TECHNICAL ACTIVITIES

of

GOVERNMENT AGENCIES CONCERNED WITH HOUSING

OF SPECIAL INTEREST TO ARCHITECTS

Prepared from data assembled by Central Housing Committee, Washington, D. C.

September 24, 1939

FOREWORD

In the many-sided operations of United States government agencies engaged in housing activities a vast amount of material of particular interest to architects has been accumulated. In order that members of the architectural profession and construction fields may be aware of the breadth and scope of past and continuing operations of the government and of future plans where they have been determined, the Central Housing Committee has sponsored the collection of this informative material.

The importance of housing to the architect and of the architect to housing have been amply demonstrated during the past few years. In this period of intense activity old concepts have been reexamined, new ideas and techniques have been evolved, and a fresh and stimulating approach to the housing problem has taken the place of the lethargy of the past. In planning, in fundamental research, in development of structural standards, and in many other directions the period has been rich in accomplishment.

No effort has been made to go into great detail as to any specific program but it is hoped that the material assembled from the different agencies will provide a fairly comprehensive idea of the work the government is doing in these fields and the facilities which are readily available in technical as well as general aspects of housing. Additional information may be obtained from agency publications and from personal interviews with officials of the agencies concerned.

A short list of publications relating to its particular activities is shown at the end of agency chapters in this bulletin. Where a price is noted the material may be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C.; for information concerning all others communicate with the issuing agency, Washington, D. C.

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CENTRAL HOUSING COMMITTEE

The Central Housing Committee had its origin in the recognition, by staff members of agencies concerned with housing construction and finance, of the need for some agency to avoid duplication of effort and function, to make available for use a large amount of accumulated data, and to establish closer working contacts between technical men engaged in similar lines of activities.

The situation and the need were focussed in the 1934 report of the National Resources Board which led to joint action of housing agencies and organization, a searching investigation with specific recommendations and appointment by the President of a committee on coordination of housing activities. The prime mover in this undertaking and the first Chairman of the Committee was the Honorable Frederic A. Delano, who, in addition to many other honors and achievements, is an Honorary Member of the American Institute of Architects.

Mr. Delano was succeeded by Admiral C. J. Peoples, Director of the Procurement Division; and he in turn by Mr. Lowell Mellett, Director of the Office of Government Reports, in the Executive Office of the President. The Central Housing Committee, as now established in its fourth year, is characterized as an informal coordinating body of specialized interests and elastic membership which exchange experience and data, and make generally available the results of joint studies or compilations. It publishes three "house organs" -- the Housing Index-Digest, the Housing Legal Digest, and Technical Bulletins, the latter of limited, confidential circulation.

The following listing of Sub-Committees and their Sections or Reference Groups, will give an idea of the scope and range of interests.

Sub-Committee on Appraisal and Mortgage Analysis
Sub-Committee on Design and Construction
  Reference Groups: Case Studies, Construction Costs, Fire Resistance, Landscape, Mechanical Equipment, Plumbing Code, Planning and Design, Structure.
Sub-Committee on Economics and Statistics
  Section: Bibliography
Sub-Committee on Land Use and Site Planning
Sub-Committee on Law and Legislation
Sub-Committee on Operation and Management
  Section: Accounting, Maintenance and Operation
Sub-Committee on Technical Research
Sub-Committee on Public Relations
  Section: Exhibitions, Publications, Terminology

In all these undertakings, architect-members are concerned and the interests and needs of architects in general are constantly in the foreground. Through its member-agencies as well as through its own publications distributed to architectural groups and Schools of Architecture the findings of these numerous Committees reach the profession; and even closer and more active working contacts are in prospect.

The composition of the Committee follows:

Principals	Member Agencies	*Alternates
	DEPARTMENT OF COMMERCE	Lyman J. Briggs
Harry L. Hopkins	FARM SECURITY ADMINISTRATION	John O. Walker
Will W. Alexander	FEDERAL HOME LOAN BANK BOARD	Ormond E. Loomis
John H. Fahey	FEDERAL HOUSING ADMINISTRATION	Miles Colean
Stewart McDonald	OFFICE OF GOVERNMENT REPORTS	Philip C. Hamblet
Lowell Mellett, Ch.	PUBLIC BUILDINGS ADMINISTRATION	Ch.* N. Max Dunning
W. E. Reynolds	THE RFC MORTGAGE COMPANY	James L. Dougherty
George B. Williams	U. S. HOUSING AUTHORITY	Warren J. Vinton
Nathan Straus		

*(Ways and Means Committee)

The Central Committee and its subdivisions are served by a small, composite staff under the direction of Horace W. Peaslee, F.A.I.A., Executive Secretary. Offices and committee meeting rooms are at 1601 Eye Street, Washington, D. C.

AGENCIES WHOSE MAJOR FUNCTION IS HOUSING

FEDERAL LOAN AGENCY
FEDERAL HOME LOAN BANK BOARD

The Federal Home Loan Bank Board was organized to administer the Federal Home Loan Bank System, the credit reserve structure for home financing institutions. When it was also charged with the operation of the Home Owners' Loan Corporation in 1933, the Board assumed a task which was to enlist the cooperation of the architectural profession to an extent even the profession itself sometimes fails to realize. The Home Owners' Loan Corporation was forced to recondition almost half of the million homes it refinanced prior to June 1936; it since has had to recondition, repair, and modernize most of the 140,000 homes it has acquired, in order to make them attractive for rental and sale. Approximately 700,000 separate reconditioning contracts had been completed up to June 30, 1939.

Importance of HOLC Operations to Architects

Some 2,200 salaried and fee architects and technicians were engaged in this work. Their contributions were of immense value to the HOLC -- and the HOLC, in turn, was of immense importance to the architectural profession. That profession in recent years had almost ignored the small home field; its members, turning again to inspecting small home properties, writing specifications, taking bids, letting contracts and supervising jobs, were brought into a field in which a great volume of future construction inevitably must lie.

