rate of production for any great length of time with the organization of the industry as it then existed. The peak year of 1941 in wartime construction again taxed the industry to the limit, but it must be said with truth that its supply of skilled manpower had been seriously reduced, the difference in numbers having been made up of unskilled men from other vocations, notably from agriculture. The present precarious position of the farmer, as far as labour is concerned, is certainly due in part to the drain to the construction industry as well as to the armed forces. Whether or not this kind of labour will return to its normal pursuits or not is problematical, but it is certain that if construction is to be undertaken on the scale proposed by the Marsh Report, the necessary manpower must come from other vocations and industries unless a vigorous immigration policy is adopted.

In any case the problem of providing an adequate supply of skilled labour to replace the normal wastage through age, and to provide for increased activity of a type different from that prevailing in wartime, must be solved. The training of mechanics is an important phase of the industry's planning for the future and steps are now being taken along these lines.

In all our approaches to the post-war problem one thing is clearly of importance. The construction industry, apart from that section engaged in building houses for sale, is an *ad hoc* industry. It builds to order and not for inventory. The volume of construction at any time is, therefore, out of control as far as the industry is concerned. If, therefore, government policy dictates a tremendous building and construction programme, the industry will, no doubt, find the means to carry it out. On the other hand, if the carrying out of such a programme involves the reorganization of the industry on a vastly greater scale than at present exists, some transitional period will be necessary. As I have indicated before, labour will be the bottleneck, particularly skilled labour. There will be other shortages, perhaps of lumber, which will prevent the immediate undertaking of projects of the normal peacetime type in any volume beyond the existing productive capacity of the industry.

In the immediate years following the war it will, I believe, be essential that construction projects initiated by the Government be of a type which consume relatively large amounts of easily obtained materials and which employ a larger than ordinary quantity of unskilled labour. Projects of this nature are largely highway construction, flood control, railway maintenance, reforestation and other heavy construction. They do not include housing and public building construction.

Huge Construction Backlog

In order to gauge the amount of private and public building construction likely to come on the market immediately following the peace, the National Construction Council recently asked the Royal Architectural Institute to make a canvass of its members. As a result it was found that due to the war and its restrictions the 1939 backlog amounted to about \$60,000,000.

A similar survey of public works proposed by municipalities disclosed a backlog of \$200,000,000, including municipal buildings, pavements, water and sewage systems, and so on. While this figure of \$200,000,000 is probably a fairly accurate appraisal of municipal works, the \$60,000,000 worth of deferred projects reported by the architects is merely an indication of a probable private backlog of about \$300,000,000, when all types of private construction are considered. The sum total of these, namely, \$500,000,000, represents the known carry-over from pre-war days and takes no account whatsoever of the large amount of maintenance and repair work which has been building up since the war began.

From the information now at hand it would appear that the industry will be required to make up a backlog of about \$500,000,000 worth of construction in addition to the normal amount of new construction required. Dr. Firestone, an economist working with the Committee of Reconstruction, estimates that the backlog of Canadian construction will have reached a total of five billion by 1945. I do not question his methods of arriving at this figure, but I do wish to point out that there is a difference in the meaning of the word backlog.

Half Billion Backlog

He has based his figure on the difference between the gross value of construction in the decade preceding 1931 and the decade 1931-1941, and assumes that the average in the former decade represents the average requirement for construction over a long period. The construction industry cannot rely on any such reasoning but only upon figures for actual known and detailed requirements represented by the announced proposals of persons and organizations competent to undertake and pay for construction projects. It is on this basis alone that we believe that the backlog or value of deferred projects over and above the normal demand is about \$500,000,000, and, furthermore, we are satisfied that the amount of construction will create full employment for at least three or four years for the industry as at present organized and manned.

On the other hand, the Government will have to face the problem of providing employment and opportunity for a substantial part of our people to be demobilized from war industry and the armed forces. Construction which has the peculiar ability to absorb large blocks of labour, without the necessity of expensive plant and equipment, seems to present the best vehicle for the purpose.

As I suggested earlier in this talk, such projects as are initiated for this purpose must be of a nature which will absorb large blocks of unskilled or semi-skilled labour and use materials which are not in short supply. This part of the programme must be superimposed on the normal activity of the industry rather than incorporated into it. The projects so promoted should, I believe, be in the nature of public works designed to increase the productive capacity of the nation and thereby produce the new wealth necessary to liquidate their cost eventually.

The deepening of the St. Lawrence River, involving harbour improvements on the Great Lakes, the development of the Saskatchewan River, and the North-West Territories, flood control works on Ontario rivers, reforestation of sand hills of eastern Ontario, the building of new roads and highways into timbered areas, and the rebuilding and extension of provincial highway systems, and so on, are all vast undertakings which are of the type falling into the category of works designed to take care of the employment problem. They can be speeded up or retarded at will.

Paralleling this kind of thing and useful as a balance wheel to private construction are such projects as large scale public housing and slum clearance projects in the larger cities.

There is no doubt that if one began to enumerate the construction projects which could be undertaken with benefit to the people of Canada, there is enough work in them to keep Canadians fully occupied in a gainful way for the next fifty years. However, if the construction industry is to be expanded to the scale envisioned by Dr. Marsh, the product of the industry, which is capital equipment, must be designed to so increase our whole productive capacity as to enable us to pay for it out of our earnings.

I have tried thus far to indicate the relative place which the construction industry occupies in the Canadian economy, as the means of providing employment for some 450,000 people and their dependents. It is at present organized to do this and little more and, short of a large public programme of works, I believe that it will do so, certainly for the first four or five years following the peace. And I am also inclined to believe that, if full employment at this scale can be maintained, the stimulation in purchasing power will go a long way toward the support of all allied industry. Such a sustained level in the construction industry has never before been experienced in Canada for a long enough period to demonstrate its value.

As the economists have agreed that good times in the country are synonymous with full employment of construction workers and have also suggested that the corollary may be true, it seems reasonable enough to give it a try.

With the exception of the so-called federal public works programme of 1934, no attempt has ever been made by any public authority to stimulate employment by use of construction projects. The effect of this programme of only \$40,000,000 was startling. As an example, the commencement of work on one project, the Hamilton Federal Building, produced an immediate and spectacular drop in the relief rolls of that city and an immediate stimulation of retail business. This proved two things—first, that the relief rolls were filled with construction workers and, second, that velocity of the construction dollar through the economic set-up was very great indeed. There is no doubt at all in the minds of the people in the construction industry that this \$40,000,000 works programme of the Bennett administration broke the back of the depression. It was the first time that a public works programme had ever been timed to correspond with a lack of private building and it worked.

Public Housing

Before concluding I would like to make a few remarks about public housing, that very much misunderstood form of enterprise. By public housing I mean that business of providing housing at public expense at less than economic rentals for the lowest income families who are unable to meet the cost out of their own resources. This kind of thing, which has had a long history in Europe and a purely Rooseveltian history in the United States, cannot be applied to every country's housing problem in the same way. In the United States it is largely a slum clearance affair aimed at two objectives,—first, the social necessity of providing decent housing for the poor and, second, at the rehabilitation of the blighted areas of cities.

In Canada we have a rural as well as an urban housing problem; both have one common denominator, namely, bad houses, resulting from poverty and sometimes shiftlessness. The solution to both surely must be found but the method will differ.

The rural problem is not that of wage earners and the solution would seem to lie in some technical guidance and a great deal of financial assistance. The urban problem is a great deal more complicated, involving for the most part a profound knowledge of mass psychology, competent and skilled architectural planning and design and a degree of standardization and mass production methods hitherto unknown in the building industry.

In spite of over ten years' experience with public housing in the United States, the business is still in the experimental stage. It has been designed for a particularly amenable class of people under fairly strict supervision. What will be acceptable to them may not be acceptable at all to people who can pay for their housing out of their own resources. Something better than a low-cost housing scheme will have to be provided before our cities can be rebuilt and blight arrested. It will be necessary, I think, to revise our whole concept of urbanism, starting with the tenure and use of land, and to create a condition under which life in the central areas and the present slums can be as pleasant and healthy as life in the suburbs and outlying areas and at no greater cost to the individual house owner or renter. A decision will have to be made as to the importance on one hand of economic return on a piece of land at the moment, and, on the other the provision of light, air and space. If the decision is for the latter, then there is a problem of finance that is baffling. But this problem must be solved before any large-scale housing can be undertaken in our urban centres and solved on a social rather than a financial basis. True, everything we do must fit into our economy, but planning and rehabilitation must end with finance, not begin with it.

No fancy scheme of cheap federal money and no panaceas offered by those whose ideas lie wholly in the realm of economies, can revitalize our cities. We must find people who want to live in them and give them what they want at the price they can pay, even though a lot of equities and municipal taxes, and perhaps some gilt-edged mortgages go by the board. If we do not, these things are lost anyway. I have mentioned these things because of the proposals to make housing a major part of the reconstruction programme, and to emphasize the point that the mere building of large projects of this kind may accomplish only the economists' primary object of providing employment and little else. These schemes, if undertaken, must be very, very wisely conceived and executed only as a part of a broader scheme of urban rehabilitation and slum clearance. If they are not so undertaken the progress of urban blight and decay will not be reversed and we will have spent our substance on a mess of pottage.

I believe that housing for rent on a large scale involving the recasting of street layouts and zoning is the only solution of the urban problem. I also believe, in spite of all that has been said against private enterprise and its failure to provide more than slums and hovels for the poor, that private enterprise is capable of altruistic motives, that it is beginning to turn its back on giving the least for the most and to believe in giving the maximum for the least. I believe that private enterprise, especially large-scale private enterprise can solve the housing problem for all in a decent and very fine way. It will no doubt involve the taking of loss on some projects and on some units, but do not forget that even chain stores and department stores believe in loss leaders and clearance sales. If it is possible for government it is possible for private enterprise, for it is you and I who pay the whole shot eventually.

From an address by Mr. Mathers before the annual meeting of the Canadian Manufacturers' Association, at Toronto.

A NATIONAL HOUSING SET-UP

By HAROLD LAWSON

The shortage of dwellings in large and small cities throughout Canada is, as we know, most serious. Apart from the temporary housing being provided by Wartime Housing Limited there is little hope for improvement before the end of the war. But when the glad day comes that marks the end of hostilities and our men and women begin to return to peacetime activities, there must be no delay in actual prosecution of work on housing wherever it may be needed.

Unless, after the war, there is a considerable change for the better in our economy much of this housing must be for families whose incomes are inadequate for the rents that must be charged by private enterprise. This problem was formerly met in most Canadian cities by a graduation of tenancy at different levels to higher ones and with an influx of low-wage earners into converted houses. Now there are not enough to go around and it is in the public interest that provision must be made for many of them through new construction in all parts of the country where there is greatest need.

This baffling problem of low rental housing cannot be solved under *present conditions* except by assistance of public money in the form of grants, loans, rent reduction or other means, and as a co-operative undertaking among federal, provincial and local governments. It is obvious that they must be of substantial construction and conform to acceptable minimum standards. They should be designed as neighbourhood development units of sufficient scale to dominate their environment and only in areas where master-plans have been established. The initiation of housing programmes, planning, construction and administration should be matters of local responsibility but with such federal and provincial assistance as may be needed.

