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### III

## SOURCE NOTES AND DESCRIPTIONS



## A. Construction Contracts

### DODGE CONSTRUCTION CONTRACT SERIES, MONTHLY

#### General Description

SOURCE: These series are based on information compiled by the F. W. Dodge Corporation of New York (now the F. W. Dodge Company). Monthly data for years prior to 1942 were taken directly from the files of the Dodge Corporation. Beginning with 1942 the basic sources have been two monthly bulletins: (1) *Construction Contracts Awarded, 37 Eastern States* (1942-1956); and (2) *Construction Contracts, United States Summary* (1957-1963). The NBER classification by type of construction differs, in some cases, from the Dodge classification. These rearrangements are noted in the descriptions of the individual series. With the exception of the three series which have been discontinued, current data for the series presented here are available in *Construction Contracts, U.S. Summary*. In some cases the titles of the NBER and Dodge series differ, and in other cases the NBER series are combinations of two or more Dodge series. (See individual series descriptions for specific Dodge sources.) Current data on the value series for total, public, and private construction; for residential and nonresidential building; and for public works and utilities are also available monthly in the *Survey of Current Business* (U.S. Department of Commerce).

Annual data are from the same sources and, for 1932-44, from *Record of Contracts Awarded, 37 Eastern States*. In addition to the series on floor space given here, the Dodge sources also include floor space data on one- and two-family dwellings, apartment houses, and hotels.

The Dodge "construction contracts" statistics are conceptually a measure of "commit-

ments of work about to start."<sup>1</sup> They include construction projects for which there are no general contracts, as well as those for which such contracts are awarded. In general, projects are included in the statistics when it is reasonable to expect construction to start within sixty days.

The data include new construction, additions, and major alterations, and exclude repairs and maintenance. Force-account work is included only when executed with materials earmarked for specific projects at time of purchase. All urban and rural nonfarm areas are included, while all but a negligible part of farm building is excluded. Both private and public construction are covered, except for privately owned projects below a minimum value. The minimum valuation, currently \$10,000, has varied considerably, falling as low as \$500 during the early 1930's. Publicly owned projects are included without minimum, except for minor deviations. In the most active counties of the eleven western states (forty-eight-state segment), two additional exclusions apply: privately owned addition and alteration projects valued at less than \$100,000, and separately built residential garages.

The types of projects included in each NBER series are enumerated in the description of the individual series. Structures are classified according to function. Combination projects are classified according to the prime purpose for which the building is constructed, insofar as can be determined. Additions and alterations to existing buildings are classified in accordance with the use to which the remodeled structure is to be put.

<sup>1</sup> *Composition of Dodge Construction Contract Statistics*, F. W. Dodge Corporation, January 1963.

Valuation figures represent, as nearly as possible, actual construction costs, including subcontracts for such items as plumbing, heating, electrical work, roofing, and normal connecting utilities, and excluding land and architects' fees. Cost of industrial equipment which is not an integral part of the structure is excluded, except for special purpose equipment in petroleum refineries, outdoor chemical plants, electrical generating, power, and heating plants, and water and sewage treatment plants.

Floor space figures represent footage under roof, exclusive of basement. Where building permit data are the basis of the statistics, floor area is estimated from construction costs, applying local building cost differentials of the Dow Building Cost Calculator to nationally established cost-per-square-foot rates.

Geographic coverage has been increased in several steps since the Dodge reporting program began. The earliest Dodge statistics cover total construction in the New England states, beginning in 1901. Data covering twenty-seven northeastern states and the District of Columbia are available from 1910 for total construction, from 1915 for residential buildings, and from 1919 for all other categories of construction. The addition of nine southern states to the reporting program between 1920 and 1923 brought the total to thirty-six. Texas was added in 1924, making a total of thirty-seven states. In January 1956 the statistical coverage was expanded to include eleven western states, and the statistics have covered forty-eight states since that time. Alaska and Hawaii have not been included in the reporting program. Because of these changes in geographic coverage, the series are presented here in separate segments for twenty-seven, thirty-six, thirty-seven, and forty-eight states, with overlaps of one or more years between segments. (Early data on total construction in the New England states are shown as a separate series.)

Until 1956 the statistics developed by the

Dodge Corporation on value, floor space, and number of projects for various categories of construction were a by-product of a daily construction news service known as "Dodge Reports." Statistical summaries were based on information collected by news reporters, through reading and clipping services, and through direct mail inquiries. The reporters gathered information primarily from architects, designers, engineers, contractors, builders, and owners; and supplemented this by consulting building inspectors and other government sources. This procedure is still generally followed.

Two new procedures were introduced in 1956-57: (1) Estimates for the eleven western states added in 1956 are based primarily on building permits, supplemented by news sources and by sampling. These states are not covered by the construction news service, and building permits are more universally required than in the thirty-seven eastern states. (2) The basic source of information on privately owned one- and two-family houses was changed from "Dodge Reports" to building permits. For one group of counties, estimated to account for 85 per cent of one- and two-family housing starts, estimates are based on complete reporting of building permits from the most active permit-issuing places, reports on permits from 75 per cent of less active permit-issuing places, and, for the eleven western states, estimates by reporters of building activity in nonpermit areas. In the second group of counties, estimated to account for 15 per cent of one- and two-family construction, activity is projected from permit data for a sample of counties in the first group, using information on the climatic and economic characteristics of each county. An estimated 5 per cent of total private one- and two-family houses in all counties is excluded. The houses not covered are those in nonpermit-issuing areas in the eastern states and those in less active nonreporting permit-issuing areas.<sup>2</sup>

<sup>2</sup> *Ibid.*

Both new procedures applied to the entire forty-eight-state segment. Revisions based on the new method of estimating one- and two-family houses were also developed for the thirty-seven-state segment back to 1947, for the monthly series on one- and two-family houses, total residential construction, and total construction. These revisions made the thirty-seven-state segment for 1947-56 comparable in coverage (except for geographic area) to the forty-eight-state segment, but not comparable to the earlier data for thirty-seven states. The data presented in both the annual and monthly sections of this volume for series A5, Total Construction, Value; A7, Total Residential, Value; A9, One- and Two-Family Houses, Value; and A8, Total Residential, Floor Space are the unrevised figures for 1947-56, which are comparable to the earlier thirty-seven-state data. The revised annual figures are shown in a footnote to the Annual Data Table (Section II-A). Series A31, Number of New Dwelling Units Provided, is presented only on the revised basis, and only from 1947 on. The revisions in the data on one- and two-family houses were not incorporated by Dodge in their series on total private construction.

Further improvements in the sampling methods for one-family houses were put into effect in January 1958.

The handling of corrections and revisions in data was modified in 1958. Before that date, adjustments were made in the months during which they were ascertained rather than in the months to which they applied. Since March 1958, the procedure has been to handle only upward adjustments in this way, and to enter downward adjustments only in the cumulative to-date statistics.<sup>3</sup>

The degree to which the Dodge data cover all construction commitments in the United States has been estimated for certain categories

<sup>3</sup> Adjustments which were made only in the cumulative figures account for the discrepancies, beginning 1958, between the monthly and annual series shown here.

and areas. In 1938 the Department of Commerce estimated that the Dodge statistics covered "as much as 80 to 90 per cent of all new nonresidential building construction regardless of the size of the project" in the thirty-seven eastern states then included in the Dodge program.<sup>4</sup> A report to the Bureau of the Budget in 1958 suggested that underreporting in the thirty-seven eastern states was at that time about 10 per cent of total valuation.<sup>5</sup>

In 1963, the Dodge Corporation estimated that 95 per cent of all privately owned, permanent, nonfarm, one- and two-family houses started in the forty-eight states were accounted for in the Dodge statistics.<sup>6</sup> Types of construction for which coverage tends to be smallest are construction in rural areas, force-account projects, additions and alterations, and smaller projects, particularly one- and two-family houses prior to 1957.