Federal Home Building Service Plan

The technical experts of the HOLC evolved what now is known as the Federal Home Building Service Plan -- designed to link member lending institutions of the Federal Home Loan Bank System and architects in a program to provide better design and supervised construction for homes costing $7,500 and less. A modified architectural service, available at a fee commensurate with the means of home buyers of small and moderate income, was projected. To date, some 375 architects have been approved by the Federal Home Loan Bank Board to offer the service, and they have contributed 450 small home designs -- unquestionably the best collection ever assembled in this country. The American Institute of Architects, together with the Producers' Council -- an organization of nearly 70 manufacturers of materials who have been allied with the Institute for 18

years -- has joined with the Federal Home Loan Bank Board in sponsoring the Plan. Architects in all parts of the country have grouped together to promote the Plan, and many individual architects have entered into arrangements with lending institutions of the Federal Home Loan Bank System to provide architectural services.

Neighborhood Rehabilitation

Architects also have contributed much toward the HOLC's program for Neighborhood Rehabilitation -- designed to halt the obsolescence of essentially sound residential neighborhoods both from blight within their borders and from encroaching slums. This program is based on the theory that an alert community can, by proper vigilance, avoid the staggering loss in property values which throughout the nation each year mounts to millions of dollars. The technical forces of the HOLC have sought to map out procedures which will effectively protect these values and rehabilitate countless neighborhoods which already are threatened with decay. The Plan envisions the voluntary cooperation of home owners, mortgage interests, city officials, and civic groups in the improvements of individual properties and neighborhoods.

Insistence on Proper Design and Supervision

Appraisers and other technicians have been utilized by the Bank Board and the HOLC, establishing methods and standards which have been adopted nationally in behalf of better construction. The Bank Board's role as the sponsor of better homes is a logical one, for the $4,500,000,000 assets of its 4,000 member savings and loan institutions are largely invested in home mortgages -- and soundly constructed homes mean sound security. From the beginning, the Board has felt that only by the cooperation of architects and accredited technicians can good construction be achieved, for good construction is based on proper design and proper technical supervision.

Nationally, the Corporation has completed nearly 5,000,000 appraisals of homes during its lending operations and later. It has developed uniform and standardized methods of valuation aiming at precision and dispatch and established a broad program of training appraisal personnel. The improved appraisal technique pioneered by HOLC has influenced methods of valuation among mortgage lending institutions generally.

Federal Home Loan Bank Review; monthly .10 copy-$1.00 year
Sixth Annual Report, FHLBB July 1, 1937 - June 30, 1938 .30
Federal Home Building Service Plan: What It Is, What It Does, How To Profit By It
Local Industry Cooperation Under the Federal Home Building Service Plan
HOLC Takes Lead in Movement for Neighborhood Rehabilitation

FEDERAL LOAN AGENCY
FEDERAL HOUSING ADMINISTRATION

The Federal Housing Administration has a common interest with the architectural profession in the improvement of property and neighborhood conditions, not only from an immediate but also a long-range standpoint. The FHA insures loans for building or purchasing homes, for constructing rental projects, and for modernizing and improving dwellings and other existing structures. Because of its insurance of hundreds of thousands of mortgages throughout the country, the Federal Housing Administration has made higher standards in residential design and construction, as well as in neighborhood planning, an important part of its underwriting requirements.

Design, Construction, Neighborhood Standards

Many benefits result from the strong support which FHA operations give to advancing the science of building, the quality of design, and the planning and stabilizing of attractive neighborhoods. Among these, architects are particularly interested in the following:

(1) Architects are provided with more suitable neighborhood environments -- including safeguards against deterioration -- for the homes and other structures they create.

(2) FHA property and neighborhood standards call for the type of skillful planning and adaptation for which architects are qualified.

(3) The rating given to superior design and construction in FHA underwriting procedure is an incentive for the prospective home builder to invest in professional architectural service.

The technical phases of the FHA program are planned to reflect the best current practice of the architectural profession, and the Federal Housing Administration endeavors to work closely with architects in achieving such coordination.

Increased Opportunities for Architects

The FHA program offers, in addition to improved property and neighborhood standards, other features of value to architects. The liberal terms of the insured mortgage plan are broadening the United States moderate-price home building market and stimulating the demand for architectural service. Operations under Sec. 207 of the National Housing Act -- rental housing properties -- afford architects numerous opportunities in large-scale projects. The insurance of loans made under Title I is stimulating the repair, remodeling, and improvement of existing structures, which means an increased demand for professional planning,

designing, and supervision.

The FHA program also has been a contributing influence in the construction of new schools, commercial structures, and other building to serve newly developed subdivisions.

Operations under the National Housing Act merit the careful study of any architect engaged in the home building field.

The Federal Housing Administration publishes bulletins and booklets on technical subjects such as design, construction, and land planning, rulings and regulations, building statistics and conditions, financing and the like. The list below is only a partial one; more detailed information on FHA publications may be obtained by writing the agency, or by applying at FHA district and State offices.

Recent Development in Dwelling Construction - FHA 2212 .05
Modern Design - FHA 2213 .05
Contract Documents for Small House Construction - FHA 2046 .05
Principles of Planning Small Houses - FHA 2219 .10
Planning Neighborhoods for Small Houses - FHA 2242 .10
Property Standards - FHA 2019
(In addition to the above publication which outlines property standards for the United States as a whole, the Federal Housing Administration issues booklets of minimum construction requirements for individual States. These may be obtained from State or district offices of the Federal Housing Administration.)
Subdivision Standards - FHA 2059
Planning Profitable Neighborhoods - FHA 2370 .20
Rental Housing as an Investment - FHA 2420
Architectural Planning and Procedure for Rental Housing - FHA 2421 .10
Underwriting Manual - FHA 2049 .75
Improvements Eligible for Financing with FHA Insured Loans (Title I) - FHA 145
Insured Mortgage Portfolio .15 copy-1.50 year
(A monthly publication containing current information on FHA operations, real estate financing methods, construction activity, etc.)

Regulations, rulings, and explanatory matter on loans insured under Title I and Sections 203 and 207 of Title II may be obtained from the Federal Housing Administration or through financial institutions authorized to make insured loans.