While low-rental housing is the real problem, the field of moderate rental housing merits encouragement, and it might be good policy to make public money available for loans to limited-dividend companies under certain conditions until the housing emergency passes.

A review of lending operations under the National Housing Act might reveal means for further stimulation of home-ownership. All these categories and their related factors should be studied with a view to formulation of a National Housing policy, and it should be done as soon as possible.

Post-war reconstruction plans for any community should give high priority to housing programmes as one of the means of stabilizing post-war employment through regulation and timing of volume of development.

Financing, administration and regulation of such great ventures as a series of housing programmes will require organization. In the first place there must be a central body to act as an agency of federal government, which it is hoped would provide the major financing. There must also be local organization, for the job of understanding the continuous life of the community, and making its growth conform to its real needs cannot be done by federal agency. It can only be done by the local authority, local planning or housing boards or specially created body for a definite project, if good results are to be obtained.

It is immaterial what name is given to the central body or authority. It may be set up as a national agency within an appropriate department of the Dominion Government or as a

Housing Section of a Central Planning Authority similar to that proposed by the Royal Architectural Institute of Canada. In any case it should have its own well rounded organization headed by an Executive Council, and have personnel including architects, engineers, economists, lawyers, sociologists, and housing administrators. It should also have secretarial staff and technical personnel. Its administrative expenses should be met by the Dominion Government.

A broad outline of some of its functions would include:

- (a) A nation-wide survey of housing conditions for which it would be empowered to enlist the assistance of provincial and municipal authorities, corporations, social service organizations, loan and mortgage companies, private persons and every other source which may contribute information on existing conditions, have views of probable needs, or otherwise make constructive suggestions.
- (b) A survey of available land, legislation and building by-laws and taxation factors beginning with the larger centres.
- (c) Preparation and publication of reports of (a), (b) and relationship of housing to health, conduct, and general welfare.
- (d) Stimulation of interest in local housing programmes, rules for procedure in initiating, financing, constructing, managing and maintaining local housing developments. These would include negotiation with provincial and municipal authorities, planning and housing boards and private entrepreneurs.
- (e) As an agency of government it should have power, under pre-arranged conditions, to extend capital grants, long-term low-interest loans, or annual rent subsidies to provinces, municipalities, housing boards or others for the execution of housing programmes within a budget fixed and approved by the Dominion Government.
- (f) Establishment of standards covering use of land and relationship to environment, facilities and utilities; amenities and physical aspect of housing, social and recreational requirements, occupancy and management.
- (g) Organization of continuous research in all factors influencing technique and structure, and, in co-operation with the construction industry, endeavour to effect improvement in building methods and construction costs.
- (h) Investigations, in co-operation with local authorities and planning or housing boards, into taxation structures of municipalities with a view to arriving on equitable basis for taxation rates on low-rent housing.

To avoid duplication of governmental activity the Housing Administration of the Department of Finance might be made an integral part of the Central Housing Authority and thus contribute further to the encouragement of Home-ownership building.

A word on local housing boards. They are not to be confused with local *planning* boards. and have quite different powers and functions.

(Continued on page 153)

THE ENGINEER AND LOW-COST HOUSING

By ROBERT F. LEGGET and GRIFFITH P. TAYLOR

The master builder of the past was at once architect and engineer. The long histories of the two professions derive from a common root and have been intertwined closely through the years. Only in the modern industrial age have the two gone their own way, with consequent loss to the achievements of both. Today there are signs of a reversal of this unfortunate trend. As buildings become more complicated and larger structures than in the past, and as architects and engineers appreciate anew the social significance of their work, so inevitably are the two professions again joining hands. And in no branch of building work should this be more in evidence than in the field of housing.

Housing must loom large in the Canadian construction scene in the near future. The public conscience is already awakened with regard to the disgraceful housing conditions that have been allowed to develop in this still new country.

Housing on the scale even now contemplated for the post-war period will be a major construction enterprise. It must be well done in every respect, and this will be possible only if architects and engineers pool their respective skills and work together on an equal footing, with the public interest as their guide and inspiration.

Almost from the dawn of history, houses have been built by small groups of craftsmen. Many stately old homes in Europe testify to the negligible changes made in recent centuries in the essentials of housing. Even to-day the building of a small house in Canada follows the identical pattern of a distant past—brick, wood, and plaster being labouriously placed by hand. The work of the speculative builder is as antiquated as the social system that permits him to despoil the landscape. The architect has to watch such tragedies from afar, being usually consulted only with regard to larger homes. And the engineer has passed by on the other side knowing that even if asked to assist with the design of a large house, he would be regarded merely as a glorified plumber.

A new analysis of housing is therefore a prime requirement of the time. The architect must be prepared to apply his knowledge of planning and design to the *small* housing unit, not along traditional lines but in association with the engineer, who must in turn be willing to apply the engineering method to the housing problem and be prepared to adapt his most advanced construction techniques to the long despised job of house building.

What is implied by the engineering method? An objective appraisal of the functions of the proposed structure, the materials and methods available for its construction, and the correlation of the results of this inquiry into a design sound economically and functionally adequate.

The functions of a house may be classified as protective, utilitarian, and social. Protective functions include shelter from rain and wind and protection from undesirable visitors, both human and insect. In temperate climates, protection against winter cold is required, and in tropical regions against the sun's heat. The utilitarian functions contribute something more positive than merely shutting out the environment. The heating plant furnishes heat which cannot be found outside. Electricity and gas furnish more convenient controls of light and cooking than

exist in Nature. Water supply, the sewage disposal arrangements, and telephone service complete the list of utilitarian functions. The social function of the house is that of being the physical framework for much of life. In particular, the house provides an essential background for the passing on of traditions of social life to young folk of pre-school age.

The materials of construction are of four types, the metallic, fibrous, stone-like, and plastic materials. The metallic materials include steel, brass, copper, lead, and zinc available in bars, beams, and sheets, and more specialized forms such as pipes, wires, and hardware. These materials are hard, dense, high in strength-weight ratio, incombustible, good conductors of electricity and heat, and generally easy to join together by means of welds, rivets, splines or separate connecting devices such as bolts and nuts.

The fibrous materials include lumber, plywood, hardboard, softboard, cork, wood wool, rock wool, and sawdust. These are available as bars, beams, sheets, and loose fill. Their properties vary widely, but all have low thermal conductivity. The first three have high strength-weight ratio but are combustible. They are easily joined together by gluing, or with splines and metallic connecting devices. The last five have extremely low thermal conductivity with little or no structural strength. They are used principally as an insulating medium in conjunction with stronger framing materials. Rock wool alone is incombustible, although chemical treatment and careful design greatly reduce the fire hazard with the others.

Principal examples of the stone-like materials are brick, stone, asbestos board, concrete, and plaster, used as blocks, beams, sheets, and in bulk ready for casting at the site. These materials are generally heavy, hard, brittle, and poor thermal insulators. Field joints capable of developing strength in tension or bending equal to that of the parent material are impossible, despite the fact that the parent material is, to begin with, far weaker in these respects than the structural materials in the first two classes mentioned. The pre-eminent merits of the stone-like materials are their durability and freedom from combustion. Most stone-like materials are joined by a "wet process" such as by the use of cement grout or mortar. Asbestos boards appear to have a certain future in housing because these permit joints to be made with metal connections being clean, dry, and immediately ready for use. Aerated concrete alone among the stone-like materials is light in weight and a fair thermal insulator but it is much weaker than the structural fibrous and metallic materials.

The plastic materials include opaque plastics, transparent plastics, and glass. The plastics are today too expensive to find much use in housing although the brilliant colouration possible with opaque plastics has made them useful for some interior finishes and post-war price reductions may make them available for house interiors. Plastics may be durable, nearly incombustible, high in strength-weight ratio, and readily moulded into curved surfaces. Modern aircraft practice shows the possibility of moulding compound curvatures in plastic bonded plywood, using glues consisting of phenol-resin plastics, producing structures far stiffer and stronger than those built from flat sheets. Glass is durable, incombustible, and transparent but very brittle so that it has normally to be used in panes set in wood or metal sash.

Against the background provided by this listing of functions and materials, the engineer can assist in rationalizing housing in three principal ways. First, he can draw up and supervise the application of standards for correlating sound foundation designs with local foundation substrata. Second, he can so combine materials of construction as to make each part of a structure fulfil efficiently the physical requirements listed previously as the protective and utilitarian functions. In this work he can draw from wide practical experience in other fields such as industrial construction, and refrigeration, automotive and aircraft engineering. Third, the engineer can draw upon the techniques of quantity and mass production developed in other industries in order to produce all parts of the housing structure far more economically than today. Large buildings providing many home units offer great possibilities for the implementing of these suggested approaches. So also does the single or small multiple dwelling, particularly in relation to its prefabrication. Within the confines of this short paper it will be possible only to outline some aspects of the latter type of housing work, as indicative of what to-day can be achieved in the housing field.

Houses are anchored in one place. Hence the relation of the house to its substratum is fundamentally important. No cellar need be damp if engineering principles are applied when building the foundation. The construction of the house must start with the excavation. Adequate tile drains should be laid on all four sides outside the wall line and below the cellar floor line. The footing of the foundation wall will be cast *in situ*, but the major part of the basement walls may be of precast reinforced concrete panels factory-waterproofed on the outside. Joints might use steel key rods passing through loops integral with the reinforcement. These joints can be waterproofed with asphaltic mastic applied under pressure from above. The cellar floor could be cast as soon as interior drains were laid and the walls plumbed. Thus constructed, basements could be put to full use instead of being wasted as in so many existing buildings.

Floor panels can be made of the largest size transportable by rail and special motor truck. In the house or small apartment building timber will probably remain the chief flooring material but with greater stiffness derived from top and bottom plywood surfaces, glued to the joists to resist high shear stresses thus increasing greatly effective cross sectional moments of inertia. Side joints between panels could be designed so that a minimum of three or four bolts would be needed in each, with grooves and spline to resist vertical shear between adjacent panels.

Exterior wall panels can be made large, with their height the storey-height, and their length twelve to twenty feet to minimize the number of exterior joints. Structural strength can be derived from steel or timber truss work or a plate girder structure within the section, in which interstitial condensaton will be avoided by keeping the metal parts wholly on the outside or wholly on the inside of the insulating filling. Canadian municipal building codes are not favourable to wooden exterior walls. Hence a section combining asbestos board or steel, for exterior durability and strength, with rock wool, chemically treated wood wool or sawdust for insulation is a practical possibility. Alternatively, if good design and pleasing appearance can be embodied in inexpensive timber construction suitably faced with asbestos board or steel sheets, then building codes might be revised in order to encourage the use of these in overcoming the housing shortage. Horizontal joints in exterior walls can be made with tarred felt or mastic compressed by gravity supplemented by a small number of bolts placed at points of stress concentration. Vertical joints are harder to make watertight. Elastic asphalt-impregnated splines could, however, be drawn tightly into grooves on both outside and inside of the wall thickness, the inside packing being intended to prevent seepage of moisture from the inside of the house into the cooler joint space where it would condense.