The Dodge construction contract data for the thirty-seven eastern states are the basis for the Bureau of the Census estimates of value of new construction put in place for all categories of private nonfarm nonresidential construction except public utilities.

For further description and evaluation of the Dodge series, see *Composition of Dodge Construction Contract Statistics*, January 1963; Geoffrey H. Moore, *Business Cycle Indicators*, Volume II, Princeton University Press for NBER, 1961, pp. 12-15; Elmer Clark Bratt, *Appraisal of Statistical Information on Construction in the U.S.*, A Report to the Budget Bureau (together with *Appendices* referred to in footnote 5); Chawner, *Construction Activity in the U.S.* (see footnote 4).

Original monthly data were seasonally

<sup>4</sup> Lowell J. Chawner, Jr., *Construction Activity in the United States, 1915-37*, Domestic Commerce Series No. 99, Bureau of Foreign and Domestic Commerce, U.S. Department of Commerce, 1938, pp. 45-46.

<sup>5</sup> Elmer Clark Bratt, *Appendices to Appraisal of Statistical Information on Construction in the U.S.*, September 5, 1958, p. 24.

<sup>6</sup> *Composition of Dodge Construction Contract Statistics*, January 1963.

adjusted by the National Bureau. For most series the adjusted data are shown in segments corresponding to those for which the original data were available. However, for ten series, the adjusted data are shown as a continuous series, all raised to the level of the forty-eight-state data. For these ten series, raising ratios were applied to the original data before the seasonal adjustment was computed. Ratios used for linking segments were based on the two annual totals for the earliest year of the overlap period.

#### *Individual Series*

##### **A1. Total Construction, New England States, Value, 1901-1918.**

SOURCE: Dodge Corporation files. This series was discontinued by NBER when data for a larger area became available. However, regional data are compiled and published by the Dodge Corporation.

CONTENT: See general description of Dodge series.

##### **A2. Total Construction, Value, 1910-1963.**

SOURCE, Monthly data:

1910-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1. 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary). 1957-63: *Construction Contracts, United States Summary*. Current data are also available in *Survey of Current Business*.

Annual data: Same as above, except 1932-1944: *Record of Contracts Awarded, 37 Eastern States*.

CONTENT: See general description of Dodge series.

##### **A3. Total Private Construction, Value, 1919-1963.**

NBER Definition\*

SOURCE:

1919-41: Dodge Corporation files. 1942-56: *Construction Contracts Awarded, 37 Eastern*

*States*, Section I, Table 1, "Total Residential Buildings," "Commercial Buildings," "Manufacturing Buildings," and "Utilities (Public and Private)"; and Section II, Table 6, "Theatre Bldgs., Etc.," "RR-Bus-Air Terminal Bldgs.," minus "Water Supply Systems." Current data for some components not available. Series discontinued.

CONTENT: Residential buildings (Series A7), Commercial and Industrial building (Series A14), Public Utilities (Series A28).

Dodge Definition \*

SOURCE:

1932-44: *Record of Contracts Awarded, 37 Eastern States*. 1945-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 5. 1956-63 (48 states): *Construction Contracts, United States Summary*, table on "Public vs. Private Ownership." Current data are also available in *Survey of Current Business*.

CONTENT: Building and nonbuilding projects constructed under private ownership.

##### **A4. Public Construction, Value, 1919-1963.**

NBER Definition \*

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Educational & Science Bldgs.," "Hospital & Institu-

\* Series A3 and A4 were each compiled according to two different concepts, designated as "NBER definition" and "Dodge definition." The NBER definitions of private and public were based on *type* of construction project. These series, which include specific categories of projects, were compiled for the period 1919-56, after which data for some components were not available. The two series do not add to total construction contracts, since a few minor categories were not allocated to either private or public. The Dodge definitions of private and public are based on *ownership*. Beginning 1932 a breakdown by ownership was available and series on privately owned and publicly owned construction contracts were therefore compiled for 1932-63. The data are presented here separately for each of the two definitions. For purposes of seasonal adjustment and cyclical analysis, they were combined, using the Dodge definition for 1932-63 and extrapolating back to 1919 by the NBER definition, linking by the ratio of the two 1932 annual totals.

tional Bldgs.," "Public Buildings," and "Public Works"; and Section II, Table 6, "Gymnasium & Athletic Bldgs.," and "Water Supply Systems," minus "Parks-Playgrounds, Etc." Current data for some components not available. Series discontinued.

CONTENT: (1) Public buildings (Series A22); and (2) public works (Series A26).

Dodge Definition \*

SOURCE:

1932-44: *Record of Contracts Awarded, 37 Eastern States*. 1945-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 5. 1956-63 (48 states): *Construction Contracts, United States Summary*, table on "Public vs. Private Ownership." Current data are also available in *Survey of Current Business*.

CONTENT: Building and nonbuilding projects constructed under public ownership.

A5. *Total Building Excluding Public Works and Utilities, Value, 1919-1963.*

A6. *Total Building Excluding Public Works and Utilities, Floor Space, 1919-1963.*

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Total Building"; and Section II, Table 6, "Parks-Playgrounds, Etc.," and "Pipe Lines-Oil & Gas Wells," minus "RR-Bus-Air Terminal Bldgs." 1956-63 (48 states): *Construction Contracts, United States Summary*, "Total Building." Current data for value series are also available in *Survey of Current Business* (sum of "Residential" and "Nonresidential" building).

CONTENT: The 27-, 36-, and 37-state segments include all construction except public works as defined in Series A26, and public utilities as defined in Series A28. The 48-state segment includes the same, plus railroad, bus, and air terminal buildings, minus parks and playgrounds, pipe lines, and oil and gas wells.

A7. *Total Residential Buildings, Value, 1915-1963.*<sup>a</sup>

A8. *Total Residential Buildings, Floor Space, 1919-1963.*<sup>a</sup>

SOURCE, Monthly data:

1915-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1. 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary). 1957-63: *Construction Contracts, United States Summary*. Current data for value series are also available in *Survey of Current Business*.

Annual Data: Same as above except 1932-44: *Record of Contracts Awarded, 37 Eastern States*.

CONTENT: One- and Two-Family Dwellings (Series A9), Apartment Houses (Series A10), and Hotels (Series A11), and other shelter, including boarding and rooming houses, tourist cottages and camp buildings.

A9. *One- and Two-Family Dwellings, Value, 1919-1963.*<sup>a</sup>

SOURCE, Monthly data:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1. 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary). 1957-63: *Construction Contracts, United States Summary*.

Annual Data: Same as above, except 1932-44: *Record of Contracts Awarded, 37 Eastern States*.

CONTENT: All houses containing one or two dwelling units built for owner occupancy, sale or rent.

A10. *Apartment Houses, Value, 1919-1963.*

SOURCE:

1919-42: Dodge Corporation files. 1943-56 (37 states): *Construction Contracts Awarded,*

\* See note on p. 232.

<sup>a</sup> See general description of Dodge series for 1957 revision in method of compiling statistics on one- and two-family houses.



37 *Eastern States*, Section I, Table 1, "Apartment Buildings" and "Dormitories." 1956-63 (48 states): *Construction Contracts, United States Summary*, "Apartment Buildings" and "Dormitories."

CONTENT: (1) Apartment buildings (all buildings designed to house families and containing three or more dwelling units); (2) dormitories of schools or institutions, nurses or staff homes, fraternity and sorority houses, etc.; (3) apartment hotels, designed primarily to house families on a relatively permanent basis (included 1919-42 only; thereafter included in "Hotels," Series A11).

**A11. *Hotels, Value, 1919-1962.***

SOURCE:

1919-42: Dodge Corporation files. 1943-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Hotels and Apartment Hotels" through September 1949, thereafter "Hotels." 1956-62 (48 states): *Construction Contracts, United States Summary*. Current data: Data on hotels not available separately. Effective January 1963, motels and hotels are combined into one classification, since the distinction between the two has lost meaning. Combined data in *Construction Contracts, United States Summary*.