FEDERAL WORKS AGENCY
UNITED STATES HOUSING AUTHORITY

The United States Housing Authority is engaged in elimination of substandard houses and in rehousing families which live in the slums. It also is charged with the responsibility of operating the former Public Works Administration Housing Division projects until they can be leased or sold to the localities. The program of the USHA differs from that of the Public Works Administration in that it is completely decentralized. Local authorities established under State enabling legislation plan, build, own, and operate their own projects.

Construction and Neighborhood Standards

The USHA sets standards of site planning, dwelling design, and construction, and makes a limited review of the plans drawn by the local authority's architects. Above all, projects must be designed as satisfactory neighborhood-communities.

Development of New Building Techniques

Costs are limited by law and are being further reduced in order that as much building as possible may be done with the funds allotted and that projects may be brought within the reach of those whose need is greatest. The USHA encourages the use of new methods of construction which give reasonable assurance of economy in construction and in maintenance. The local architects themselves, who are well acquainted with local needs and habits, available materials and climatic conditions, are in the best position to develop such methods. Thus in Puerto Rico, where there are high winds, the local Authority has developed a reinforced concrete shutter to reduce the costs of replacement and repair. And in Miami one of the projects is equipped with a solar hot water heating system which makes use of the climate to reduce the cost of operation.

New Fields for the Architect

The techniques developed specifically for public housing projects with a view to lowered initial and maintenance costs are of value to private enterprise. They may help to lower the boundary line of the income-group for which private enterprise can build. The architect who applies the new techniques developed in connection with public housing may find that he is able to make fields profitable for himself which hitherto have been dominated by the builder, or completely neglected.

The USHA encourages a fresh approach to the problems of design by a painstaking analysis of the essentials of livability, and the elimination

of all those features of design which do not add to the amenity, suitability, or stability of the dwelling.

Bulletins
No. 11 - Planning the Site
No. 12 - Dwelling Unit Planning
No. 14 - Site Engineering Design
No. 16 - Planning for Low Rents
No. 19 - Planning Utility Services and Rate Negotiations
No. 20 - Design of Low-Rent Housing Projects: Heating
No. 21 - Design of Low-Rent Housing Projects: The Structure
No. 25 - Sub-Surface Soil Investigation
Check lists on architectural design, site planning, site engineering, structural design, heating, electrical design, specifications.

OTHER AGENCIES CONCERNED WITH HOUSING

DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL CHEMISTRY AND ENGINEERING

The housing activities of the Bureau of Agricultural Chemistry and Engineering are directed at raising the standards of housing in the rural areas of the United States. They are divided into two classes: First, research, and second, the dissemination of information designed to assist farmers with their home building problems.

Objectives and Methods

The object of investigations conducted by the Bureau is to develop improved types of farmhouses which are economical to construct and maintain, comfortable to live in, and which adequately provide for the varied activities which are carried on within their walls.

Studies are conducted of materials, methods of construction, and equipment adaptable to farm use. Native and other materials which can be processed and handled satisfactorily by farmers and other unskilled and semi-skilled rural labor are of particular interest.

Investigations of Heating and Cooling

The relation of construction to winter and summer comfort is being studied at the present time in cooperation with the University of Wisconsin and the University of Georgia. The work in Wisconsin is carried on largely in occupied farm homes, while that in Georgia is mostly in experimental houses built for the purpose. Heating equipment and economical methods of summer cooling are included in these investigations.

Farmhouse Planning

Another type of investigation which is under way at the Wisconsin project is a study of planning as related to various household and farm tasks carried on in the farmhouse.

Information on farmhouse planning, construction, and equipment is available in technical and popular form. The non-technical or Farmers' Bulletins present not only the results of investigations conducted by this Bureau but also give information which is the result of the work of others or which is generally recognized as good practice.

Working drawings of farmhouse plans are available to farmers throughout the country at a nominal cost through the Plan Exchange Services carried on by the Bureau and the various States.

Coordination with State Colleges

The function of these services is to coordinate the work of preparing plans which is carried on by the various State colleges in order to avoid unnecessary duplication of effort and to make available in other parts of the country the plans developed by individual States. Plan books containing plans of farmhouses and of various farm structures and equipment already have been prepared by the Bureau and the Extension Service for three of the four principal agricultural regions and are available at nominal cost from the Government Printing Office. Working drawings for these plans are available from the various State colleges. The Department of Agriculture has issued various other bulletins, principally Farmers' Bulletins, on farmhouse construction and remodeling.

Farmers Bulletin 1738 - Farmhouse Plans
Farmers Bulletin 1749 - Modernizing Farmhouses
Farmers Bulletin 1227 - Sewage and Sewerage of Farm Homes
Farmers Bulletin 1448 - Farmstead Water Supply
Farmers Bulletin 1698 - Heating the Farm Home
And others.

DEPARTMENT OF AGRICULTURE
FARM SECURITY ADMINISTRATION

The Farm Security Administration is not primarily a housing agency. Its job is to help farm families on, or near, relief to become self-supporting. However, since many farm families have become stranded on unproductive land where they have no chance to make a decent living, the Government found it more economical to help them get a new start on better land. With the aid of Farm Security Administration, more than 10,000 such families have established themselves on new homesteads, scattered through every section of the United States.

The houses constructed under this program were designed to meet a wide variety of climatic conditions, living habits, and economic needs. Some of the first houses were suburban, such as Greenbelt communities, rather than rural. Today, however, the Farm Security Administration is building through private contract only low cost farm houses.

Small House Construction

The most outstanding recent development in Farm Security's housing program is the construction of fully modernized homes in California, the Northwest, Texas, and Florida, including bathrooms, for less than $1,500. These low-cost labor homes were built in connection with the camps for migratory agriculture workers, and rent for approximately $8 per month to those families who are able to find year round agricultural work in the area and settle down. Most of the homes are individual houses with two bedrooms, combination dining and living room, kitchen, and bath. About 250 of the labor homes were multi-family apartments, with a third of the units containing an additional bedroom. Because these homes were grouped together in the labor camps, it was possible to supply them with running water and sewage disposal facilities without exorbitant cost.