Flat roofs should find increasing favour because of their small area in proportion to volume protected. The smallest plan dimension of a house is usually thirty feet or less, and roof sections thirty feet long and ten feet wide are an economical size for mass production. With light weight design these would weigh three tons. It is not difficult to design a motor crane for panel erection, counter-weighted by an auxiliary truck opposite to the load, opening to a height of three stories and cantilevering its load twenty feet beyond its outside wheels. One of the authors has designed such an erecting machine and built a scale model from this design.

The roof joint presents many difficulties. Plastic glues may permit galvanized steel sheets to be bonded to the load resisting wood framing. Vee crimps would permit thermal expansion crosswise of the panel. The structural strength of the joint between panels could be developed by keys and bolts applied from below the ceiling, and the waterproof joint could be applied by sweating an inverted U-section over the upturned edges of the waterproof sheets. Such a roof with integral eave troughs would retain the snow as an insulating blanket in winter, and ponded water renewable from the main could be used as a means of keeping the roof cool in summer.

Interior partition walls might be of the non-bearing type associated with a few columns for interior floor and roof support. This would permit a greater adaptability of room arrangement than now current. Features providing acoustical insulation, such as independent studding and hair cushion suspensions, can be used most readily in non-bearing partitions. In apartment buildings floating floors could be most easily applied over full unbroken areas before hanging the partitions.

With large-scale production, monotony of arrangement need not develop in prefabricated houses. Universal jigs will permit the positions and sizes of windows in wall panels to be varied in any multiples of the four-inch jig module. A house factory would turn out both standard and custom built sections, the latter at a slight extra charge and increased delivery time. The last stage in production of panels such as have been described would be the application of finishes. Transport and erection machines can be designed to handle panels by their connections only so that both surfaces of each panel can be prefinished under controlled factory conditions making for a higher uniformity of product than has been possible heretofore. Interior finishes where necessary would be protected with waterproof paper to be removed immediately before occupation.

By careful factory grading of raw material and control of gluing, nailing, or welding sequences in fabricating the panels, and by the use of jigs of high structural rigidity, full interchangeability of prefabricated panels can be obtained. When the foundation passes a routine inspection for squareness and level, the superstructure will then go together like a Meccano model, with the four-inch module of the house joint details an engineering parallel to the half-inch module of Meccano parts. The skills required in the factory for building panels will be not greatly different from those developed with such ardour by war workers. Some of the special machinery and fixtures built for producing tanks and aircraft can be converted to prefabricated housing with much less economic waste than if they were scrapped or left idle.

The building of small houses in Canada has long been the province of the builder-contractor, and to a large extent can remain so. The conscientious local builder can prepare the site and place the foundations more efficiently than visitors from a metropolitan factory. The local builder's office is the best place for advertising new building methods. Prefabrication, in particular, lends itself to the use of accurate scale models of panels with which houses can be built in miniature to help the customer make his choice. The transport and erection of large panels

would be specialized work for a field staff from the factory, but completion of interior finishing and preparation for occupation would be carried out by the local builder.

If town planning is to be recognized at all in Canada's post-war housing programme, then all such work of local builders must be a part of planned development. Here should be one of the architect's principal contributions to low-cost housing, in the efficient and aesthetic planning of all new housing projects. Correspondingly, although the structural design, factory production and field erection of large prefabricated housing panels must be the work of the engineer, the planning of all panel units—and of the housing units they are designed to form—must rightly be a co-operative venture of architect and engineer.

The suggestion that architects may thus have to work as members of groups engaged in factory production of housing units will be distasteful to some members of the profession, so great a departure does it represent from the long-accepted individualistic practice of the past. Surely, however, it would be preferable to have architects thus associated with new low-cost housing developments than not at all. The engineer knows that any contribution he may make must be a corporate one, so complex have modern factory technique and structural design become. Will the architect co-operate?

This discussion of prefabrication deals with one approach only to the problem of low-cost housing but it is an approach that will inevitably be used in the post-war world. Many boogys

about prefabrication will have to be displaced from the public mind—that it is costly, that prefabricated houses are ugly, that it reduces the volume of building work. Structures erected by Wartime Housing Limited may be cited by some as examples but study of the foregoing notes will show that these now familiar housing forms are in no sense examples of the prefabricated construction herein discussed. Some local labour will still be needed but the greater part of necessary manual work will be done under ideal factory conditions, with regular working hours. And just as Canada has for long exported many of the raw materials for housing, it is not too wild a dream to envisage Canada exporting finished houses in like manner to automobiles if the initiative and vigour that have been shown in the production of materials for war are channelled, in due course, into the essential task of providing decent housing for all the people.

After the above paper had been submitted to the Editor, the authors were privileged to see a summary of the first report of the British Committee for the Industrial and Scientific Provision of Housing which has recently been issued in London. The committee was set up in November, 1941. Its findings are similar, in many essential respects, to the suggestions advanced in the above paper and thus tend to confirm the thought therein implicit that, if architects and engineers do not prepare to co-operate in this seemingly inevitable development in housing, industry may be found to be embarking upon such a venture without such professional aid and guidance.

A NATIONAL HOUSING SET-UP

(Continued from page 150)

Housing boards are distinct corporate entities, the same as any other business corporation, with such powers as may be given them by the legislature. Broadly these powers include buying land and developing it for all purposes connected with housing. It is obvious that in matters of site planning and zoning that there must be mutual co-operation between them and the planning board and that they (the housing boards) must conform to master plans where these exist. Their financing is done through public credit. Projects developed by them may be held and administered or may be sold. Needless to say, a housing board does not limit itself to providing for low or lowest wage earners, but through its operations should be able to limit the usual high cost of financing by private entrepreneurs and thus widen its field of usefulness.

It may be apropos to illustrate an instance of relationship of a federal agency to local planning boards and a brief outline of a method of financing. The United States Housing Authority's method of financing construction is through co-operation with local housing authorities established by state legislation. The federal government advances 90% of the cost and the local government 10%. Bonds are issued and retired over a period of sixty years by federal and local contributions. There are no taxes but the federal government pays a fixed sum for local public services. The rent charged for each unit is consequently for operating charges only, resulting in reducing rents to about

half of that necessary if the project were privately financed with a 4 per cent. return on investment. I understand the U.S.H.A. has in all cases employed local architects for its projects, and that they have been built by contractors in the usual way.

Whether the method here described would be suitable for Canadian conditions in all provinces is for others to decide who are more versed in these matters than I. The United States and practically every European country have recognized the need, and have agreed to tax themselves as the discharge of a debt to past neglect in housing low-income families. There are many examples which may be studied to serve as a guide in directing our efforts to provide at least some of the housing that Canada so urgently needs. The exigencies of the war effort limit the number of people who can even think about these problems, and except for those immediately affected, those who are living in stores, garages and sub-standard dwellings, there are few who realize the housing situation as it exists—and fewer yet who realize the impending housing crisis that the end of the war will bring. There is so little time in which to prepare for developments that post-war conditions will bring. Organization and planning should begin now, for when the war ends there will be impatience of considered thinking and planning which does not imply immediate action. It will then be too late for comprehensive planning and housing programmes, or any other kind of large scale physical development programmes.

PRAIRIE SLUMS, UNLIMITED

By ERIC W. THRIFT

If we were able to assemble, let us say, 1,000 typical homes from the farms and small towns of western Canada and arrange them on an urban street layout, we should in all probability find that we had on our hands a community which in most of its physical respects was just another slum. Much has been written, lengthy reports made, much ado and a little action taken about the problems of our urban slums. True, they are undoubtedly the worst spots we have in Canada for moral and physical deterioration—but, whilst we plan to eradicate such rotted areas and to prevent their development, let us consider the whole problem of proper housing and surroundings for all of those Canadians, rural as well as urban, whose homes are inadequate in various ways to maintain a decent and comfortable life.

What are these conditions which may be classed as those to be found in a slum? One of the conditions most commonly found in our urban slums is that of overcrowding. Housing authorities generally agree that a condition in which there is less than one room per person is overcrowded. In Manitoba it is found that rural houses average 4.54* rooms in size (comparatively low by urban standards) and average 4.68 occupants per house. This gives an average of 0.94 room per person for rural Manitoba homes. On top of this we find that there are more than 50% of these homes with less than four rooms each.

Consider the age of these rural homes both on farms and in small towns. Many are 50 years old and more, and all too few can be found whose life span is less than 15 years. Now, while this may not be long when we consider the life of many buildings, even houses, in other parts of our country and in the older parts of the world, it is a long time for the type of structure which is to be found on the prairies. Good foundations are not common and such things as insulation are practically unknown. To make the situation worse the vast majority have had little money spent on them for maintenance, particularly during the depression and drought years of the thirties. All incentive to try to maintain domestic buildings in good repair and up to date in services was lost. Consequently, many of these homes have deteriorated to the point where it would be doubtful economy to attempt to rehabilitate them. They are decadent in plan, structure, equipment and all the amenities so essential to a home of the 1940's. They need to be replaced completely. There is factual evidence of these conditions in census figures, an analysis of which shows that 44.17% of houses reported showed need of external repair. And when we consider what constituted need for external repair, "cracked or leaning exterior walls, shingled roofs with warped or missing shingles, chimneys cracked or with missing bricks, unsafe outside steps or stairways",—we realize that many more are probably in as bad, but less evident need of such work.

In turning to the question of sanitary facilities and water supply we find that there are conditions in our rural areas which are far worse than those commonly found in urban slums. Very few homes outside of the large centres in Manitoba have running water or adequate sewage disposal. To indicate how extensive is the lack of these modern conveniences in rural Manitoba, there are 94.3% of homes using outside privies and

*NOTE: All figures quoted are based on material supplied by the Dominion Bureau of Statistics taken from the 1941 Dominion Census and concern rural housing in Manitoba.

only 1.25% of families who have exclusive use of an inside toilet. In 93.6% of them there is found neither bath nor shower. Again the source of water supply has been outside the house, by wells or other means, in 88.4% of cases. Thus we see that the use of modern plumbing conveniences, which have become a common standard of living even in most urban slums, is a rare luxury in rural sections. There, we find sanitation still in the primitive stages of pioneer days.

The prospect with respect to electric power and lighting is a little brighter. Many of the towns in rural Manitoba are now supplied with Hydro power, and although few farms have it as yet (over 90% are still using kerosene or gas lighting) the hope for rural electrification after the war is good if present plans materialize. Thus, we may hope that this will help to reduce the almost 96% of farm homes using wood as fuel for cooking and to replace it with modern, safe, comfortable electricity. However, the use of electric light must not remain in the primitive state in which it is found in many of the smaller installations: the bare light bulb suspended on the end of a wire in the middle of a room is hardly a modern standard of lighting.