CONTENT: (1) All transient hotels, inns, etc.; (2) apartment hotels designed primarily to house families on a relatively permanent basis (included only from 1943 on; prior to that date included in "Apartment Houses," Series A10).

**A12. *Total Nonresidential Buildings, Value, 1919-1963.***

**A13. *Total Nonresidential Buildings, Floor Space, 1919-1963.***

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Total

Non-Residential Bldg.;" and Section II, Table 6, "Parks-Playgrounds, Etc.," and "Pipe Lines—Oil & Gas Wells," minus "RR-Bus-Air Terminal Bldgs." 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary). 1957-63: *Construction Contracts, United States Summary*. Current data for value series are also available in *Survey of Current Business*.

CONTENT: (1) Commercial buildings (Series A16 and A17); (2) industrial buildings (Series A18 and A19); (3) public and institutional buildings (as defined in Series A20 and A21, except that theater buildings are included throughout); and (4) miscellaneous nonresidential buildings (railroad, bus, and air terminal buildings included only for 48-state segment).

**A14. *Total Commercial and Industrial Buildings, Value, 1919-1963.***

**A15. *Total Commercial and Industrial Buildings, Floor Space, 1919-1963.***

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Commercial Buildings" and "Manufacturing Buildings"; and Section II, Table 6, "Theatre Bldgs., Etc." and "Pipe Lines—Oil & Gas Wells." 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary). 1957-63: *Construction Contracts, United States Summary*, "Commercial Bldgs." plus "Manufacturing Bldgs."

CONTENT: (1) Commercial buildings (Series A16 and A17); (2) industrial buildings (Series A18 and A19); and (3) theater buildings: theaters, music conservatories, radio broadcasting studios, etc. (Theater buildings included only in 27-, 36-, and 37-state series; excluded in 1956-63 segment for 48 states.) The floor space series does not cover pipe lines and oil and gas wells.

A16. *Commercial Buildings, Value, 1919-1963.*

A17. *Commercial Buildings, Floor Space, 1919-1963.*

SOURCE, Monthly data:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1. 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary). 1957-63: *Construction Contracts, United States Summary*.

Annual data: Same as above, except 1932-44: *Record of Contracts Awarded, 37 Eastern States*.

CONTENT: Public garages, auto service stations (gasoline, battery, greasing, etc.), aircraft hangars, etc.; banks, building and loan associations, and other financial buildings; office and loft buildings; all retail stores and shops; all restaurant buildings; all commercial warehouses and storage buildings, excluding cold storage, grain elevator and storage silos. Airports were excluded beginning in 1931. (Their total value amounted to less than 2 per cent of total commercial buildings in 1930.)

A18. *Industrial Buildings, Value, 1919-1963.*

A19. *Industrial Buildings, Floor Space, 1919-1963.*

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Manufacturing Buildings," and Section II, Table 6, "Pipe Lines-Oil & Gas Wells." 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary). 1957-63: *Construction Contracts, United States Summary*, "Manufacturing Bldgs."

CONTENT: Manufacturing, assembly and warehouse buildings in processing or mechanical industries; refrigeration, ice and cold storage plants of warehouses; industrial grain elevators and storage silos; dry cleaning plants,

laundries, and light manufacturing buildings. Pipe lines and oil and gas wells are included except for 1956-63, 48-state segment. Industrial power plants are excluded throughout. The floor space series does not cover pipe lines and oil and gas wells.

A20. *Total Public and Institutional Buildings, Value, 1919-1963.*

A21. *Total Public and Institutional Buildings, Floor Space, 1919-1963.*

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Educational & Science Bldgs.," "Hospital and Institutional Bldgs.," "Public Buildings," "Religious Buildings," and "Social & Recreational Bldgs.,"; and Section II, Table 6, "Parks-Playgrounds, Etc.," minus "Theatre Bldgs., Etc." 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary), "Educational," "Hosp.-Institutional," "Public Bldgs.," "Religious," and "Social-Recreational." 1957-63: *Construction Contracts, United States Summary*, "Educational & Science Bldgs.," "Hospital Bldgs." (since 1960 called "Hospital & Institutional Bldgs."), "Public Bldgs.," "Religious Bldgs.," and "Social & Recreational Bldgs."

CONTENT: Public Buildings (Series A22) and Institutional Buildings (Series A24). The floor space series does not include parks and playgrounds.

A22. *Public Buildings, Value, 1919-1963.*

A23. *Public Buildings, Floor Space, 1919-1963.*

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Educational & Science Bldgs.," "Hospital & Institutional Bldgs.," and "Public Buildings"; and

Section II, Table 6, "Gymnasium & Athletic Bldgs." 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary), "Educational," "Hosp.-Institutional," and "Public Bldgs." 1957-63: *Construction Contracts, United States Summary*, "Educational & Science Bldgs.," "Hospital Bldgs.," and "Public Bldgs."

CONTENT: Educational and commercial laboratories, science buildings, observatories, planetariums; private and public libraries, museums, and fine arts buildings; all public and private school and college buildings; hospitals, clinics, and other institutional buildings; public administration buildings, post offices, armories, arsenals, jails, penitentiaries; comfort stations, fire stations, zoo buildings and other miscellaneous public buildings; military and naval buildings. Gymnasium and athletic buildings are included only from 1938 to 1956 and only for the 37-state segment.

**A24. Institutional Buildings, Value, 1919-1963.**

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Religious Buildings" and "Social and Recreational Bldgs."; and Section II, Table 6, "Parks-Playgrounds, Etc.," minus "Theatre Bldgs., Etc." and "Gymnasium & Athletic Bldgs." 1956 (48 states): *Record of Construction Contracts, 48 States* (1956 summary), "Religious" and "Social-Recreational." 1957-63: *Construction Contracts, United States Summary*, "Religious Bldgs." and "Social & Recreational Bldgs."

CONTENT: Churches and other religious buildings; assembly buildings, auditoriums, and community houses; clubs and lodges; gymnasium and athletic buildings (excluded 1938-56 for 37 states); parks, playgrounds, outdoor stadiums and similar projects (1938-56 for 37 states only); miscellaneous social and recreational buildings. Theatre buildings are included in 1956-63 data for 48 states, but excluded in other segments.

**A25. Public Works and Utilities, Value, 1919-1963.**

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Public Works (Public & Private)," "Utilities (Public & Private)"; and Section II, Table 6, "RR-Bus-Air Terminal Bldgs.," minus "Parks-Playgrounds, Etc." and "Pipe Lines-Oil & Gas Wells." 1956-63 (48 states): *Construction Contracts, United States Summary*, "Total Heavy Engineering Construction" (beginning February 1963 designated "Total Non-Building Construction" with no change in content). Current data are also available in *Survey of Current Business* (sum of "Public Works" and "Utilities").

CONTENT: 27-, 36-, and 37-state segments: (1) Public works (Series A26); and (2) public utilities (Series A28). 48-state segment: Same as above, plus parks and playgrounds, pipe lines, and oil and gas wells, and minus railroad, bus, and air passenger terminals.

**A26. Public Works, Value, 1919-1956.**

SOURCE:

1919-41: Dodge Corporation files. 1942-56: *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Public Works (Public & Private)"; and Section II, Table 6, "Water Supply Systems," minus "Parks-Playgrounds, Etc." Current data for some components not available. Series discontinued.

CONTENT: Streets and highways, bridges except those built by railroads or other private corporations, dams and reservoirs, waterfront developments, sewerage systems and treatment plants, water supply systems, canals, drainage ditches, incinerators, parking lots, memorials, and all other miscellaneous public works except parks and playgrounds.

**A27. Streets, Roads, and Bridges, Value, 1919-1963.**

SOURCE:

1919-41: Dodge Corporation files. 1942-56 (37 states): *Construction Contracts Awarded, 37*

*Eastern States*, Section II, Table 6, "Streets & Highways" and "Bridges." 1956-63 (48 states): *Construction Contracts, United States Summary*, "Streets and Highways" and "Bridges."