Tenant-Purchase Homes

In addition to the homes it has built on projects, the Farm Security Administration now is supervising construction of houses for thousands of tenants it is financing in the purchase of farms. These five-room frame houses, without bathrooms, developed by Farm Security Administration on one of its projects for about $1,100, are being built throughout the South under private contract, for prices ranging from $1,100 to $1,400. The average cost, including those built in the north where more expensive construction is required, is less than $1,500.

Construction has been based on a few simple principles, intended to produce adequate, attractive, but modest homes at the lowest possible cost. They are:

1. Design: Cubic footage of the house was held to the minimum necessary for health and comfort. Rooms were arranged for both compactness and convenience. Every unnecessary gable, beam, and purely decorative feature was eliminated.
2. Materials: First grade materials were used throughout, so that maintenance and repair costs would be as low as possible. Standard materials, in standard sizes, usually proved most economical. The use of local products often resulted in considerable savings, through lower transportation costs.
3. Construction: Precutting and prefabrication were highly developed. A small portable sawmill, for example, often was set up on the project, to cut lumber to exact specifications for a large number of houses. Complicated parts, such as window and door frames, and sometimes the entire frame of the house, were prefabricated at the mill, so they could be installed with a minimum of labor.

Small Houses .10
Greenbelt Towns

DEPARTMENT OF AGRICULTURE
FOREST SERVICE

The Forest Service, with headquarters in Washington and regional offices and experiment stations throughout the country, is concerned with management, protection, and utilization of our forest resources. Research in the utilization of forest products is centralized at the Forest Products Laboratory, Madison, Wisconsin. Problems related to the use of wood in construction have occupied a prominent place in the Laboratory's research program for many years, and inasmuch as wood is the major material in residential construction, the results of such research have a direct bearing on problems met by the architect every day. Wood is a renewable resource, its cost is low, and with proper use it should continue to hold the high rank as a building material which time has given it.

Comparative Strength Data for All American Woods

Hundreds of thousands of tests have defined and differentiated the various kinds of strength of more than 160 wood species, including all the more important woods produced for the nation's market. Both the methods and the results of this research have been adopted as standard by engineering authorities in the United States and abroad. The data provide a fundamental basis for design, and for selection of species for particular uses.

Working Stress Values

Tests of full-sized timbers have demonstrated in quantitative fashion the influence of common defects, such as knots and checks, on strength, with the result that structural designers have been supplied with more efficient working-stress values, building codes are being modernized, and timbers are bought and sold on the basis of strength grades, by which they can be rationally and economically selected for their intended loadings. The value of the Laboratory's contributions to structural practice is further illustrated by the development of a special formula for wood-column design, which has replaced the less accurate ones formerly in wide use, and by discovery of a new engineering principle applying to beams under shear loading, by which large savings of material are made through the improved design of railway- and highway-bridge stringers and other large members.

Stronger Joints in Timber Construction

The strength of the fastenings used in wood is fully equal in engineering importance to the strength of wood itself. A new field of engineering construction has been opened by the investigation of modern plate and ring connectors that act as dowels or keys in wood framing. By means of these connectors new types of large timber structures are coming into being throughout the country, including long-span highway bridges, radio and lookout towers, oil-field equipment, and public buildings.

Prefabricated Housing

The provision of easily erected, economical, and comfortable homes for families of small means is one of the most urgent needs of our economic era. An intensive study of prefabricated housing is in progrss, centering on structural problems and extending into related fields of investigation, such as seasoning, moisture control, painting, and fire resistance. A complete house of plywood unit panels has been worked out and demonstrated.

Laminated Construction

Besides the use of plywood in the development of a prefabricated house the work on laminated construction includes wood arch construction for industrial, recreational, and buildings where large floor space free of all obstruction is important. The first building of this type in the United States was built by the Laboratory.

Moisture Control Becomes More Important with Air-Conditioned Homes

By whatever means it is accomplished, the seasoning process has one main purpose -- to fit wood for the moisture conditions it will meet in service. Instruments for the quick determination of wood-moisture content have been developed and now are manufactured and sold commercially. By extensive field tests the principal wood-moisture climates of the United States have been chartered as a guide to seasoning for different regions. Definite moisture tolerances thus are determined for lumber according to localities and uses and are finding an increasing place in commercial specifications.

The modern development of air-conditioning systems for homes and other buildings is introducing serious winter problems of moisture transfusion, sweating, and ice formation in walls. A thorough investigation has been undertaken to determine the rate of moisture movement in woodwall panels of different types at various temperatures and humidities and the effectiveness of sheet barrier materials in bringing it under control.

Better Paint Service Will Reduce House Maintenance Costs

Useful discoveries have been made in methods of applying paint to wood and the choice of priming materials. Examination of numerous failures in the repainting of houses shows, however, that the life of a coating cannot be wholly predicted from the immediate conditions of application, but that the service given depends on a proper or improper combination of the new paint with coats that have preceded it. This fact points to the need of a thorough-going classification of house paints according to the long-time maintenance programs of home owners. The work of classification, recently begun, involves a wide range of chemical research and service tests. The findings already indicate that by a proper distinction of paint types the complexity of present paint markets may be greatly simplified, with resulting benefits to the user in lower costs and better service.

Fireproofing of Wood

If by the addition of chemicals the combustion of wood can be materially retarded, the danger of spread of fire in and by wooden structures can be largely decreased. Laboratory research in this field extends over a wide range of chemical treatment and types of fire-resistive construction. Treated wood specimens are tested in specially designed combustion apparatus. Full-sized house parts are subject to flame test in a separate building equipped with a panel furnace having 67 large gas burners. Although highly effective fireproofing treatments are available, they are too expensive for general construction purposes. The objective of research is to reduce costs and to bring the benefits of fire-retardant wood within reach of the average home builder.

Decay in Buildings

The causes of decay in buildings and wood products are investigated. Rules of construction for the avoidance of decay have been developed, with consequent large savings to thousands of home owners.

The Growth, Structure, and Identification of Wood
- Identification of oak woods. Technical Notes 125
- Guidebook for the identification of woods used for timbers. .30

1 — Manufacture and Grading of Lumber
- How lumber is graded, Circ. 64, Revised Sept. 1933. .05

Mechanical Properties and Structural Uses of Wood and Wood Products
- Properties of ordinary wood compared with plywood. Tech. Notes 131

2 — Condensation in walls and attics, Mimeo. R1157.