Heating also remains primitive in the vast majority of rural homes. Over 80% use stoves of one sort or another—stoves which are dangerous, inefficient and very often most ineffective. These are the accepted prairie standard. The pioneer's conditions of discomfort and inconvenience are still very much with us. The kitchen stove is an important source of heat in the winter. If it were possible to replace the old wood burner with electrical equipment what would happen to the heating? One of two things would have to be done. Either the heating system would have to be changed completely or the use of an electric stove abandoned. Using electric power thus means more than acquiring the power and equipment.

Suppose for a moment that the average Manitoba farmer's home be compared with the manufactured equipment which he uses. It is soon evident that his home suffers greatly by comparison for much of his farm machinery is well painted, modern, efficient and good to look at, while his home is anything but these. The same applies to the car he drives, that is, if he has gasoline. Only 24½% of Manitoba farmers, according to census reports, have neither radio, car nor telephone, but there are 73% without refrigeration of any kind—not even ice. Obviously, the home improvements which many might have been able to afford seem to have been put aside for things that were physically easier to get and use.

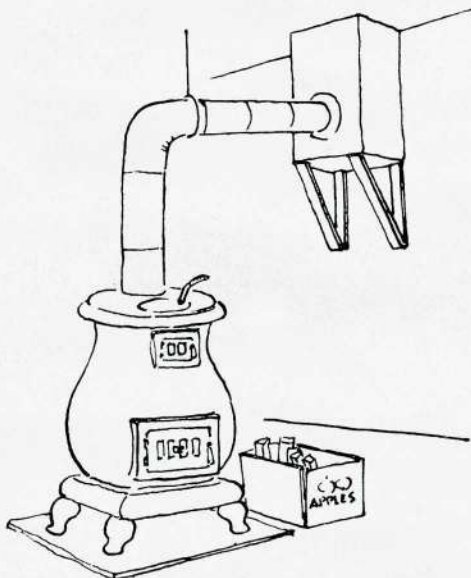
In spite of the heavy incidence of crowding in rural homes, we know that at present there are many absent from these homes, having entered the forces or war production. The farm labour shortage is acute in many sections, particularly during harvest time. It is also a familiar theme that the young people will not stay on the farms. The utter inadequacy of rural housing is emphasized when we consider the extra population which may return to rural sections in peacetime from the forces and industry. There is no room for population increase within existing rural housing. The economy of the prairie provinces is almost wholly an agricultural one and yet this most important of our industries is losing its primary productive capacity in the younger generation who are moving away to the cities. Over 60% of heads of farm families in Manitoba were over 45 at time of census in 1941. How can the young people be attracted



to return to agricultural pursuits? One thing seems certain—to expect young people, who have come to understand and appreciate the common comforts of urban living, to return to rural home conditions as they exist today, is asking the impossible. Therefore, if our primary industry is to thrive and enable Canada to play its proper part among the nations of a world peace—as our post-war planning insists—we must see to it that it is not sabotaged through lack of sufficient and proper housing provision. Rural life must, and can, be made as attractive as urban life.

The architectural profession, by and large, has done little to improve the lot of rural people, simply because it has done practically no work for them. In the past it has tended to scorn the rustic and leave him to his own deserts. True it is that the problem of the economics of architectural practice has had a large part to play in this omission. Can such work be made to pay? It can, but only if the farmers and small communities realize fully the value of architectural service. One fact is certain, that unless the benefit of architectural thought is easy to come by, the country man will be little interested in it, whether he consciously commissions it himself or gets it already applied to his house or building.

Since there has been little or no professional architectural advice on the homes of our rural areas and small towns, a large part of them are still in the most primitive stages of development. Many are just log huts or shacks erected by the occupants and reflect the lack of adequate knowledge on the part of the people. This fact points out the absence of one of the fundamentals of civilized progress—education. Proper education for all people would bring with it the recognition of poor standards



of living and their detrimental effects on mental and physical well-being, followed by understanding of how these poor conditions may be remedied as well as the incentive to eradicate them. The architectural profession could help in this education on phases related to housing and working conditions and their betterment. There is much for all to do—architects have knowledge and ability of value to the future growth of civilization; it will be a crime against society if they “hide their light under a bushel.”

There are some conditions which must be well considered if rural work is to be of real value. The standards and requirements of houses for country, particularly farm use, vary a good deal from those of urban types. These requirements must be studied and understood to achieve farm home planning which adequately serves the complexities of farm life. The duplication of houses designed for urban lots is an obvious stupidity. As yet, in the few newer houses that are seen in rural areas, seldom



has much consideration been given to the differences between the needs of the farm home and the city home. The result is just another “house” which might have been plucked from the middle of some new urban subdivision, and generally not a very good one at that.

In the past the architect frequently has tended to give his clients what he thought they should have and to get for them in such a manner as suited his business methods more than those of anyone else. There may be other methods of getting good buildings for those who need them. People need something in the form of shelter which they can acquire easily and pay for easily. The solution may lie in some form of industrial production of houses, but if and when we do solve the technical problem of devising a system of house production by which people can obtain houses almost as easily as automobiles, then we shall need a competent marketing programme. There is more than sufficient evidence of these needs in the purchases of equipment by farmers who could, in many cases, have acquired better living conditions if they could have purchased them as readily as other things. Therefore, the implication is this—that there would have to be a pooling of research and design ability by some organization whether private or public, large enough to support such an enterprise and to make its technical work effective. It seems likely that the development of such organizations will be necessary in the future in order to achieve the conditions we know are needed. Whether the architect will continue, under such a scheme, to operate as a separate unit or be absorbed as a part of a larger organization, will probably depend on the individual and his abilities. Whatever happens to him, this we know—that our western farmers need better houses that can be obtained by some better means than those that our frequently archaic systems have produced in the past.

CO-OPERATIVE HOUSING

By SAMUEL HENRY PRINCE

Professor of Economics and Sociology, King's University, Chairman of the Nova Scotia Housing Commission, and Director of the Maritime School of Social Work. Author of *Society and the Housing Crisis*.

The present happens to be the pre-centennial year of the Co-operative Movement. While the first co-operative shop was actually opened in 1844 it was in the preceding year that the Rochdale pioneers instituted a search for an economic expedient which would help the weaving fraternity to weather the industrial storms of the "hungry forties".

It has been well said that necessity is the mother of invention. It was when their fortunes touched rock bottom that there emerged from this little group the new philosophy of living together which Henry A. Wallace has described as "the dominant economic idea of the future". What this idea is and its particular relevance to the housing problem is the concern of this article.

"Together" has been called the key-word of the Twentieth Century. The Co-operative Movement is an earlier version of this idea applied to the ownership of property. That which individuals can never hope to own alone they may at least own together. The concept was so closely akin to the religious ideal of mutual aid that the early co-operators envisaged a new community with something of the ethical character of Swedenborg's angelic society. But the pioneers were by no means visionaries. They kept their feet on the ground and plugged all the economic loop-holes with such safeguards as cash sales, no speculation, limited interest and majority control. After much trial and error the day of small beginnings was succeeded by one which saw the establishment of cooperative ownership of stores, credit unions and other enterprises serving millions of workers in many lands.

Co-operative Housing

Housing was not the first co-operative venture to be undertaken. It has followed in the wake of other co-operative endeavours. This is not surprising for housing is one of the most complicated forms of co-operative activity. But of them all housing is, perhaps the one of greatest importance because it is in the power of good housing to mould the social fabric. With the restoration of the home as an economic fortress the spiritual renewal of the family is but a single step.

There is, however, a great deal of confusion about the meaning of the term co-operative housing. It has been loosely applied to many types of housing developments in which co-operation as such is a very minor factor. Co-operative housing may be classified into two principal categories. There is first of all "orthodox" co-operative housing. This is co-operation pure and simple, and is conducted according to the ideals of the Rochdale pioneers, i.e. every tenant a member, to each member one vote and the membership owning and controlling the organization. There is, secondly, the "modified" type of the co-operation set-up with control vested in a society rather than in the members who may possess little or no equity in the undertaking. Each type has its advantages. The former offers the satisfactions of self-government and joint ownership, but of necessity is limited to those workers whose employment permits them to settle permanently in one location. The latter is, however, more adapted to modern industrial society allowing the occupants greater mobility but giving them little or no voice in the control of the organization.

European and American Experience

European experience has departed more and more from the original "orthodox" co-operative pattern in favour of the "modified" type of organization. For instance in Copenhagen practically nothing but large multi-family houses are constructed and these by great co-operative societies which retain the ownership and control of the apartment units. In Stockholm considerable attention has been given to the mass production of small individual homes, but these are concentrated in large communities and exhibit the same features of diffused ownership and centralized control.

In America co-operative housing has not, as in Europe, become an important factor in the provision of low-cost housing. Until recently co-operative activity has been limited to apartment houses which have been built or purchased by co-operative groups. Practically all of these conform to the "modified" type of co-operation.

Public-Co-operative Housing

The most visible trend in co-operative housing in the United States has been the bid for government credit looking toward what is known as "public-co-operative self-liquidating housing". Admittedly what has retarded the development of co-operative housing in America has been the inability of co-operative organizations to secure credit. Most of the projects which have failed have done so because of insufficiency of funds and credit. The few which have succeeded owe their life to the advantageous terms provided by insurance companies or interested sponsors. In Scandinavian countries, on the other hand, huge credit societies, pooling the savings of a co-operative-conscious population, have been able to supply housing loans independently of government aid. But even in Europe co-operative organizations have been forced to make increasing use of state loans (via the municipality) as is possible, for example, under the Dutch Housing Act. Advanced co-operators are of the opinion that in this way governments can bring about the promotion of "social housing" with the minimum strain upon the self-reliance and initiative of the individual citizen.

Neither in the United States nor in Canada have there been as yet any examples of public-co-operative housing of the "modified" type, although a few small co-operative projects in the United States have been so devised as to take advantage of the Federal Housing Administration insurance on loans. But in the "primary" type of co-operative housing where the people do their own building with initial public financing a beginning has been made.

Crown-aided Co-operative Housing

Credit for the inauguration of Crown-aided co-operative housing of the "primary" type must go to the Province of Nova Scotia. In 1937 the first move was taken toward a public co-operative housing project among the miners of Cape Breton. The idea took root and there are now in the Province seven co-operative villages actually constructed. These are "Tompkinsville", "Villa Nova", "Reidville", "Princeville", "Churchill Centre", "Claremont Park", and one, the name of which has not,

yet been chosen, in New Glasgow. All consist of detached, single-family homes for workingmen. But they are not workingmen's homes in the ordinary sense of the term. On the contrary, the new dwellings are first-class houses which would sell in the market at a bid-cost of from \$3,000 to \$4,000. They are of frame construction, have seven-foot basements with ten-inch concrete walls, excellent kitchens, living rooms, dining rooms, three (sometimes four) bedrooms, each with well-appointed bath-rooms. In size the houses are 24 x 26, in some cases larger, and have an average cubage of 16,000 cu. ft. They possess the desirable element of individuality made possible through an album of twenty or more low-cost-housing designs furnished by the Government and also by skilful changes in gables, porticoes and painting.