CONTENT: (1) Streets, highways, alleys, vehicular tunnels; and (2) bridges except those built by railroads or other private corporations.

**A28. *Public Utilities, Value, 1919-1956.***

SOURCE:

1919-41: Dodge Corporation files. 1942-56: *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 1, "Utilities (Public & Private)"; and Section II, Table 6, "RR-Bus-Air Terminal Bldgs.," minus "Pipe Lines—Oil & Gas Wells," and "Water Supply Systems." Current data for some components not available. Series discontinued.

CONTENT: Electric light and power plants, including industrial power plants; substations and lines, radio stations, and conduit systems, etc.; gas plants and mains; railroad construction, including bridges, tunnels, subways, crossing eliminations, etc. (excluding buildings); airports (starting 1931); railroad, bus and air passenger terminal buildings (starting 1938); all other utility construction except pipe lines, oil and gas wells, and water supply systems.

**A29. *Public Works and Utilities Under Private Ownership, Value, 1932-1963.***

**A30. *Public Works and Utilities Under Public Ownership, Value, 1932-1963.***

SOURCE:

1932-41: *Record of Contracts Awarded, 37 Eastern States*, tables on "Utilities—by Ownership" and "Public Works—by Ownership." 1942-56 (37 states): *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 5. 1956-63 (48 states): *Construction Contracts, United States Summary*, table on "Public vs. Private Ownership."

CONTENT: Privately owned (Series A29) and publicly owned (Series A30) projects in the following categories: streets and highways, bridges, dams and reservoirs, waterfront developments, sewerage systems, parks and playgrounds, electric light and power plants, gas plants and mains, pipe lines, oil and gas wells, water supply systems, railroad construction, airports (excluding buildings), miscellaneous public works and utilities.

**A31. *Residential Buildings, Number of Dwelling Units Provided, 1947-1963.*<sup>a</sup>**

SOURCE:

1947-55: *Record of Construction Contracts, 37 States, Revised* (annual summaries), "Dwelling Units—Number—New Building Only"; plus units provided in apartment buildings "by conversion" from *Construction Contracts Awarded, 37 Eastern States*, Section I, Table 3. 1956 (37 states): *Record of Construction Contracts, 37 Eastern States, Revised* (1956 summary), "Dwelling Units—Number." 1956-63 (48 states): *Construction Contracts, United States Summary*.

CONTENT: Dwelling units provided in new or converted apartment buildings (all buildings designed to house families and containing three or more dwelling units), and in new one- or two-family houses. Converted projects are additions or alterations to existing buildings that create additional dwelling units. Dwelling units thus created in apartment buildings are included if the conversion involves expenditures above the \$10,000 minimum valuation. Excluded are dwelling units provided in converted one- or two-family houses, and in "combination projects"—buildings that are primarily stores, office buildings, or other nonresidential structures. Also excluded are trailers, mobile homes, temporary structures, and summer bungalows without cooking facilities.

<sup>a</sup> Data for this series include 1957 revisions on one- and two-family houses, for the period 1947-1956. (See general description of Dodge series.)

*ENGINEERING CONSTRUCTION CONTRACTS,  
ENGINEERING NEWS-RECORD, MONTHLY*

*General Description*

SOURCE: Data are reprinted by permission of *Engineering News-Record*, copyrighted, McGraw-Hill Publishing Company, Inc., New York.

Data on value of contracts awarded for heavy engineering construction projects were compiled by *Engineering News-Record* from 1913 to 1962 from information gathered by its field staff and reported in *Construction Daily*. Monthly statistics, presented here in terms of weekly averages, were derived from monthly summary tables in *Engineering News-Record* for years 1943–1962, and from monthly totals obtained directly from *ENR* files for years prior to 1943. The monthly series on total construction contracts was also carried in the *Survey of Current Business*.

The statistics cover contracts and projects announced by owner-builders for public and private construction projects in the U.S. that are valued over a specific minimum. Alaska and Hawaii are included beginning in 1959. The minimum valuation varies for different types of construction, and has been changed several times over the period covered, to reflect changes in construction costs. From 1959 to 1962 it ranged from \$53,000 for waterworks, excavation, drainage, and irrigation projects to \$400,000 for nonindustrial buildings (for details of minimum figures, see individual series descriptions). Because of the minimum valuation, a large segment of residential building is excluded. In the residential category, only larger housing projects, hotels, and apartment buildings are included. Data are available in the published source for total construction, for private and public construction by type of project, and for federal construction separately. A regional breakdown for each type of construction is also given. Series are presented here on total construction

and four selected categories (for types of construction included in each, see individual series descriptions).

The monthly figures from *ENR* cover four- or five-week periods. Weekly averages were computed by NBER by dividing monthly totals by the number of weeks reported in each month. The data were seasonally adjusted by NBER.

The series on contracts awarded were discontinued after 1962. However, the *Engineering News-Record* has developed statistics on proposed new construction and backlog of proposed construction. These data represent anticipated construction at an earlier stage in the planning process than the contract award series. One of these series, "new advance planning" for total heavy construction is available in the *Survey of Current Business*, beginning with the March 1963 issue.

*Individual Series*

**A32. Total Construction, Value, 1913–1962.** Sum of A33, *Total Building*, and A34, *Construction Other Than Building*. (See below.)

**A33. Total Building, Value, 1913–1962.** Includes private buildings: industrial, commercial, and "mass housing"; and public buildings: residential and other, except federal buildings before 1932. Federal buildings were not separable from federal nonbuilding construction for 1913–1931, and were included in Series A34 for that period.

Minimum values of industrial buildings included are shown in Series A35 below. Minimum values for all other buildings are as follows: 1913 through June 1932, \$150,000; July 1932 through 1935, \$105,000; 1936, \$140,000; January 1937 through April 1946, \$150,000; May 1946 through November 1947, \$205,000; December 1947 through November 1950, \$250,000; December 1950 through 1954, \$300,-

000; 1955 through 1958, \$344,000; 1959 through 1962, \$400,000.

**A34. Construction Other Than Building, Value, 1913-1962.**

Includes (1) public works: waterworks, sewerage, bridges, earthwork, waterways, streets and roads, and "unclassified"; and (2) private construction: bridges and "unclassified." For 1913-1931, federal buildings, which were not separable from other federal construction, are also included.

Projects of the following minimum costs are included. Waterworks, excavation, drainage, and irrigation: 1913 through June 1932, \$15,000; July 1932 through 1935, \$10,500; 1936, \$14,000; January 1937 through April 1946, \$15,000; May 1946 through November 1947, \$22,500; December 1947 through November 1950, \$28,000; December 1950 through 1954, \$34,000; 1955 through 1958, \$44,000; 1959 through 1962, \$53,000. Other public works: 1913 through June 1932, \$25,000; July 1932 through 1935, \$17,750; 1936, \$23,000;

1937 through April 1946, \$25,000; May 1946 through November 1947, \$40,000; December 1947 through November 1950, \$50,000; December 1950 through 1954, \$60,000; 1955 through 1958, \$73,000; 1959 through 1962, \$88,000.

**A35. Industrial Buildings, Value, 1913-1962.**

Includes private industrial buildings above the following minimum costs: 1913 through June 1932, \$40,000; July 1932 through 1935, \$28,500; 1936, \$37,000; 1937 through April 1946, \$40,000; May 1946 through November 1947, \$55,000; December 1947 through November 1950, \$68,000; December 1950 through 1954, \$82,000; 1955 through 1958, \$93,000; 1959 through 1962, \$110,000.

**A36. Federal Construction, Value, 1913-1962.**

Includes contracts of the federal government for construction of building or nonbuilding projects which are above the minimum cost for the particular type of construction involved. (See Series A33 and A34 for details of minimum costs.)