3 — Wood handbook: Basic information on wood as a material of construction with data for its use in design and specifications. .35

- Modern connectors for timber construction. Joint publication of the Natl. Comm. on Wood Utilization and Forest Products Laboratory. 1933 .15
- Strength and related properties of woods grown in the United States. Tech. Bul. 479.

The Seasoning of Wood
- Correct moisture content of lumber. Tech. Notes D-5.
- Comparative durability of green and seasoned timber. Tech. Notes F-33.
- Preventing cracks in new wood floors, Leaflet 56.

Wood Finishing Subjects
- Repainting the paint-neglected house. Mimeo. R1135.
- Some causes of blistering and peeling of paint on house siding. Mimeo. R6.

Wood Preservation
- Experiments in fireproofing wood -- fifth progress report. A.W.P.A. Proceedings, 1935.
- Decay resistance in woods for window sash and frames, Mimeo. R919.

DEPARTMENT OF AGRICULTURE
BUREAU OF HOME ECONOMICS

Designs for farm dwellings must take account of the close association between the farm business and living arrangements of farm families. This affects not only the number of rooms, their size and arrangement, but the general orientation of the house with reference to other buildings on the farm and to the highway.

Relative Size of Farm and City Houses

Studies of the Bureau of Home Economics show that within each geographic region farmhouses tend to be larger than village or city houses of families at practically every income level. The average number of rooms in dwellings on farms in Michigan and Wisconsin was 8.02; in villages in this region, 6.50; and in small cities, 5.71.

Reasons for Difference in Size

Farmhouses should be larger than city houses not only because farm families tend to be larger, but also because a greater variety of activities must be carried on under a single roof. The farm family usually carries on much more household production than city or village families. Home sewing, laundry work, gardening, canning, baking, and cooking on a comparatively large scale are necessary in order to maintain a satisfactory level of living in the face of low money incomes. Home production requires ample work space, suitable equipment conveniently arranged,

and adequate and convenient storage spaces.

Comparatively large houses are also needed because of the frequency with which hired farm help is given board and lodging in the family dwelling. This calls for wash and coat rooms conveniently located to the entrance from the farm buildings, additional bedrooms and a larger kitchen and dining room than the family itself would need.

Room Occupancy

Another factor affecting the design of farm dwellings is the relative inability of the farm family to move as can village or city dwellers, to houses suited in size and arrangements, as children join or leave the family circle. Among large families, then, there may be much overcrowding, especially observed in the Mountain-Plains region and in the South where the average number of rooms per house tends to be small. In the South as a whole, the 1934 Farm Housing Survey showed an average of more than one regular occupant per room.

On the other hand, this survey showed an appreciable percentage of unused rooms in farm dwellings -- more than 15 percent in New England and East North Central States, and averaging 10 percent for the country as a whole. It would be interesting to know how many of these rooms were unused because families could not afford to furnish, clean, and heat them, and how many were unused because the house was still -- or again -- too large for current needs. In either case, unless the original plan for the house was made with changing space requirements in mind, shutting off part of the house may have an undesirable effect upon the "livability" of the dwelling.

Modernization of Farmhouses

Progress in modernization of farmhouses to provide electricity, running water, and other comforts commonly found in urban dwellings depends to a considerable extent upon income levels and purchasing power achieved by farm families, although the importance which farm women in various regions attach to different facilities does not always parallel the desires of village and city women. In a study of certain counties of Pennsylvania and Ohio, electricity lighted the homes of 70 percent of the families with incomes of $2,500 to $3,000, as compared with only 31 percent of the homes of those with incomes of $500 to $1,000. Electricity or gas was used for cooking by few families at any income level; coal, wood, and kerosene were the most usual cooking fuels. About three times as many of the upper as of the lower income families had an indoor supply of running water, and more than four times as many had hot and cold running water in both kitchen and bathroom. A kitchen sink with drain

preceded running water in many homes, possibly because of its lower cost. Fewer than one-third, 30 percent, of the houses of the upper income group and only 7 percent of the lower had electric lights, running hot and cold water, and an indoor flush toilet.

Project Under Way

Studies of arrangements in farm kitchens differing in size and shape to find which are the best adapted to work activities carried on in the kitchen. Varying arrangements of different types of equipment, working surfaces, and placement windows and doors are being considered.

The Farm Housing Survey. Directed by the Bureau of Home Economics in cooperation with the Bureau of Agricultural Engineering, Extension Service and Office of the Secretary. 1939. .15
Housing Requirements of Farm Families in the United States. .10
Electric Light for the Farmstead. Bureau of Agricultural Engineering and Bureau of Home Economics. Farmers Bull. 1838 (in press).
Family Homes and Their Facilities (in manuscript) to be published in the series of the Consumer Purchases Study.

DEPARTMENT OF COMMERCE
FOREST PRODUCTS DIVISION

The Forest Products Division of the Department of Commerce is primarily charged with the collection and dissemination of information for expanding in particular the domestic trade. It has functioned in this capacity over a period of years and has paid especial interest to the building and construction industry. This activity is centered along trade promotion lines, based upon two principles, first, increasing the markets for lumber in construction, and second, giving authoritative information on the use of wood in construction.

Lumber Production and Construction

Since 40 percent of the lumber produced in the United States moves directly from the sawmills into general building and construction, it is natural that the Forest Products Division has an acute interest in this industry. Still of a greater importance is the fact that 80 percent of individual homes in the United States are at least lumber framed, while it is estimated that 90 percent of all farm structures are made of wood.

One of the outstanding developments in this line was the introduction

into this country of metal connectors for timber construction in 1930, principally from Germany and France, working in cooperation with the Timber Engineering Company, a subsidiary of the National Lumber Manufacturers Association. Basic information was turned over to this company which now controls patent rights in the United States for various types of connectors. The growth and use of these connectors have been tremendous. Up to the present time over one-half billion feet of lumber have been employed in structures using modern connectors with a value of over ten million dollars.

Prefabricated Construction

The Forest Products Division has also sponsored a project for the export of prefabricated and ready-cut houses to foreign countries. Considerable progress has been made and it is quite probable that in the future we shall develop a definite export trade for them.