Creation of a Co-operative Village

There are three stages in the creation of a co-operative village. The first step is the rounding up of an ambitious group of men who possess energy, strength of purpose and a strong home instinct. They must, of course, be converts to co-operationism; especially must they be impressed with the "fictional advantages" of private ownership as regards a house to live in, and appreciate the increased security which may be enjoyed as "tenant-owners" in a company-held property, when they, the tenants, constitute the company. The second stage is the study-club period when some months are given over to the discussion of the principles of construction, to architectural plans and to the preparation of card-board models. The final or building stage finds the group engaged in unremitting manual work absorbing all off-hours and evenings for more than a year, the whole project being carried forward by the members of the group (and their wives) working as a crew. Mistakes are made but as time goes on experience becomes pooled and the results more than justify the thesis that workers who are neither carpenters nor plumbers by vocation can, under competent supervision, erect suitable homes for and by themselves.

The Nova Scotia Housing Commission Act

The scheme has been made possible only through the substantial aid given by the Provincial Government under the Nova Scotia Housing Commission Act (Chap. 12, 1932, and amendments). In the first place the Commission has made available 20-year low-interest loans (3½%) to the extent of more than \$150,000. The loans are limited to 75% of the total cost of each project, and are designated to cover the materials used. The land and labour must be provided by the members of the groups themselves. But the Commission does not stop here. The Act provides exemption from incorporation fees and provincial taxes. The Commission furnishes free plans, specifications and blue-prints; it provides free architectural help and supervision; it gives free legal aid and advisory assistance; free bookkeeping services, free carpenter's risk insurance and also arranges for the protection of the workmen under the Workmen's Compensation Act.

In addition the Crown has provided trees, hedges and assisted with beautification schemes, has helped to build roadways, and contributed to the development of community activities. Yet with all this, the system has worked so happily that monthly amortization payments (which in one project is as low as \$9.65, inclusive of interest, insurance and taxes) are made with punctuality and care; and in the long run the total cost to the Province whereby several hundred people have been helped to live in decent homes will have been accomplished at a negligible administrative cost of less than \$5,000.

It should be repeated that what has been done is not on any large scale. Nova Scotia is a small province and its undertakings are often on laboratory dimensions. Perhaps they are none

the less valuable for that. Indeed, the Nova Scotia Housing plan has already given impetus to other developments to which the attention of the reader will be drawn.

The Building Associations Act (Alberta)

The only other province in Canada to have developed legislation favourable to co-operative housing groups is Alberta. The Building Associations Act Amendment Act, 1941, sets out conditions under which ten or more persons may join together in co-operative building associations. Several groups have given the provisions careful study but, perhaps due to the war, no co-operative associations have as yet been incorporated under the Act.

Pure Co-operative Housing

The best and perhaps the only example on the continent of pure or "orthodox" co-operative housing is that of Asbestos in the Province of Quebec. The Asbestos project has followed the organizational pattern developed in Nova Scotia. There are 14 houses built by the workers themselves. Each house has a lot of 90 x 110 feet affording a fine garden space. They are built in bungalow style, 26 x 36, in size. The exterior finish is made of *un bardeau d'amiante* of different forms and colours. The association is organized under the Company Act of Quebec, but the project is unique in that the entire financing has been carried out, not with Government aid as in Nova Scotia, but by the Union régionale de Sherbrooke of the Credit Unions. There is another similar project on the point of getting under way in Sherbrooke. Les Trois-Rivières and Quebec are also looking forward to doing something more or less along the same lines.

Pseudo-Co-operative Housing

In the United States seven or more attempts have been made to develop similar small co-operative housing enterprises without public assistance. The best-known of these are "Penn-Craft" (Pa.); "Oakwood" (N.C.); "Iona" (Idaho); "Crestwood" (Wis.); "Greenbelt" (Md.); and "Glenview" (Ill.) Two more are located in Minneapolis and St. Paul (Minn.) Another is being constructed on the outskirts of Detroit. In three or four of these the actual work has been done by the members of the group themselves or by exchange of labour. In others private contractors do the construction work under a contract with the co-operative association. The funds were supplied through a variety of sources. In one instance by a Quaker organization; in another, by credit unions. The 15-family "Iona" project is of special interest inasmuch as the financing was done through an unused balance of a State-Federal relief fund which was made available for the experiment. This constitutes a revolving fund and will be eligible for other projects as it is returned.

While all these groups started out to adhere to the principle of collective ownership, because of one reason or another, the idea was abandoned and all now lack this final characteristic of Rochdale housing procedure—permanent retention by the association of the title to the land and dwellings. They have, however, by joint effort succeeded in making possible well-built homes of moderate cost to persons who would otherwise have been unable to afford them.

Evaluation and Limitations

Co-operators have always stressed the spiritual and social values of their philosophy. They emphasize the neighbourliness and fellowship which is engendered by living in a co-operative community. They look upon it as a sort of Zona Gale "Friendship Village" way of life. But it is rather upon its economic virtues that co-operation must stand or fall as an instrument of housing reform. Some of the more obvious of these may be set down. It is to be borne in mind that housing is first of all a land problem; and there is usually a substantial saving in group

purchase of land acreage. Collectively, it is possible for a group to enjoy the environment of a landed estate; while "socially controlled" land as a rule maintains its economic stability over a longer term. Again, the co-operative purchase of materials and equipment favours economic pricing, especially if the government credit removes all doubt as to the payment of bills. There is, moreover, a saving on the contract pricing margin which would otherwise go to cover strike-insurance, sales-cost and profit. Labour costs are reduced through self-help and labour exchange, and there are less "waste-end" losses because of lessened pressure for rapid work. Economies of administration are also practicable in the co-operative technique. Volunteer direction and superintendence saves on salaries. There is a further saving in caretaker's costs, landlord's commissions and in the reduced turnover of tenancy. Again, there is a favourable difference in the rate of depreciation. In short, it may be said that to a considerable degree co-operationism justifies its slogan—"Housing at Cost".

But co-operation has its limitations. It is not applicable to all housing situations. Like the single tax, it was once looked upon as a panacea for all economic ills. But its warmest friends do not now regard it in this way. It is not suitable for the lowest paid industrial workers. It cannot easily function for isolated workers or for mobile labour which must be constantly changing its abode. It has a lower limit of utility; and on the other hand, it has an upper limit. It offers no appeal for the fastidious and the better-off class whose psychology is not satisfied by community ownership. Indeed it has been said that only a small per cent. of a nation, perhaps ten per cent., wants to live and work along co-operative lines. Again it is difficult to implant in an atmosphere of individualism and succeeds often only when depression or war has helped to make it a stern necessity. Yet with all its limitations it has a role to play in the field of good housing. It means that for a segment of our more stable industrial population large families may have decent homes at bargain prices, and at the same time a zest and pride in home security which is lamentably wanting in many communities to-day.

A Public-Co-operative Housing Plan for Canada

If all housing, like Gaul, may be thought of as divisible in three parts: Public, Co-operative and Private, it may be said that public housing is the only solution for the shelter of the lowest-income groups. Co-operative housing of the "primary" type will provide dwelling accommodation for the next strata at perhaps 20% less than can be supplied under the "modified" form of co-operation which should serve a better-off income bracket. The rest can be taken care of by the ordinary private channels of commercial enterprise.

There are two reasons for the belief that neither the "orthodox" nor the "modified" type of co-operative housing will flourish in Canada in the immediate future. One is the general ignorance of the co-operative idea itself; and the other is the problem met with in the United States, namely, the inability of co-operative organizations to secure credit. There is, of course,

the allied difficulty of securing homogeneous groups in our larger cities. Were there in existence in Canada large co-operative organizations with accumulated resources, the thing might be done as it has been done in Sweden at a great saving to the Government. But things being as they are, if there is to be any extensive application of the co-operative technique in this country it must be along the lines of public-co-operative housing. Perhaps for single-family homes no better scheme is needed than that of the Nova Scotia plan. It should, however, be supported by funds from the National treasury. To this end the National Housing Act, Part 2, should be re-enacted and adapted to the purpose. Administration should remain with the Province which might add its own special enabling services suited to local needs.

With the increasing industrialization of the nation and the greater mobility of the population there will be a growing need for large apartment centres. Here again the benefits and potentialities of co-operative housing may be utilized if we are satisfied not to be too doctrinaire about the co-operative philosophy. Public-co-operative self-liquidating development might well be attempted with appropriate provincial legislation together with the provision for the requisite Dominion loans. Even should the projects themselves not be co-operatively built, there would still be distinct advantages in entrusting their operation to co-operatively united tenants. If the co-operative spirit in the matter of the use of property, and in the participation of tenants in managerial functions, and in other ways, should result in dividends on rent payments it would provide incentives for economical operation which are not to be seen in commercial housing to-day.

Finally, attention should be given to the development of large self-contained neighbourhood units preserving the principle of private homes but along the lines of the so-called pseudo-cooperative housing of Stockholm in which the spirit and many of the values of true cooperation are effectively conserved. A development of great promise in this direction has already been undertaken by L'Union Economique D'Habitations in the new Cité-Jardin du 111e Centenaire de Montréal. Thirty-four houses have already been completed and ninety-seven more are under construction. The most careful thought has been given to community-planning and human relationships. It is perhaps the most important of all Canadian co-operative endeavours in the housing field and points the way to great vistas of social well-being. The work is being done under the National Housing Act, Part I, but not to the advantage that would have been possible had Part II of the Housing Act remained in force.

It would seem, therefore, that as a first step in a public-co-operative housing programme for Canada, Part II of the National Housing Act might well be revived with such amendments as will make it more adaptable to co-operative undertakings. It will then be time enough to give consideration to the more complicated forms of state financing in the field of co-operative housing.

PREFABRICATION

By BRUCE H. WRIGHT

There seems to be an erroneous idea as to what constitutes Prefabrication. It is nearly always confused with demountability which may well follow as a result of prefabrication, yet it is not one of the prime reasons for attempting to prefabricate buildings. Prefabrication has come about in an effort to reduce cost and speed up construction by the use of standard interchangeable parts built in a factory or on the building site. There is no doubt that the automobile industry has been the shining example which builders have striven to imitate. However, the same methods do not apply since the motor car can be entirely a factory made product, whereas, a building, because of its size, must be at least partly assembled on the site. Foundations must be built, water and sewer lines laid, walks and roads built, none of which are prefabricated.

We have always had some degree of prefabrication, however. Bricks are factory made, also doors, plumbing fixtures, etc., and the recent interest is an effort to expand the number and size of factory made parts of a building. It does seem that it should be possible to have a factory built wall, for example, which would be simpler to construct than having to lay one brick on another, then render the inside, add strapping, then lath, and finally at least two separate coats of plaster before we are ready for the painter or decorator. To build this wall five trades have been employed with great loss of time due to weather conditions and lack of co-operation.