*PORTLAND CEMENT ASSOCIATION, ANNUAL*

**A37. Concrete Pavement Contract Awards for Roads, Streets, and Alleys, Yardage, 1919-1963.**

**SOURCE:**

1919-1934: *Survey of Current Business, 1936 Supplement*. 1935-1938: *Business Statistics, 1959 Supplement to Survey of Current Business*. 1939-1962: *Business Statistics, 1963 Supplement to Survey of Current Business*. 1963 and current data: *Survey of Current Business*.

Data are compiled by the Portland Cement Association in Chicago. They represent the yardage of concrete pavement in contract awards for roads, streets, and alleys in the United States (including Alaska beginning January 1959, and Hawaii beginning November 1960).

The annual figures include all areas reported and all adjustments and corrections. For

1935-1963 they were computed from the monthly averages, shown separately for roads and for streets and alleys, in *Business Statistics*. For years prior to 1935, they are the annual totals reported by the Association. (See descriptive note, p. 156, *Survey of Current Business, 1936 Supplement*.)

Monthly data covering 4- or 5-week periods are also available from the same source. Irregular reporting for some areas before 1959, and adjustments and corrections which are not allocated monthly, account for the discrepancies between the monthly and annual series.

Concrete pavement data are shown separately in the source for (1) airports; (2) roads, and (3) streets and alleys.

Prior to 1933, airports were included with streets and alleys, but the volume for airports was negligible.

## B. Building Permits and Housing Starts

### LONG'S INDEXES OF BUILDING PERMIT ACTIVITY, ANNUAL AND MONTHLY

#### General Description

SOURCE: Clarence D. Long, Jr., *Building Cycles and the Theory of Investment*, Princeton University Press, 1940.

Information on number and value of buildings covered by building permits issued or building plans filed was compiled by Long for individual cities from published reports of city building departments or other municipal agencies, and from data collected (beginning in 1920) by the United States Bureau of Labor Statistics. Supplementary sources of data were board of trade and chamber of commerce year books; and periodicals, including *Bradstreet's*, *American Contractor*, *Construction News*, *Chicago Economist*, *Real Estate Record and Builders' Guide* and *American Land and Title Register*.

From these detailed data, several composite indexes of building activity were constructed: (1) a monthly index of the value of all building, (2) a set of annual indexes of the number of new buildings covered by permits, by type of building, and (3) a set of annual indexes of the value of total building, by type of building. For specific information on coverage and method of computation, see individual series descriptions below.

In general, the indexes are based on an increasing number of cities, beginning in each case with one city. The index for each month or year was calculated by dividing the volume of building in all cities covered for that period by the average monthly (or annual) volume for the same cities during the base period (1930 for the monthly index and 1920-1930 for the annual indexes).

The value indexes are based on value of building as represented by builders' estimates of cost at the time of application for permits. No attempt is made to adjust the data for changes in construction costs. The indexes of number represent number of buildings covered by permits or plans filed. This is not precisely the same as number of permits, since in several large cities, particularly in the case of residential building, a single permit or plan filed may represent many buildings.

Excluded are some state and local public building, most federal building, and all rural building. The data are restricted to larger cities of the U.S. They are dominated by the east, particularly by Manhattan in the early years.

In addition to the series selected for inclusion here, indexes are available in the source on value of detached dwellings, multifamily dwellings, private nonresidential building, and alterations, for fourteen cities, 1868-1935; value of alterations and total building for twenty-seven cities, 1868-1935; and number of families accommodated in sixteen localities, 1871-1935. See also Long's Index of Value, Total New Building, Adjusted by Colean and Newcomb (Series B9).

For further discussion and evaluation of the indexes, see Long, *Building Cycles*; U.S. Bureau of the Census, *Historical Statistics of the United States, 1789-1945*, pp. 166 and 325; Miles L. Colean and Robinson Newcomb, *Stabilizing Construction: The Record and Potential*, New York, 1952, Appendix N; and Moses Abramovitz, *Evidences of Long Swings in Aggregate Construction Since the Civil War*, New York, NBER, 1964, Appendix A, Part III.

*Individual Series*

**B1.** *Index of Value, Total Building, Monthly, 5 to 35 Cities, 1882-1917 (1930 = 100); Annual, 1 to 37 Cities, 1868-1939 (1930 = 100).*

SOURCE, Monthly data: Long, *Building Cycles*, pp. 214-219; Annual data: U.S. Bureau of the Census, *Historical Statistics of the United States, 1789-1945*, Series H77.

The published monthly series covers the period 1868 through April 1940. The index was smoothed, and random and seasonal fluctuations eliminated, by means of the Macaulay 43-term graduation. (See source, pp. 101 and 223.) The original monthly indexes for the segment 1882 through 1917 are presented here with seasonal adjustment by NBER. For 1868-1874, coverage consisted of Manhattan only. The number of cities included reached five in 1882, thirty-five in 1906, and thirty-seven in 1930. The specific cities covered are listed in the source. The monthly index covers all types of buildings for which permits were issued or plans filed and includes alterations and repairs. The base is the monthly average in 1930 of the aggregate value of building in the cities included in the index for the particular month being measured.

For a monthly series on value of building plans in Manhattan, beginning 1868, see Series B18. For monthly data on value of building permits for 120 cities, beginning 1911, compiled by *Bradstreet*, see Series B19.

The annual figures for this series were calculated in *Historical Statistics* by averaging Long's monthly indexes.

**B2.** *Index of Value, Total New Building, 1 to 27 Cities, Annual, 1868-1935 (1920-30 = 100).*

SOURCE: Long, *Building Cycles*, Appendix B, Section 2.

This series and Series B3 and B4 are based on the same list of cities. The coverage con-

sisted of Manhattan only through 1874, and was increased gradually thereafter until the full complement of twenty-seven cities was included in 1911. Value of alterations in these cities is shown in the source as a separate series. The base is the annual average in 1920-1930 of the aggregate value of building, in the respective categories, in the cities included in the index for the particular year being measured. See also Long's Index of Value, Total New Building, Adjusted by Colean and Newcomb (Series B9).

**B3.** *Index of Value, Total Residential Building, 1 to 27 Cities, Annual, 1868-1936 (1920-30 = 100).*

SOURCE: See source note to Series B2.

**B4.** *Index of Value, Total Nonresidential Building, 1 to 27 Cities, Annual, 1868-1936 (1920-30 = 100).*

SOURCE: See source note to Series B2.

**B5.** *Index of Number, Total New Buildings, 1 to 29 Cities, Annual, 1856-1935 (1920-30 = 100).*

SOURCE: Long, *Building Cycles*, Appendix B, Section 3.

This series and Series B6 and B7 are based on the same list of cities. The coverage was limited to Philadelphia through 1862. In 1863 Manhattan and the Bronx were added. The number of cities included was increased gradually until the full complement of twenty-nine cities was reached in 1912. The base is the annual average in 1920-1930 of the total number of buildings, in the respective categories, in the cities included in the index for the particular year being measured.

**B6.** *Index of Number, Total Residential Buildings, 1 to 29 Cities, Annual, 1856-1936 (1920-30 = 100).*

SOURCE: See source note to Series B5.



**B7.** *Index of Number, Total Nonresidential Buildings, 1 to 29 Cities, Annual, 1856-1936 (1920-30 = 100).*

SOURCE: See source note to Series B5.

**B8.** *Index of Value, Public Building, 1 to 14 Cities, Annual, 1868-1935 (1920-30 = 100).*

SOURCE: Long, *Building Cycles*, Appendix B, Section 1.

This series is based on a list of cities for which buildings could be classified as detached dwellings, multifamily dwellings, public building, or private nonresidential. Value of alterations for all classes combined is shown in the source as a separate series. Coverage was limited to Manhattan through 1874, and was increased gradually until it reached fourteen cities in 1911. The base is the annual average in 1920-30 of the aggregate value of public building in the cities included in the index for the particular year being measured.

**B9.** *Index of Value, Total New Building, Adjusted by Colean and Newcomb, Annual, 1868-1935 (1920-1929 = 100).*

SOURCE: Miles L. Colean and Robinson Newcomb, *Stabilizing Construction: The Record and Potential*, New York, 1952, Appendix N, Table 2.