Reports and Publications

In addition, the Division, through the foreign offices, receives reports on construction trends, and information on the development of new uses of wood in construction which is turned over to American industry.

The Division maintains an extensive and comprehensive selected list of publications on the general subject of construction. It also offers individual services to American business men, architects, and consumers, giving authentic, practical information on the use of wood in construction.

Trade Promotion Bulletins

Most important of the services of the Forest Products Division are the series of trade promotion bulletins on the use of wood in construction. It was responsible for the publication of "Wood Construction" a 711-page book which is perhaps the most authoritative publication of its kind in the country today. In addition are "How To Judge A House", "Light Frame House Construction" and similar booklets which are published primarily for the consumer and builder. The following is a list of the more important publications issued by the Division and the former National Committee on Wood Utilization bearing directly upon the general subject of building and construction:

Modern Connectors for Timber Construction
Treated Lumber, Its Uses and Economies
House Insulation, Its Economies and Application
Insulation on the Farm
Grade Marking of Lumber for the Consumers' Protection

Seasoning, Handling and Care of Lumber (Consumers' Edition)
The Marketing of Short-Length Lumber
End-Matched Softwood Lumber and Its Uses

The Forest Products Division also has prepared a series of trade promotion bulletins which include discussions on the use of wood in building and construction. These are as follows:

American Douglas Fir Plywood and Its Uses
California Redwood and Its Uses
American Hardwoods and Their Uses
American Western Pines and Their Uses
American Hardwood Flooring and Its Uses
American Southern Pine
American Southern Cypress
American Hardwood Dimension, Solid Wall Paneling and Interior Trim

DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards serves architects, home builders, and others in the construction industry interested in materials, equipment, and building practices. It makes available the results of basic research in the selection, properties, and use of building materials and advocates sound methods in design and construction of dwelling structures in the interest of health, safety, durability, and economy.

Tests, Standards, and Specifications

The Bureau develops test methods, conducts tests, disseminates technical data, and gives advice on home building and maintenance problems. It also offers suggestions on the preparation and selection of specifications, particularly those of the Federal Government or of industries cooperating in commercial standardization activities. It cooperates actively with agencies interested in establishing dimensional and quality standards, and in unifying specifications.

Research

In addition to research and testing on all of the basic materials used in building construction, the Bureau is engaged in a program of research on building materials and structures with particular reference to their use in housing with the assistance of the Sub-Committee on Technical Research of the Central Housing Committee.

As part of this program, the Bureau is investigating the performance of structural assemblies and combinations of materials under varying conditions of use. For example, structural elements of a house such as wall, partition, floor, and roof assemblies are subjected to compressive, transverse, impact, and concentrated loads stimulating forces encountered in actual service. Included in the types of masonry construction tested are solid brick, structural clay tile, concrete block, and cavity walls of various materials, pre-cast concrete slabs, and masonry veneer combinations. Floor constructions of light steel joists and cellular sheet-steel panels with various types of floor coverings have also been investigated, as well as wall and roof assemblies of light steel frame and sheet-steel panels combined with numerous wall finishes and roof coverings.

Special attention is being given to the fire-resistance properties of floor constructions, and of partitions, including several of the so-called prefabricated types. Work is also being done on the flammability of interior and exterior finishing materials.

Experiments are being made on the effect of humidity on the thermal conductivity of insulating materials. Insulation against solar radiation and measurements of heat transfer through different types of wall panels are also being studied.

Surveys of the weathering qualities and extent of use of the various roofing materials on dwellings in the Southeastern and Northeastern States have been completed, and work is in progress on reports covering metal and prepared asphalt roofings for low-cost housing.

Indentation and recovery tests of floor coverings, the effect of humidity variations on changes of dimensions of materials, and adhesives have all been investigated. Experiments are also being conducted on the durability of floor coverings under constant wear.

In the field of heating, tests are being made on radiators, connectors and boilers. A heating laboratory, simulating a four-room bungalow with adjustable ceiling heights, has been constructed for testing heating devices in general.

With regard to plumbing, experiments are under way on drainage and venting at varying story heights, and a paper is being prepared on methods of determining loads in plumbing systems. The application of the results of these studies to the design of plumbing layouts is also being developed.

Studies are being made to determine the durability of fiber building boards, sheathing boards, and wall tile and sheathing papers.

Protection of steel against corrosion by means of coatings and finishes is being investigated.

Tests of the water permeability of a large number of masonry walls of different types are being made to determine the effect of various classes of materials and workmanship and the effectiveness of waterproofing treatments in preventing rain penetration.

Experimental calking compounds have been prepared and studied for durability and effectiveness, in addition to numerous commercial products now on the market.

Laboratory and outdoor tests are being made on cement paints for masonry walls (including experimental mixtures in which the proportions of the principal constituents are varied), with particular reference to hiding power, durability, and waterproofing value.

A small masonry structure is being erected for the purpose of measuring differential movements between masonry walls and reinforced concrete roof slabs, in an effort to determine the causes of the cracking of the masonry in such structures and to develop design and construction methods to overcome these tendencies.

Building and Safety Codes

The Bureau has been active in the development of improved building and safety codes over a long period. It conducts research, makes surveys of the status of code requirements, and cooperates in the production of recommended minimum requirements suitable for general adoption. At the present time a complete series of such requirements is being prepared under the procedure of the American Standards Association with which the Bureau is cooperating. Fourteen sectional committees under the jurisdiction of the Building Code Correlating Committee are engaged in this work. Their membership comprises representatives of national associations of architects, engineers, and building officials, as well as of governmental agencies and other organizations having an interest in the subject. Through such activity it is hoped to produce recommended requirements that will assure safety while permitting all legitimate economies possible in building construction. These recommended requirements will be made generally available and should do much to remove existing differences in local codes.

LC290 Publications of the National Bureau of Standards relating to Building Materials, Building Standards, Home Building (lists). And Supplement thereto.