In order to improve these conditions, immense sums of money and years of study have been spent. Until recently this research has been done by the larger firms or industries in an effort to expand the sales of their product rather than improving building and its methods, consequently, the problems were approached with a biased attitude and materials were used for purposes they were quite unsuited. Research, however, in the realm of building requires large resources and the architect and building contractor can ill afford to experiment though they are best qualified to do so. Then, war with its demand for speed provided a means of trying out new methods and materials, many of which, will continue to be used in times of peace. For instance, there is no doubt that the improvements in the manufacture of plywood and plastics will make them most useful materials for the prefabrication of buildings when they become available for other than essential war uses.

A material for large scale use in building prefabrication must firstly be cheap and plentiful. There is no use developing a product regardless of how admirably suited it is, if the cost is such that the public cannot afford to buy it, or if the supply is such that a steady flow cannot be assured. It must, secondly, be inert, that is, not subject to change of size or shape by reason of weather or other conditions. The lack of this quality has caused the failure of a number of prefabrication systems where parts must fit accurately together and be interchangeable.

Few buildings are small enough to be entirely factory fabricated and shipped in one piece to the site, hence, the method of joining the various parts which at first glance may appear simple must be carefully determined. It is so easy to say "bolt them together" but, what will happen without some continuous member running through to provide stiffness at the panel joints. The prefabricator will welcome an improved safety pin or super-zipper.

Weight is another important factor in the choice of material. This does not mean that light weight is essential, since if it must be transported any great distance, freight costs will soon eat up any advantage it might have over a heavier material available closer to the site. This cost of handling the various parts of a building is a large item in the total cost, so the ultimate would be a moveable factory that could be transported to the building site and the manufactured sections moved directly from the plant into position in the new building without intermediate handling. This practice in a modified form has been found to be quite practical in the case of large housing projects where there is considerable repetition in the manufacture of parts.

We are inclined to think that once a satisfactory method of prefabricating buildings has been worked out, there is nothing left to do but raise money, start a factory, and push houses off an assembly line—plenty of work for all and since it is work under shelter, no fear of being laid off because of weather. If this were true, building could again be nominated to lead the people back to the promised land of prosperity in a post-war world.

We have forgotten that having produced the houses we must sell and distribute them. There is no doubt the potential market is tremendous but whether the houses are to be sold through department stores, or as a dealer sells automobiles, or through real estate channels, has a direct bearing on production and even design. We are still faced with the problem of creating a steady market for houses. With our long Canadian winter, building has always slowed down for four to six months each year, and with the large amount of capital which must be employed in plant and equipment of a prefabricating company, some method must be found to make use of this production the year round. For this reason we may well find building companies developing which will manufacture articles not related to building.

Prefabrication of houses limits the design very slightly and in fact these systems which have been developed using a module, are an aid to design. This module is usually based on the width of panel necessary to contain a door or window and it is surprising the small number of different sized doors and windows which are required in the average house. The size of houses are not limited, prefabricated basement walls have been developed, and one, two or three stories may be used. Room sizes are only limited by the maximum span of the floor construction. Another influence on the module size is the type of interior wall or lining used. The tendency has been away from the conventional lath and plaster and toward the use of wall boards, which are mostly made in multiples of two feet. In the past the objection to these has been the unsightly joints, however, skilled workmen can now apply certain boards with joints practically invisible when the wall is painted or papered. The elimination of water which must be used in plastering, along with the reduction in time since drying is unnecessary with wallboards, is a tremendous improvement in building.

So much has been written about this company or that erecting a building in so many hours or minutes that the layman is apt to be misled into believing and expecting that he can order a building one day and occupy it the next. I believe this

form of advertising will prove to be a boomerang and injure future sales. It is not realized the amount of work that must go on behind the scenes before the actual building is commenced—to say nothing of the preparation of foundations and the installation of services. This is an essential part of any building operation and one that is glossed over generally by the prefabricator; in fact, there has been a tendency to sell structures to the unsuspecting public with these items excluded. They warrant more study than they have received to keep in line with the advances made in the buildings themselves.

The success or failure of prefabrication depends largely on its ability to supply as good or a better building for the same or less money. This, no doubt, accounts for the large number of prefabricators of wood and the comparatively small number using fireproof materials. The restrictions imposed against the use of wooden buildings by our large Canadian cities will tend to reduce the market for prefabricators unless this is removed or fireproof walls at least placed on the market. We Canadians being a conservative crowd, look upon anything new with a doubtful eye and we will have to be patient and not expect any rapid change from the conventional building methods. This change, I believe, will most certainly come about by a gradually increasing use of standardized prefabricated parts.

The house purchaser appears to expect something different in a prefabricated house—what, he is not sure—but, at least something new and pleasant. However, he seems to be well satisfied when he finds he can have a prefabricated house which appears to be the same as a dwelling built by conventional methods, provided he can get more house or a better house for less money.

Demountability has some value, but the day seems far distant when we will be considering demounting and moving buildings except possibly the temporary houses built in wartime, to serve war needs only.

We may well be concerned as to what reception the prefabricated structure receives from civic authorities, mortgage companies and insurance companies. While there is little precedence to follow in Canada, we can be guided by results from the U.S. and rest assured that provided the buildings are sound and not freaks in construction or appearance, they will not be handicapped in securing mortgage money and insurance.

I do foresee, however, difficulty because of rigid building by-laws of some centres. In all fairness to those who prepared them, I believe they well served the time when they were prepared. Now, with new materials and methods having been proven by reason of unprecedented opportunities created by war needs, these by-laws should be made more flexible or we will be forced to forego many improvements.

After all, there is little difference in appearance of the completed house whether it has been prefabricated or built by conventional methods and there is no reason why the prefabricated should not be as structurally strong and durable.

This new process of construction does not change the fundamental character of a house as a complex structure to protect people from the weather and to provide for the various activities of a family. A house needs design for economy, convenience and attractive appearance, or in other words, it needs the Architect. He need not fear that the prefabricator is encroaching on his field, since the Architect has always found the low-priced house field far from profitable and this is where the prefabricator is concentrating. He has mostly turned away from the expensive house with its special detail for one house only in order to develop the low-priced market where durable though standardized shelter is more important than indulgence in personal idiosyncracies. This market readily accept a high degree of standardization if it means a good house for the money and standard parts are a necessity in prefabrication so as to permit a smooth flowing production line.

The Architect, feeling safe from encroachment on his preserves, may feel he can let prefabrication go its way while he goes his, but, if he does, he will have to admit he is nothing more than a servant of the wealthy as far as private house building is concerned and he will have lost an opportunity to broaden his professional field.

Prefabrication has been so occupied with problems of engineering production, distribution and transportation, that design has been somewhat neglected. It is about in the same position the automobile would be if the design were left to the production engineer. The opportunity is there for the Architect if he will grasp it, though he will have to sell his services and adapt himself to new methods with their limitations but, with compensating opportunities.

COMPETITION BY MINNEAPOLIS-HONEYWELL

Minneapolis-Honeywell Regulator Company in Canada and the United States is offering \$10,000.00, in competition, for apartment heating designs. First prize is \$2,000 with twenty-four others ranging from \$150 to \$1,000.

The design must include the control system and is for a six-storey building. It must incorporate the individual tenant or Personalized Heating Control idea. Contest closes November 15, 1943.

The competition is open to contestants in Canada as well as the United States. Its purpose is to provide a heating system which will give greatest tenant health, comfort and convenience, low first cost and low operating cost, as well as individual temperatures.

Architects requiring further information should write to Minneapolis-Honeywell Regulator Co., Limited, 117 Peter Street, Toronto.

HOUSING IN SASKATCHEWAN

By LYMAN SANDE

Climate and materials have influenced architecture more than any other factors. Saskatchewan has plenty of climate but not much material—at least not native to the Province.

With two transcontinental railway lines, all materials are made available but the railways will not haul them for nothing. This affects the cost of housing in Saskatchewan, but more about that later.

The first houses constructed by Eastern Canadians in what is now Saskatchewan, followed the same specification as used in their native Provinces. Experience proved they were not suitable. The Province is now 38 years old and in that time we have learned to build houses that are comfortable in both Winter and Summer. Here are the lessons learned.

The house should have a basement. This contains the heating plant and fuel bin. It also serves as the laundry and in 40-below zero weather the madam hangs washing there. There should be a vestibule at both front and back doors. In winter there is often a difference of 110 degrees between the inside and outside temperatures. The extremely low temperature drives the frost into the ground and water pipes must be buried at least eight feet to be safe from freezing.

The general construction should be equal in insulating value to the following:

Wall studding shiplapped inside and out, with water-proof paper and siding or stucco outside; and paper, 1 x 2 strapping and lath and plaster inside.

The under side of ceiling joists and rafters forming part of the ceiling should be treated the same as the inside of the studding.

The rafters should be shiplapped and covered with water-proof paper and shingles. Roof sheathing laid tight. The space between the rafters and the wall plate beamfilled.

All windows should be fitted with storm sash and all outside doors should have storm doors or combination storm and screen doors.

The foregoing specification is followed by the Jerriest of Western Jerry Builders as they know that nothing less will sell. In recent years it has been the custom to place insulation material between the outside wall studding and over the top storey ceiling. Weather stripping is often applied.

Canada is a large country with diverse climate. There can be no standardization of construction in Canada unless the lads who standardize, can do something about the weather. This does not mean that regional standardization should not be attempted. A house that gets by on the Pacific Coast would freeze up in Saskatchewan. Eastern Canadian houses would also be unsuitable. Not only are more construction materials necessary but a larger heating plant must be provided. This together with all hardware, electrical wiring and appliances, plumbing pipes and fixtures and practically all manufactured materials, come from Eastern Canada. The lumber comes from the Pacific Coast. It would be impolite to say that Saskatchewan

is between the Devil and the deep blue sea but that is the general idea. Add freight and jobbers' profits to the extra weight of material required to build a suitable house and you have the key to the high cost of housing in Saskatchewan. Something might be said about the extra labour involved but you have probably figured that out for yourself.

The design of housing in Saskatchewan is a job for an architect who knows the country. He knows the country after he has lived in it for a number of years. He should have a free hand to use his knowledge and judgment and not be hampered by any ideas of nation-wide standardization. Houses constructed below the standard outlined above will eventually have to be remodelled or they will degenerate into slums.

This article was to deal with rural as well as urban housing. Unfortunately, rural housing has received very little expert consideration. A great many rural homes in Saskatchewan fall far below a livable standard. The few modern rural homes follow closely their urban prototypes. No attempt has been made to make the design fit the landscape.

It would be better to spread the house out rather than pile it up. There would be less area to catch the wind and the fire hazard would be lessened. For some reason, many farmers build high houses. This tendency causes a considerable loss of life through persons, especially children, being trapped on the upper floors of burning houses.

Some years ago a minister of public works, in addressing a group of builders, compared the average farmer's modern car and machinery with his rather inadequate buildings. He stressed the opportunity for builders to get out and sell good homes to the farmers, and laid the lack of good rural housing at the door of the construction industry. It sounded like a good argument but here are the facts.

The car or machine salesman can show his prospect a finished article. The farmer can see it in operation and try it himself. It is for sale at a set price and he can take it or leave it. He takes it because he can see where it will make his job easier. When the salesman closes the deal, he has made his profit.