This series represents an adjustment of Long's index of permit values for new building in one to twenty-seven cities (see Series B2). Two modifications were made. First, the residential building component was given a weight of one-third, rather than the implicit weight of one-half in Long's series. Second, the base was changed from 1920-1930 to 1920-1929.

The result of this adjustment was one step in the development by Colean and Newcomb of an "Index of Dollar Volume of New Construction, 1831-1951," presented in the source, Appendix N, Table 3.

To calculate a constant price series, Abramovitz divided this index by Riggleman's index of building costs. The resulting series for 1853-1933, on a 1913 base, is shown in Moses Abramovitz, *Evidences of Long Swings in Aggregate Construction Since the Civil War*, New York, NBER, 1964.

#### CONSTRUCTION AUTHORIZED BY BUILDING PERMITS, MONTHLY SERIES OF THE BUREAU OF LABOR STATISTICS AND THE BUREAU OF THE CENSUS

##### *General Description*

SOURCE: Estimates of monthly building permit activity, including data on the value of total building and new nonresidential building and on the number and valuation of new private housing units authorized, have been published by the Bureau of Labor Statistics and the Bureau of the Census. The BLS data, from January 1942 to June 1954, covered all urban areas, with estimates for nonreporting or non-permit-issuing areas. The series on number of new dwelling units authorized in urban areas can be extended back from 1942 to 1939 by the BLS series on "new family

dwelling units started."<sup>1</sup> For January 1954 to April 1960, the BLS data covered 6,600 permit-issuing places, both urban and rural non-farm. In 1960 the BLS estimates were replaced by Census Bureau series covering 10,000 permit-issuing places. The series on number and valuation of new private housing units were carried back to January 1959 and continued through 1963, and those on total building and

<sup>1</sup>Data on dwelling units started were based on building permits issued. Prior to 1945 no adjustment was made for lapsed permits or time lag between permit issuance and start of construction, since it was believed these influences were negligible at that time. (See *Construction in the War Years, 1942-45*, BLS Bulletin 915, 1948, p. 28.)

new nonresidential building were carried back to June 1959. Beginning in January 1963, the coverage of the Census Bureau series was again expanded from 10,000 to approximately 12,000 permit-issuing places.

The series presented here are currently available in *Construction Review*, a monthly publication of the Business and Defense Services Administration. In addition, the series on new private residential construction authorized are available in *Construction Reports, Building Permits*, C42 reports (monthly) of the Bureau of the Census. *Construction Reports, Housing Starts*, C20 reports of the Census Bureau, include unadjusted and adjusted monthly data on number of new private housing units authorized. (See below for specific sources of individual series presented here.)

These series represent volume of construction authorized, rather than actual construction activity. (For a description of the use of residential building permit data in developing statistics on housing starts and on value of new construction put in place, see Series B14 and C27.)

The total building series for the urban and 6,600-place segments is composed of (1) new nonresidential buildings, including commercial and industrial buildings; educational, institutional and religious buildings; public buildings; public utility buildings; private residential garages; and an "all other" category; (2) private new residential housekeeping units, excluding conversions and other items under (4) and (5); (3) publicly financed residential housekeeping units; (4) nonhousekeeping residential buildings, such as transient hotels, motels, nursing homes, and dormitories; and (5) additions, alterations, and repairs to both residential and nonresidential buildings. Excluded are demolition or moving of buildings; nonbuilding construction, e.g., streets, pipe lines; costs of land and land development; and architectural and engineering fees. Although building permits generally apply only to private building, the series on

total and nonresidential buildings authorized include estimates of public construction in these segments. Data were collected from building permit officials through a BLS questionnaire. Officials were asked to report on structures covered by building permits, and on state and local government building construction in their localities for which permits were not required. Information on construction contracts awarded for federal projects was obtained from federal agencies. The 10,000-place, and current 12,000-place, segments for the series on total and new nonresidential building authorized by building permits cover private construction only.

The current series, beginning 1963, represent building authorized in all of the approximately 12,000 permit-issuing places, so identified in 1962, in the U.S. (including Alaska and Hawaii). The monthly figures are compiled by direct tabulation of reports from approximately 3,500 of the more active permit-issuing places, to which are added estimates for the remaining 8,500 places, based on reports from a representative sample of 500. It is estimated that for private residential construction, the permit-issuing universe of 12,000 areas accounted for about 83 per cent of all such construction in the U.S. in 1963.<sup>2</sup> The 1959 to 1963 segment for 10,000 places was compiled in a similar manner, based on the permit-issuing places identified in 1959, with direct tabulation of reports from 3,014 places, and estimates for the remaining places based on a sample of 500. Annual totals for 10,000 places in 1960-63, and for 12,000 places in 1963, were based on a complete enumeration of all permit-issuing places identified. The BLS series for January 1954 to April 1960 was based on a monthly survey of all of the 6,600 places identified as having permit systems in 1954. The earlier BLS series on number of residential units, January 1939 to June 1954, and value of residential units, total and nonresidential building, January 1942, to June 1954,

<sup>2</sup> *Construction Reports, Building Permits*, Bureau of the Census, No. C42-59, December 1964, p. 3.

covered all places defined as urban in the 1940 Census, and included estimates for some of the smaller urban places which did not have permit systems. The 1954-60 segment excludes estimates for the non-permit-issuing places; however, coverage was extended due to the inclusion of (1) areas which increased in size after the 1940 Census to become classified as urban, (2) areas incorporated after the 1940 Census, and (3) unincorporated permit-issuing places, such as towns. (For a more comprehensive comparison of coverage between the 1942-54 urban building series and the 1954-60 series for the permit-issuing universe, and comments on linking the segments, see *Trends in Building Permit Activity*, BLS Bulletin 1243, 1959, pp. 4, 5, and 12.)

The method of reporting valuation on building permits leads to serious limitations in the nationwide figures on dollar volume of building permits. The permit value figures do not represent actual construction costs. They are reported differently in different permit-issuing places. In some cases they are estimated at a flat value per square foot, the value frequently having been fixed several years before; in other places the official may accept the figure submitted by the permit applicant. The total value data are therefore less meaningful than the corresponding data on number of units, and should be used only with these limitations in mind.

Data are not adjusted for lapses of permits or time elapsed between issuance of permits and actual start of construction.

More detailed descriptions of the building permit activity series can be found in the Bureau of the Census publications, *Construction Reports, Building Permits, Housing Authorized in Permit-Issuing Places: Summary Statistics 1963*, No. C42-53, 1964; *Construction Reports, Building Permits, New Residential Construction Authorized in Permit-Issuing Places*, Nos. C42-1 (September 1960) and C49-1 (September 1960); and in the Bureau of Labor Statistics publication, *Trends in Building Permit Activity*, Bulletin 1243, 1959.

Two monthly bulletins from the Bureau of

the Census make available data on new housing units authorized in specific areas. For geographic regions, states, and selected standard metropolitan statistical areas, data on number and value of units by type of structure are included in the C42 reports. Data on number of new housing units authorized in selected permit-issuing places are shown in the C40 reports.

### *Individual Series*

#### **B10. Total Building Authorized by Building Permits, Value, 1942-1963.**

SOURCE:

**January 1942-June 1954** (urban building): U.S. Bureau of Labor Statistics, special tabulation, "Urban Building Authorized, by Principal Class of Construction and Type of Building." **January 1954-April 1960** (6,600 permit-issuing places): 1954-1956, *Trends in Building Permit Activity*, BLS Bulletin 1243, 1959. 1957-April 1960, *Construction Review*, issues of April 1958 to August 1960. **June 1959-December 1963** (10,000 and 12,000 permit-issuing places): *Construction Review*, issues of September 1960 to July 1965.

This series and Series B11 were seasonally adjusted by NBER.

#### **B11. New Nonresidential Building Authorized by Building Permits, Value, 1942-1963.**

SOURCE: Same as Series B10.