LC432 Publications relating to Building Codes and Construction Practice (list).
LC552 Building Materials and Structures Report (list).
Technical Information on Building Materials (list).
LC555 Building Regulation; Publications Issued by the National Bureau of Standards (descriptive list).
LC323 Standards and Specifications for Building Materials (list).
Services of the National Bureau of Standards to the Home Building Industry.

FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE

The Public Health Service is concerned with housing primarily from the point of view that housing is a basic factor in the part sanitary and healthful environments play in reducing sickness and mortality rates. Many studies have been conducted in the past by the Public Health Service on the effects of impure water supplies, insanitary toilets, lack of sewer connections, inadequate lighting, poor ventilation, lack of heating, excessive dampness, dilapidation, faulty screening against flies and mosquitoes, overcrowding, and other matters which find their origin in poor housing and community conditions.

National Health Survey

In 1936 the Public Health Service conducted a National Health Survey in all sections of the country during which a house-to-house canvass of 800,000 families was made. Along with disability, illness and accident data, information was secured on sanitary facilities and crowding. For the first time on a large scale data are thus available through which it may be possible to establish certain relationships between housing and health. The data are currently being analyzed to determine possible correlations between the degree of crowding and disability rates, as well as rates for specific diseases such as pneumonia, tuberculosis, and neurasthenia; between sanitary facilities and certain diseases such as typhoid fever; and between home accidents and certain indexes, such as rental scales, which reflect the condition of homes.

Environmental Sanitation

Recently a new section on environmental sanitation has been created to correlate these studies and to establish their specific applicability to desirable housing standards. This has already been accomplished in part through the participation of staff officers of the Public Health

Service in the work of the Committee on the Hygiene of Housing of the American Public Health Association. This Committee has just published a report on the "Basic Principles of Healthful Housing" in which specific requirements and methods of attainment are set forth relative to fundamental physiological needs, fundamental sociological needs, protection against contagion, and protection against accidents. The subjects considered are as follows:

A. Fundamental Physiological Needs
Maintenance of a thermal environment which will avoid undue heat loss from the human body.
Maintenance of a thermal environment which will permit adequate heat loss from the human body.
Provision of an atmosphere of reasonable chemical purity.
Provision of adequate daylight illumination and avoidance of undue daylight glare.
Provision for admission of direct sunlight.
Provision of adequate artificial illumination and avoidance of glare.
Provision against excessive noise.
Provision of adequate space for exercise and for the play of children.

B. Fundamental Psychological Needs
Provision of adequate privacy for the individual.
Provision of opportunities for normal family life.
Provision of opportunities for normal community life.
Provision of facilities which make possible the performance of the tasks of the household without undue physical and mental fatigue.
Provision of facilities for maintenance of cleanliness of the dwelling and of the person.
Provision of possibilities for esthetic satisfaction in the home and its surroundings.
Concordance with prevailing social standards of the local community.

C. Protection Against Contagion
Provision of a water supply of safe sanitary quality, available to the dwelling.
Protection of the water supply system against pollution within the dwelling.
Provision of toilet facilities of such a character as to minimize the danger of transmitting disease.
Protection against sewage contamination of the interior surfaces of the dwelling.
Avoidance of insanitary conditions in the vicinity of the dwelling.
Exclusion from the dwelling of vermin which may play a part in the transmission of disease.
Provision of facilities for keeping milk and food undecomposed.

Provision of sufficient space in sleeping-rooms to minimize the danger of contact infection.

D. Protection Against Accidents
Erection of the dwelling with such materials and methods of construction as to minimize danger of accidents due to collapse of any part of the structure.
Control of conditions likely to cause fires or to promote their spread.
Provision of adequate facilities for escape in case of fire.
Protection against danger of electrical shocks and burns.
Protection against gas poisonings.
Protection against falls and other mechanical injuries in the home.
Protection of the neighborhood against the hazards of automobile traffic.

Relation of Substandard Housing to Health

In addition to these studies investigations are being made of techniques in the rating of substandard housing in terms of criteria which easily can be identified as having a bearing on health.

Housing as a Public Health Responsibility (September issue - "The Health Officer")
Relation Between Housing and Health .05
Some Factors Which Affect the Relationship Between Housing and Health .05
National Health Survey 1935-1936. Adequacy of Urban Housing in the United States as Measured by Degree of Crowding and Type of Sanitary Facilities. National Institute of Health.

DEPARTMENT OF INTERIOR
BUREAU OF MINES

The Bureau of Mines was organized in 1910 and since that time has continuously conducted research and published information on the selection, care, and operation of residence heating apparatus with the broad objective of conservation of the mineral fuel resources of the nation and the collateral achievement of comfort, convenience, economy, and safety in the heating of homes.

Efficiency of Heating Apparatus

The value a householder gets from the fuel he burns depends largely on the character of the heating apparatus, the conditions under which it is installed, and the manner in which the fire is handled.

Elimination of Smoke

The elimination of smoke, particularly in urban areas, is related directly to comfort and economy in homes. Much has been accomplished in the reduction of industrial smoke and there is much room for further improvement by the burning of smokeless fuels in residences or by the smokeless burning of smoky fuels in suitable equipment, as, for example, the domestic stoker. One field of research by the Bureau of Mines is the low-cost production of the smokeless fuels, coke, gas, and oil of qualities desirable for domestic use from bituminous, sub-bituminous, and lignitic coals.

Hazards of Faulty Appliances

During every heating season many deaths are caused by the escape of lethal gases from faulty fuel-burning equipment in homes. To combat this hazard, the Bureau of Mines has distributed publications on the maintenance of furnaces and flues, adjustment of dampers, carbon monoxide hazards from house heaters burning gas, and on stenches for detecting leakage of gas.

The Bureau cooperates with the American Society of Heating and Ventilating Engineers and other organizations on research problems in this field.

Questions and Answers for the Home Fireman .05
Report of Investigation No. 2980. Coke as a Domestic Heating Fuel. .05
Technical Paper 576. Bibliography of United States Bureau of Mines Investigations on Coal and Its Products 1910-35. .15
In the Operation of Domestic Heating Furnaces Avoid Leakage of Gases into the House.

DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE

The National Park Service was founded in 1916. Two years later the Landscape Architectural Division was formed showing impossibility of any real success without the assistance of an architect.