The builder, who is not a slick salesman, has to sell something that does not exist. He must draw on the farmer's imagination and it is surprising how little imagination a man can have when it is going to cost him money. When the builder has sold the idea, he still has to put up the building and try to make a profit.

Plans for suitable farm homes should be made available, but if the farmers are going to have better houses, someone else will have to do the selling.

The preparation of stock plans for rural buildings is not an attractive, speculative proposition. It is not likely to be undertaken by a practicing architect. It may never be undertaken by a government body, but if it is, let it be done by some practitioner with prairie dust on his hat band and alkali in his blood. He will have some knowledge of the requirements.

APPRENTICESHIP AND APPRENTICESHIP TRAINING

By FRED J. HAWES, Director of Apprenticeship

In this paper on apprenticeship I propose to deal with apprenticeship as affecting construction trades only. If we concede that in order to erect buildings efficiently we must have trained skilful mechanics, then we must certainly consider methods of producing skilful people, and after a lifetime spent in and associated with construction trades I have never yet heard of any other method of satisfactorily producing skilled mechanics for the various trades except by apprenticeship.

This statement merely repeats in effect what was said by those who saw the necessity for organized apprenticeship in construction trades many years ago and who felt that it was so vital to the best interests of the construction industry, that they were successful in having placed upon the Statutes of Ontario the Apprenticeship Act of 1928.

Our experience in the operation of the Act has demonstrated that the individuals responsible for formulating the plans and having the Act placed upon the statutes, were wise in their deliberations and the decisions made by them at that time were practical and sound, and can and do apply just as well now as when first placed upon the statutes in 1928.

The Ontario Apprenticeship Act provides for orderly apprenticeship by the parties affected, that is the employer and the apprentice and his guardian entering into contract, and a contract is essential in the promotion of organized apprenticeship.

Having placed the embryo mechanic under contract of apprenticeship he is now definitely identified with a particular trade, and it has been conceded that with our present-day methods of construction, and the speed with which a job is rushed along, it is not possible to thoroughly teach an apprentice entirely on the job. We, therefore, make provision for school training, whereby the apprentice can receive instruction in the science and theory of his trade, also additional training in basic principles, trade practices, and related subjects.

When the Act was placed upon the statutes the Provincial Advisory Committee, under whose guidance the Act was to function, were quite sincere in their efforts to bring about a condition whereby our Canadian boys could enter one of the construction trades with the expectation of receiving an opportunity to learn his chosen trade, and by so doing making a valuable contribution to the industry and also placing himself in a position to successfully compete with those who had learned their trades in other countries. It is true that their hopes and expectations were not fulfilled, not because of any weakness of the system they were hoping to establish, but by the general collapse of all business in 1929.

With the unprecedented lack of construction, our apprenticeship system was sadly disrupted. No longer were we able to provide the essential technical training for lack of funds. A great difficulty was experienced in finding work for boys under contract of apprenticeship, with hundreds of boys seeking jobs and willing to do anything in an effort to learn a trade. Since

that time we have experienced the conditions brought about by war, where the greater inducement is in the armament plant and in the armed forces, and we are not able at the moment to provide the trades with a sufficient number of the right type of boys.

Our experiences in the 15 years since the Act has been placed upon the statutes have been a series of disappointments, and apparent failures. We have proven that proper and efficient training is essential to all trades. We have established the necessity and proven the benefits obtained by instruction in the school and experience on the job, coupled with the order and supervision we are able to exercise through this department. I have for years asked employers to accept apprentices. At this time I ask them what have they to offer that will enable their trade to maintain its efficiency and to keep pace with the developments of the trade if they don't *train apprentices*.

We know that we will win this war; we all have great faith in the future developments of Canada. Can we expect to keep our skilful trades fully supplied by people from war devastated countries where the demand for building tradesmen will be unprecedented, and even if we were able to figure for the future as in the past, that a large number of fully trained immigrants would come to this country, should we not be interested in the thousands of Canadian boys who graduate from our schools every year, and make sure that an opportunity is provided to every boy who has the desire and ambition to learn a trade under a system that will enable him to become a confident, fully trained mechanic.

The provisions of the Apprenticeship Act provide the means of co-operative apprenticeship. Since the Act was placed upon the statutes we have 1,626 young men who have completed their apprenticeship and received diplomas certifying that the apprenticeship was served and brought to a successful conclusion. A number of these are now foremen, superintendents, and contractors.

If we are to meet our obligations in full to the youth of Canada, we must have the sympathetic co-operation of all those interested in construction.

We are not satisfied with the number of apprentices trained in the construction trades, and our Provincial Committee have under consideration ways and means whereby a sufficient number of Canadian boys might be trained to provide the various trades with a sufficient number of well-trained, competent mechanics.

I purposely refrain from attempting to show by figures and statistics what apprenticeship means to the construction trades. *Apprenticeship* in all its meaning can stand alone, having been proven over hundreds of years to be a most important part of a young person's education. We spend considerable money on primary and secondary education. It is our purpose to make a direct connection between secondary education and trades.

THE PROVINCIAL PAGE

ALBERTA

The ordinary intelligent citizen, when called on to take part in discussions on town planning, inevitably conceives of the subject as a matter of beauty of appearance, and this in spite of much that has been said and written about the creation of "Cities for Living". Human instincts are not always wrong and it may be that this dream of making life beautiful, persisting ineradicably, is a saving grace. It will be wise, in planning city reconstruction to give more specific attention to this view of things. Modernism in architecture does not warm the hearts of the general public. Its insistence on severe simplicity and orderliness has indeed a strong appeal and people are glad not to have to pay for traditional stylistic trappings with which they have ceased to have personal sympathy. The appetite for beauty remains unsatisfied.

In Alberta, the first town planning act, that of 1913, now superseded, laid principal stress on the control of bill boards, particularly in the country. In the existing act large bill boards are forbidden in cities except in designated major streets. There can be no doubt that the appearance of our business streets is quite generally degraded and vilified by the customary methods of advertising businesses and goods. This permeates all our cities from the largest to the smallest. What are the possibilities of some decent control in this matter? It is at bottom, of course, a matter of self-respect on the part of the advertisers, a self-respect that may either conflict with or support financial interest. Institutions such as banks or insurance companies and some of the more select stores find it to their interest to be reserved in regard to outward appearance. They aim at being respectable. Others, less sure of their clientele, imagine that they must be blatant in order to attract attention. They do not hesitate to cover up decent architecture with the most offensive forms of advertisement. It is the interest of architects that their work should not thus be obliterated.

Considering the extreme individuality of the retail store business this may seem a case in which the problem of creating a unity out of an insistent diversity is one of peculiar difficulty. Until this problem is solved the achievement of beauty in shopping streets will remain hopeless. It will not be hopeless so long as the dream of making life beautiful persists in the hearts of the people. The key to the situation consists in getting people to conspire together to realize this dream. This can only be done by making a clear analysis of the processes by which the end may be attained.

Probably the most glaringly offensive advertising is that by sky signs and by enormous painted signs on the exposed gables of the higher buildings. The absolute elimination of these would go a long way to improve appearances. The great gain to the public may be weighed against loss to private interests. As regards shopping fronts generally, signs projecting over sidewalks are, in some cities, prohibited or somewhat arbitrarily controlled. But these are an element of interest and picturesque effect when not in themselves offensive. Since, however, when over-numerous, they are mutually obstructive, thus defeating their only purpose, it would be well to prohibit them on premises of, say, less than twenty feet in width.

Much good would result from the limitation of signs on fronts of buildings to properly provided spaces and, since it is quite necessary that stores should be easily identified, architects provide for this, but the tenants cheerfully ignore them. The occupants of small stores are usually tenants. In these cases it is

open to the building owners to impose restrictions in this matter upon their tenants. This is frequently done with good effect. The principle should be extended farther; owners should get together on the question. A whole city block has frequently no more than three or four owners and if these confer and agree the good work would cover the whole block. If this idea should take root a reformation would grow out of it. There would remain some difficulty about individual peculiarities. Each tenant regards himself, and not his neighbour. Each has his own ideas as to size, form and colour of sign. It is characteristic that when a man has to select a dominating colour he looks on either hand and decides that he must choose a third alternative; the result being probably some scarlet sin. There are better ways of achieving individual distinction; for example, alternating pleasantly contrasting dominating colours and harmonizing them by recalls in detail, or by one prevalent colour and contrasting the details. As things actually go, the effect is that of what some one has called "an explosion in a paint shop". Our older little towns and villages where houses were of frame construction limited themselves to one scheme of colouring—white walls and grey-brown shingles. These take their place agreeably amidst surrounding greenery and avoid the paint-shop disaster.

In districts where businesses are small and struggling, conditions are often at their worst. In these, stores of one storey in height are built on a temporary basis as "taxpayers" with a perfectly futile individuality without benefit of architecture. There would be great gain to the public and to the storekeepers themselves in lining these up with some view to a decent general order. A uniform height and alignment of sign boards could be insisted on, however cheap or expensive the material. If farther, by persuasion of architects, or whoever cares about these things, the colours could be pleasantly arranged, order would appear out of chaos.

A crying source of visual discomfort is the variety and condition of the awnings used to shade shop fronts. This often gives a disreputable appearance as of a line of old clothes shops. Where heights and alignments could be controlled this trouble would also be brought within control and it might be hoped that a general decency of appearance would encourage shopkeepers to take pride in the cleanliness and gaiety of their awnings.

An architect, when advertised as being entrusted with the design of a considerable building, is apt to be besieged by neon or other sign dealers whose object, naturally, is to sell as much of their stuff as possible without regard to neighbourly interests. Might not these be appeased (unholy word) by limiting the perennial application of their goods and extending their occasional effects? Modern lighting may be a source of great joy. We hope that in days to come there will be many occasions for festive displays. Architects may well give some thought to this. All important buildings should be provided to appear in appropriate gala and evening clothes on suitable occasions. This can be of real and striking beauty, if the original designers prepare accordingly. Here, one of our most important public buildings displays annually a long white sheet, carefully preserved from year to year, with the words in the tamest sort of black letters, "Season's Greetings". The sentiment is unexceptional but the expression of it is pitiful. It is customary for departmental stores to advertise annual, semi-annual, January, etc., sales and for this purpose they array themselves in the

most offensive style conceivable. Is this really necessary? Is it rational? Can nothing better be done?

The above are only a few specimens of things needing attention in our cities. It is up to architects to make their influence felt publicly in such matters. No one else has the training to suggest anything effective.

Cecil S. Burgess.

ONTARIO

A popular song which laments the fact that "Old Rocking Chair's Got Me" would seem to have the makings of a theme song for many back-woods architects whose offices seldom are rushed and who seem just now to line up projects only to have them squelched by the powers that be. Probably increasing numbers of us will take a rest or "voluntarily transfer" to other work should present restrictions remain in force for another year.