#### **B12. Number of New Private Housing Units Authorized by Building Permits, 1939-1963.**

SOURCE:

**January 1939-June 1954** (urban places): 1939-1941, *Construction in the War Years, 1942-45*, BLS Bulletin 915, 1948, Table 15. 1942-1954, U.S. Bureau of Labor Statistics, special tabulation, "Urban Building Authorized, by Principal Class of Construction and Type of Building." **January 1954-April 1960** (6,600 permit-issuing places): 1954-1956, *Trends in Building Permit Activity*, BLS

Bulletin 1243, 1959, Tables B-5 and B-6. 1957-1960, *Construction Review*, issues of April 1958 to August 1960. **January 1959-September 1964** (10,000 and 12,000 permit-issuing places): *Construction Reports, Housing Starts*, No. C20-50, August 1963, Table 6; No. C20-63, September 1964, Table 6.

Seasonal adjustment for the urban and 6,600 permit places segments was by the Bureau of the Census for NBER. For the 10,000 and 12,000 places segments, the adjustment was by the source.

**B13. Value of New Private Housing Units Authorized by Building Permits, 1942-1963.**

SOURCE:

**January 1942-June 1954** (urban places): U.S. Bureau of Labor Statistics, special tabulation,

"Urban Building Authorized, by Principal Class of Construction and Type of Building." **January 1954-April 1960** (6,600 permit-issuing places): 1954-1956 (annual data), *Trends in Building Permit Activity*, BLS Bulletin 1243, 1959, Table B-7. 1954-1956 (monthly data), *Construction Review*, issues of April 1955 to April 1957. 1957-1960, *Construction Review*, issues of April 1958 to August 1960. **January 1959-December 1963** (10,000 and 12,000 permit-issuing places): 1959 (annual data), *Construction Reports, Building Permits*, No. C42-43, October 1963. 1959 (monthly data) *ibid.*, No. C49-1, September 1960. 1960-1963 (annual data), *ibid.*, No. C42-53. 1960-1963 (monthly data), *ibid.*, Nos. C42-9 to C42-60.

Seasonal adjustment by Bureau of the Census for NBER.

## HOUSING STARTS, BLANK-BLS-CENSUS, ANNUAL AND MONTHLY

### *General Description*

SOURCE: The four monthly series on private nonfarm housing starts presented here represent one major component of the total housing starts series currently compiled by the Bureau of the Census, and until 1959 prepared by the Bureau of Labor Statistics. The aggregate series includes public as well as private housing, and beginning 1959, farm as well as nonfarm construction. The series are available currently in *Construction Reports, Housing Starts*, C20 reports, of the Bureau of the Census. A breakdown of the aggregate into metropolitan and nonmetropolitan location is available in this source.

"A housing start is the start of construction on a new housing unit, when located within a new building which is intended primarily as a housekeeping residential building designed for non-transient occupancy. Start of construction for private housing units is defined as the beginning of excavation for the foundation

of the building. All housing units in a multi-family building are counted as being started when excavation for the building is started. A housing unit is defined as a single room or group of rooms intended for occupancy as separate living quarters by a family, by a group of unrelated persons living together, or by a person living alone." <sup>1</sup> The series thus exclude group quarters (such as dormitories and rooming houses), transient accommodations, family units in primarily nonresidential buildings, units in structures which are moved, units provided by conversion of residential or nonresidential space, and mobile homes (trailers).

Private housing units include those financed by a government insured or guaranteed mortgage. One-family structures include detached, semidetached, or row houses, which have separate entrances, heating, and utility connections, and which can be sold independently. Two-family structures have one unit over the

<sup>1</sup> *Construction Reports, Housing Starts*, No. C20-60, Bureau of the Census, June 1964, p. 5.

other, or two on the same floor, with a common entrance or common heating facilities. Three or more family structures contain three or more units having a common basement, heating plant, stairs, or entrance.

The current monthly series on private non-farm housing starts was initiated by the Bureau of the Census in May 1960, and at that time was carried back on a modified basis to January 1959. This series replaced the Bureau of Labor Statistics series, which covered the period January 1939 through April 1960. The data are derived by adding separate estimates for housing starts in localities requiring and not requiring building permits. Starts in permit areas are based on building permit data (see Series B12). Estimates of the number of housing units authorized in all permit-issuing places are converted to starts estimates by adjusting them for lapses of permits and time lag between permit issuance and start of construction. Information from a continuing sample field survey is the basis for these adjustments. An additional adjustment is then made to account for housing construction started in advance of (or without) the required permit authorization. Estimates of housing starts in nonpermit areas are developed from a continuing monthly survey, conducted in a sample of fifty-six large areas. Data are gathered from informed sources including public officials, builders, suppliers, lending institutions, and public utility companies. Reports from these sources are verified by field visits. An adjustment for underreporting by these sources is then made on the basis of an intensive canvass by visual inspection of a subsample of land area. A detailed description of these procedures is included in *Construction Reports, Housing Starts*, Bulletin C20-11 (Supplement), Bureau of the Census, May 1960.

The new series on housing starts, described above, represents a substantial improvement over the old series in coverage and in measurement of month-to-month changes, and the data are therefore not comparable to the old series.

In May 1964, the Bureau of the Census released revised *annual* estimates for 1945-58, which are comparable to the current monthly series. These revisions are based on an analysis of the 1950 and 1960 Censuses of Housing, the 1956 National Housing Inventory, and the 1959 Survey of Components of Change and Residential Financing (all compiled and published by the Bureau of the Census). A detailed description of these revisions is included in *Construction Reports, Housing Starts*, Bulletin C20-60, Bureau of the Census, June 1964.

The revisions for the period 1945-58 were not developed on a monthly basis by the Bureau of the Census. However, the Business and Defense Services Administration has prepared monthly housing starts figures for this period, which conform to the level of the revised annual series, and which follow essentially the pattern of month-to-month changes of the former BLS series. These monthly estimates are shown here for total private non-farm housing starts (Series B14). For an explanation of the method used in deriving the monthly estimates, see *Construction Review*, July 1964.

Estimates at the revised level are not available for this period for the component series on one-, two-, and three-or-more-family units; therefore, the figures for these three series do not add to the aggregates for the period 1945-58. According to the Bureau of the Census, "It seems probable that the major part, or perhaps even substantially all, of the revisions is applicable to one-family structures, and that little change is implied in the figures for structures containing three-or-more families."<sup>2</sup>

The former monthly BLS series, shown here for 1939-45 (total), and 1940-59 (by type of dwelling), were based on building permit data, and field surveys in nonpermit areas. They differed from the current Census series in that they were based on a smaller number of permit-issuing places; they did not measure directly, on a continuing basis, con-

<sup>2</sup> *Construction Reports, Housing Starts*, report C20-60, June 1964.

version of permits to starts, and undercoverage in permit-issuing places; and they did not include as intensive a survey of nonpermit places. For detailed descriptions of the estimating procedures used in these series, including major revisions in 1941-42, 1946-47, and in 1954, see *Nonfarm Housing Starts 1889-1958*, BLS Bulletin 1260 (1959), pp. 1-11; *Techniques of Preparing Major BLS Statistical Series*, BLS Bulletins 1168 (1954), Chapter 2, and 993 (1950), Chapter 3.

The earlier annual data, based on the investigations of David M. Blank, and of David L. Wickens and Ray R. Foster, were developed from building permit data for urban areas, expanded to approximate total private nonfarm housing starts by relating them to changes in population.

For 1889-1919, the BLS adopted the series calculated in David M. Blank, *The Volume of Residential Construction, 1889-1950*, New York, NBER, 1954. The basic source for Blank's estimates was an extensive set of building permit data transcribed from local records in 1938-40 as part of a WPA project sponsored by the BLS. After stratifying the reporting cities by size, Blank estimated the number of starts in each city size class and in all cities on the basis of data on population change in permit-issuing and non-permit-issuing places, and then calculated total nonfarm housing starts by using his urban estimates and data on urban and rural nonfarm population changes. Since the series are annual, no adjustment was made for the lag between permit issuance and the start of construction. Only minor allowances for lapses of permits, for multifamily dwellings in New York City, were calculated in this part of Blank's series.