Scope of Service

The bulk of the work of the National Park Service consists of hundreds and hundreds of small projects. These projects have run all the way from a fire-look-out tower in the mountains to the Federal Warehouse

in Washington.

Many old historic buildings are being repaired and preserved by the Branch of Plans and Design. Its survey of historic American Buildings, covering many privately owned buildings which easily could be destroyed or lost to posterity will produce carefully measured drawings on file in the Library of Congress and available for purchase. These drawings now include approximately 5,000 structures, from New England covered bridges to prehistoric Indian pueblos in the continent.

Building Code

After two years of work and study the Branch of Plans and Design has completed a rigid building code covering all work to be done henceforth in National Parks and assuring proper design and construction, whether government or otherwise, within their boundaries.

Catalog of the Historic American Buildings Survey, listing measured drawings and photographs of a Survey of notable examples of Early American Architecture, which are filed in the Library of Congress. 264 pages. .50

Following is a list of buildings or areas in Washington which may be visited:

Robert E. Lee Mansion, Arlington National Cemetery.
Field House, Palisades Playground.
Reservoir Road.
Ford Theatre and The House Where Lincoln Died.
George Washington Birthplace National Monument, Westmoreland County, Virginia.
Mount Vernon, ancestral estate of George Washington.
Shenandoah National Park, Virginia, including the Skyline Drive, numerous picnic grounds, cabin developments, and lodge buildings, some completed and some under construction.

DEPARTMENT OF INTERIOR
OFFICE OF INDIAN AFFAIRS

To administer architectural service to Indians, one of the activities of the Architect in the United States Indian Service, is one of the most complex problems of progressive thinking. The architect is called upon to design for tribal groups or clients of which he has no knowledge as to background, habits, and environment. What appears to be beautiful to the architectural-trained eye may appear unacceptable to the superstitious, tribal Indian, since he has no knowledge of our conception of form and mass and clings to his tribal religious beliefs, customs, and forms and method of living.

Design

Architectural expressions are basically functional and the design patterns should embrace the customs and living habits of the people, as well as climatic conditions. The study and design of institutional buildings such as schools, hospitals, boys' and girls' dormitories, nurses' homes, power plants, etc., are based upon knowledge of methods of progressive teaching, surgery, housing, technical operative skill, methods of nursing, etc.

The Indian-Service Architect becomes the coordinator, designer, and psychoanalyst to the teacher, doctor, technician, and nursing staff. These people, in turn, supply him with their practical knowledge of their respective professions.

Successful functional design depends entirely upon correct analysis, accurate professional information, coordination between groups, and intimate knowledge of Indian ways of living and thinking. Expression and form in design must, therefore, be the study and application of habits rather than temperament.

The Office of Indian Affairs in Washington publishes considerable material which outlines in detail the varied aspects of its program which are available to those interested. Other information may be secured from the office of the Commissioner of Indian Affairs, Washington, D. C.

Some Problems of Indian Education.
Education of Indian Children.
Types of Indian Schools.
Government Indian Schools.
The Federal Government and the Education of Indians and Eskimos.
List of Indian Hospitals.
Indian Service Schools (Their Aims and Some Results).
Indians at Work (monthly).

TENNESSEE VALLEY AUTHORITY

The activities of the Tennessee Valley Authority in the field of housing have been carried on only as incidental to the major objectives in the TVA program. They have been limited largely to providing housing for employees, chiefly on construction projects. In its work in these

fields, the Authority has made no radical departure from conventional methods. However, by careful planning of structures and operations, by studying economical construction techniques, and by equally careful analysis of results, it has obtained findings which may prove valuable to those who are concerned with housing, public or private. A number of reports on the Authority's housing projects and investigations are available to technicians in the field of housing.

The outstanding developments and investigations of the Authority are summarized below:

Design

The Authority has been concerned with designing (a) communities, and (b) houses. In connection with community design, the Authority has developed communities which satisfy both temporary and permanent housing requirements, and which have demonstrated that advanced standards of community design are economically feasible, as well as socially and esthetically desirable.

To the design of houses, the Authority's chief contributions have been simplification which permits maximum economy, and adaptation to environment. Thus, at Norris, for example, many of the houses are adaptations of a local form, the "dog-trot" house. Others, such as hillside houses, are designed to take advantage of the terrain.

Costs

The Authority's work on housing costs is significant. In spite of its relatively high wage scale, it has made distinct contributions to reduction of costs: At Hiwassee, the Authority has produced houses at a cost of approximately $1,000 per dwelling unit, including materials, labor, plumbing, and wiring, but excluding heating equipment, grading and outside utilities. While these houses were designed for four-year occupancy, results indicate that their life will be comparable to that of ordinary frame structures. At the Kentucky project, the Authority has secured low-cost housing by salvaging houses no longer needed at Pickwick, and transferring them intact by barge to the Kentucky site. And in all its communities the Authority has so planned construction as to insure the continuous profitable employment of labor.

Materials

The Authority has utilized a wide variety of materials in the construction of houses. In Norris, it has produced a large number of very satisfactory dwellings using cinder blocks, precast concrete beams,

precast colored concrete tiles, and various types of insulation. At Hiwassee, it has developed low-cost houses of building board, painted and unpainted. In appraising completed projects, the Authority has conducted tests which should add significantly to the body of knowledge on thermal efficiencies of building materials.

Utilities

The Authority's studies in the field of utilities have been centered largely on the problem of housing heating. Investigation of the relative effectiveness of different types of heating equipment have covered low-temperature electric heaters -- portable and installed -- coal ranges, circulators, and central blower units. Through its power program, the Authority has contributed also a large amount of data on the demand for electric appliances -- ranges, refrigerators, hot water heaters, and space heaters -- and on the feasibility of home electrification under specified promotional rates.

The Planning of the Town of Norris
Central Electric Heating Plant in TVA School at Norris, Tennessee
Heating at Norris, Tennessee - A study of Thermal Efficiency in Housing
Studies in the Heating of Small Houses
TVA Low-Cost Houses at Hiwassee Dam
Employee Housing on the Hiwassee Project - Summary

(Produced through courtesy of the Federal Home Loan Bank Board)