John Ruskin has been out-of-date for many years, but on the subject of "resting" he seems to have had some first-hand experience, as the following quotation would indicate: "There is no music in a rest, but there is the making of music in it. In our whole life melody, the music is broken off here and there by 'rests' and we foolishly think we have come to the end of time. God sends a time of forced leisure—sickness, disappointed plans, frustrated efforts—and makes a sudden pause in the choral hymn of our lives, and we lament that our voices must be silent, and our praise missing in the music whichever goes up to the ear of the Creator. How does the musician read the 'rest'? See him beat time with his unvarying count and catch up the next note true and steady as if no breaking had come in between. Not without design are rests written in the music of our lives. But be it ours to learn the time and not be dismayed at the 'rests'. They are not to be slurred over, not to be omitted, not to destroy the melody, not to change the keynote. If we look up, God Himself will beat the time for us. With the eye on Him we shall strike the next note full and clear."

During the present lull, some activity is seen in this part of Ontario—a cold-storage plant in Trenton; a four-roomed school in Frankford; plant extensions in Peterborough, Belleville and Deloro, as well as routine repairs here and there and improvised apartments in large old houses to ease the housing pressure. Signs of good planning are also abroad, especially in a recent press quotation of a Queen's Park official that consideration is being given to the matter of treating all sewage entering Lake Ontario and its many and beautiful bays. Personally, I sincerely hope this includes the Bay of Quinte. It is also reported that the town of Cornwall has ordered a plan to envisage such matters as "a municipal airport, rail and water-borne transportation, railway stations, dockage, laying out of streets, housing, sewers and beautification of the municipality."

The Ontario Legislature is fortunate in the fact that Mr. F. W. Warren, M.R.A.I.C., has been elected to a seat therein. We congratulate Mr. Warren and look forward to a Legislature that will be kept well informed about our profession and about construction in general.

W. A. Watson.

THE PERIODICALS SHELF

By ANTHONY ADAMSON

Pencil Points, July and August. In the section known as "Views", which is really letters to the editor, and in the editorial too, they are having one of those exciting arguments about whether a foreigner is a ruddy foreigner or just an American. In July is a wondrous outline of an "Architectural Center". It reminded a reader in August of the Tower of Babel. It did us, too. Also, in July is a romantic coverage of a pre-Inca city in the Peruvian Andes and a fine and detailed coverage of the

first unit of Goucher College (for girls) in Maryland, which appears to be a very pleasant place. In August is the Swan Song of the National Resources Planning Board killed at the age of 10 by a rapidly-growing-rightist U.S.A. because planning at the federal level appears to them undemocratic. The song is worth hearing if you are interested in plans for your home town as it contains urban studies of Tacoma, Salt Lake City and Corpus Christi (Texas). A N.R.P.B. man went to each city and with the help of local architects, etc., enthused natives to prepare sketch master plans. Also in August is a long illustrated article on "Architecture and Reinforced Concrete" showing some remarkable techniques. In both months the Discussions on Urbanism continue, Nos. 11-16. We read all but two and found them most interesting. They are to do with Planning Agencies and methods, the future of New York, urban re-development generally and sociological survey in Sweden.

The **Forum**, July and August. In July is a portfolio of the work of William W. Wurster (husband of Catherine Bauer) whom Ontario architects may have met at their last Annual Meeting. His buildings are in an individual style and he makes great use of the fine woods of the North-Western States. There are eight most interesting buildings of very varied types. Also in July is "A Programme for City Reconstruction" by Walter Gropius and Martin Wagner. Starting with re-housing it shows the work of advanced students at Harvard working up into a method of reconstructing the vicinity of Boston. In August, a description of Vanport City outside Portland, Oregon, built for Kaiser, interested us greatly. In the same issue the *Forum* has again launched out into the field of public education. They have developed a scheme for anybody (rotarian, architect, mayor, philanthropist) to get his city "steamed up" about planning. They print the pages of a pamphlet called "Planning With You", which may be bought in bulk (5 cents each) and handed out as propaganda. They show full page advertisements suitable for the same purpose. It may have been a wet day or something but we were unimpressed. We don't even like the pictures. The same issue, August, has an interesting Connecticut house and an intricate flight of Libbey-Owens-Ford and a Long Island Realtor in a sort of helikitchen; a fool thing we thought, with pedal taps and glass you can't see through.

Architectural Record, July and August. The July issue appears to have had trouble scraping together enough satisfactory material and is a collection of little bits. There is a Georgian Library for rare books at Harvard, a discussion on the United States market for post-war, non-farm houses, which is here put at a little less than a million (which pro rata for Canada means 100,000); there are a couple of dullish factories and quite an extensive section on airports and hangars with details. The section in the *Record*, "For Better Building", always has useful information these months on concrete hardeners, alloy surface sprayers, wooden springs and things like that. In August, a rather fierce Major-General Fleming says, "Dreaming isn't Planning" and urges people to demand to see the blue print for sewage disposal worked in their home towns rather than all the guff that gets into architectural magazines. Also in August is a series of municipal buildings for Queens, N.Y.C., Salinas and Topeka. Probably the most interesting section to most in either of the issues is an extensive and intensive survey of restaurants with their kitchens. From the ordinary joint an architect eats in up to the snazzy types frequented by dollar-a-year men. The August issue had also an article on "Practical Radiant Heating", which was informative to us.

Journal of the R.I.B.A., June and July. The June issue has details of the master plan of London prepared by the R.I.B.A. and exhibited at the National Gallery, while the July issue has the first details of the master plan actually prepared by the London County Council. The lectures we read were either dull or had little bearing on our existence. In the June issue, there

is, however, an excellent address on the "Fundamental Principles of the Weathering of Building Materials", by F. L. Brady. Although what they call "weathering" in England is child's play to our materials, this is good sound stuff.

As for the Minor League, the *American City* has little of interest to Architects in its latest issues. *Building Methods* we don't read any more, it makes us feel small. *Canadian Homes and Gardens* would have a good recipe for blueberry muffins if we could get blueberries. It also has a "Portfolio of Nine Houses" done by us Architects. There are also before and after being restored pictures of a little house on page 28. After prolonged consideration we have decided that it would have been better to have left the things alone. We did not read any of the others.

OBITUARY

PROFESSOR J. PHILIP TURNER

Philip John Turner was born in Stowmarket, Suffolk, in 1876. He was one of seven brothers and sisters. His father and mother lived to see their sixtieth wedding anniversary in 1930, when there was a memorable family party. The townspeople of Stowmarket gave them a silver salver, and the King sent them good wishes. They both died in the same year, in 1934, at the ages of 84 and 85.

As a boy Professor Turner went to Framlingham College, Suffolk. An old master in that school was a constant friend and kept up a correspondence with him all his life. He is now over 85 and perhaps it was he who caused Professor Turner to develop the quality of never forgetting his old students.

He studied later at the Architectural Association in London and was articled to Mr. John Corder, an architect in Ipswich. During that time he prepared for his Associateship in the Royal Institute, which he got in 1901. He was a fine draughtsman. Some may remember, the careful measured drawings, published as supplements of the magazines of the day, the ones signed RENTUR were Turner's.

He left England, September 6th, 1906. A. J. Hazelgrove was a companion on his first voyage. In 1907 he commenced what became a distinguished practice in Montreal. Most of the time he practised alone, but sometimes with W. E. Carless and S. H. Maw. When he arrived, he was described as having a shy and retiring manner, and it is pleasant to recall that in the first winter he was here, he won the competition for the Ice Palace, to be erected in connection with the carnival of that year. How contrary it must have seemed for the serious young lecturer in Building Construction to be set the problem of building with ice, water and frost, and impermanently? However, it is said that he designed a "Palace of fairy-like imagery, a fitting Castle for Our Lady of the Snows". What happier introduction to a strange town, could any young architect desire, than to be the designer of the central feature of its carnival?

In June, 1910, he was married in Montreal to Adeline Peddar, who had travelled out from England to be his companion. Mrs. Turner has received expressions of sympathy from hundreds of his friends. She is endeavouring to reply to them all but it will take a very long while.

Professor Turner built many fine houses in and about Montreal. He loved good carpentry and particularly, good brick work. He also built a number of banks and commercial buildings and lately he found most pleasure in designing churches, church furniture, and libraries. St. Phillip's in Montreal West, the Y.M.C.A. Chapel on Drummond Street, the children's chapel at the Cathedral, and the rebuilding of the Westmount Public Library are among his recent works.

From 1908 to 1941 he lectured in the School of Architecture on Building Construction, Materials of Construction, Profes-

sional Practice and Specifications. He was a careful lecturer and tireless in working with students. He has left most of his papers, lectures, and his collection of books, notes and observations to the School. They constitute a record of years of service to the profession and the University. During the stormy period 1939-1941 he was Director of the School, and it was he who saved it from becoming a wartime casualty. In doing so he prevented a contraction of the University's work that would have certainly been regretted in the years to come. To Professor Turner also goes the credit of lifting the restriction on women students in the Engineering building.

In 1926 he was appointed Special Lecturer on Library Buildings in the McGill Library School. This post he retained even after he retired from his other duties, and it is going to be very difficult to find a lecturer to replace him.

Aside from his work at the University, Professor Turner participated actively in the affairs of the Province of Quebec Association of Architects. He was councillor for 10 years and successively occupied the positions of Honorary Treasurer, second Vice-President, first Vice-President, and finally President in 1933. He was the P.Q.A.A. delegate to the R.A.I.C. for eleven years, 1929-1940. He was a Fellow of the R.A.I.C., and for seven years a member of its Executive. And for three years he represented the R.I.B.A. on its Council. He was the Senior Fellow of the Royal Institute in Canada. He received the gold medal of the Province of Quebec Association of Architects in 1941.

During his lifetime he wrote many articles for papers in Canada, notably *The Canadian Geographic* and *The Journal*. *The Montreal Churchman* is now publishing a series on church customs. Many of his articles were also published by McGill University. Writing was not easy for him. He could not be glib. Everything he wrote was the result of painstaking research.

Professor Turner was an able lecturer on English Buildings and Customs. He often spoke to the St. James Literary Society and to other institutions in Montreal. Many will remember his illustrated accounts of English Inns and Villages, or Glastonbury Abbey, or Liverpool Cathedral. He loved England and he never spared an opportunity of demonstrating some of England's charm.

The war worried him. He was hurt to see the destruction caused by the raids and he was particularly concerned about the safety of his sisters who lived in an "East Coast town". All this and his unfortunate illness weakened him and when he was overcome by a heart attack at home on Tuesday, August 10th, he was unable to recover. He died the following Friday at the Western Hospital.

Perhaps it may be remembered that each year Professor Turner gave a prize of \$25.00 to the student who made the best building construction drawings. Now there is a fund growing for the purpose of maintaining that prize. Some who knew him and appreciated his work in the School have set aside amounts that will more than assure the continuance of the annual prize. It may even reach the proportion of a scholarship, but whatever its amount may be, it will carry on a small part of the work of helping young people which Professor Turner generously began.

John Bland.

NOTICE

Mr. Charles B. Dolphin informs the *Journal* that he was the Architect for the Gunner and Torpedo School published in the last issue. Photographs came from official sources and pains were taken to give no more information than was supplied by the Departments of Publicity of the Navy, Army and Air Force. We are glad to correct this omission.

Editor.



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