The BLS series for 1920-29 incorporates the estimates of Wickens and Foster, which are based on somewhat similar methods. The 1930-36 data are BLS revisions of the Wickens-Foster estimates. The 1937-39 data are BLS estimates, based on building permit data. For detailed descriptions of the annual data,

see Blank, *The Volume of Residential Construction, 1889-1950*, David L. Wickens and Ray R. Foster, *Nonfarm Residential Construction, 1920-1936*, New York, NBER, 1937; David L. Wickens, *Residential Real Estate*, New York, NBER, 1941; and BLS Bulletins cited above.

There are also available, in Blank's *The Volume of Residential Construction*, estimates of number and permit value of new private urban housekeeping units started, 1890-1929 (Table 10, p. 41).

The Blank data back to 1889 cover substantially more cities than the Long series (see Series B1 through B9). Coverage was gradually increased from 1 city in 1870 to 20 cities in 1889, 104 cities in 1906, 156 in 1911, 255 in 1918, and 314 in 1929.

For a regional breakdown of the estimates of new private nonfarm housing units started in 1920-50, see Leo Grebler, David M. Blank, and Louis Winnick, *Capital Formation in Residential Real Estate*, Princeton University Press for NBER, 1956, Table H-1, p. 396.

#### *Individual Series*

**B14.** *Number of New Private Nonfarm Housing Units Started, Annual, 1889-1963; Monthly, 1939-1963.*

##### SOURCE:

**1889-1919:** David M. Blank, *The Volume of Residential Construction, 1889-1950*, New York, NBER, Technical Paper 9, 1954. **1920-1938:** *Nonfarm Housing Starts 1889-1958*, BLS Bulletin 1260, 1959. **1939-1945 (old series):** *Construction During Five Decades, Historical Statistics, 1907-52*, BLS Bulletin 1146, 1954. **1945-1958 (new series, annual data):** *Construction Reports, Housing Starts*, No. C20-60, June 1964. For monthly data, *Construction Review*, July 1964. **1959-1963:** *Construction Reports, Housing Starts*, Nos. C20-50 to C20-66, August 1963 to December 1964.

Seasonally adjusted by compiling agencies, except figures for 1945 (new series) which

were seasonally adjusted by NBER by applying implicit seasonal factors from the BLS series for 1945.

**B15.** *Number of New Private Nonfarm Housing Units Started, One-Family, Annual, 1900-1963; Monthly, 1940-1963.*

SOURCE:

1900-1919: Blank, *Volume of Residential Construction*. 1920-1939: *Nonfarm Housing Starts 1889-1958*, BLS Bulletin 1260, 1959. 1940-1959 (old series): *Housing Statistics, Historical Supplement, June 1960*, Housing and Home Finance Agency. 1959-1963 (new series): *Construction Reports, Housing Starts*, Nos.

C20-50 to C20-66, August 1963 to December 1964.

The series was seasonally adjusted by NBER.

**B16.** *Number of New Private Nonfarm Housing Units Started, Two-Family, Annual, 1900-1963; Monthly, 1940-1963.*

SOURCE: See source note to Series B15.

**B17.** *Number of New Private Nonfarm Housing Units Started, Three-Family and Over, Annual, 1900-1963; Monthly, 1940-1963.*

SOURCE: See source note to Series B15.

#### OTHER SERIES ON BUILDING PERMITS, ANNUAL AND MONTHLY

**B18.** *Value of Plans for New Buildings, Manhattan, Monthly, 1868-1940.*

SOURCE:

*New York City Record* (official daily journal of New York City Record Office); *Real Estate Record and Builders' Guide* (F. W. Dodge Corp.); and *Annual Reports*, Building Department, Borough of Manhattan, and Department of Housing and Buildings, New York City.

The data represent estimated cost of buildings as indicated on building plans filed. No adjustment is made for plans later withdrawn or disapproved. Only new buildings are included in this series; data on additions and alterations are available from the same sources. Types of building included are residential, commercial, industrial, municipal, educational, religious, and institutional.

The 1868-1897 figures include Manhattan and such portions of the Bronx as were annexed from time to time. For January 1898 through January 1899, Manhattan and the entire Bronx are included since data for the two boroughs were not separable. Beginning February 1899, separate data are available on Manhattan, and the last segment, February 1899 to December 1940, covers Man-

hattan only. An overlap for February 1899 to December 1900 is provided, showing Manhattan and Bronx combined. For certain years, weekly figures were converted to monthly by NBER. In these cases, data for overlapping weeks were prorated according to the number of days in each month.

The building plans data differ from building permit data in that they include value of building plans for which permits are never issued, and therefore cover some proposed construction that does not materialize. The data have been used, however, in compilations of building permit data. (See Series B20, and Series B1, both of which cover additions and alterations, as well as new construction.)

Later annual data can be found in annual reports of the Department of Housing and Buildings (later, Department of Buildings).

The series was seasonally adjusted by NBER.

**B19.** *Value of Building Permits, Monthly, 20 Cities, Babson, 1903-22; 120 Cities, Dun and Bradstreet, 1911-September 1960.*

SOURCE:

1903-1922: Babson's Statistical Organization. 1911-February 1955: Dun and Bradstreet,

*Monthly Review*, September 1935; *Dun's Statistical Review*, January 1939, May 1947, November 1953, and April 1955. **March 1955–September 1960:** Dun and Bradstreet, unpublished data.

Building permit data from two sources have been combined in this series. The first segment, for the period 1903 to 1922, was compiled by the Babson's Statistical Organization (now Babson's Reports), and covers twenty large cities which accounted for approximately one-third of U.S. urban population in 1920. These data were obtained directly from Babson's by the NBER. They were also published (and extended through November 1926) in "Babson's Desk Sheet of Tables," 1911 to 1926.

For the period January 1911 to September 1960, data were compiled for 120 identical cities by Dun and Bradstreet (formerly Bradstreet's). Data for March 1955 and later months were not published. Reports were furnished to the compilers by the building departments of the individual cities. The 120 cities include all the twenty cities in the Babson series, and accounted for slightly over half the U.S. urban population in 1920. The figures represent total costs estimated by builders, under permits issued within the corporate limits of the cities covered. They include new building, additions, alterations, and repairs. After September 1960 only quarterly data are available for this series.

Both segments of this series were seasonally adjusted by NBER. They have been linked at the year 1911 for cyclical analysis purposes (see Section IV).

A monthly index of building activity for the period February 1903 to December 1933, developed by William H. Newman, also employs these two series: Babson's for 1903–1910, and Bradstreet's for 1911–1933. (See William H. Newman, "The Building Industry and Business Cycles," *The Journal of Business of the University of Chicago*, July 1935, pp. 63–71.

*Riggleman and Riggleman-Isard Series on Value of Building Permits*

**B20. Value of Building Permits Per Capita, Current Dollars, Riggleman, Annual, 1830–1933.**

SOURCE: John R. Riggleman, "Variations in Building Activity in United States Cities," unpublished Ph.D. dissertation, The Johns Hopkins University, 1934.

The basic data for this series and for Series B21 and B22 are Riggleman's compilations and estimates of the value of building permits for an increasing number of U.S. cities. In the early years they are largely estimates, based mainly on other information, such as real estate valuations. Value figures are for residential and nonresidential building combined, including additions and alterations. The data cover Manhattan, Boston, and Washington, D.C., from 1830 through 1848. The coverage then increases gradually to a total of ten cities by 1868, and to sixty-five cities for 1900 and subsequent years. (For specific cities covered each year, see Colean and Newcomb, *Stabilizing Construction*, Appendix N, Table 4, fn. c, p. 240.) The series are dominated by Manhattan before 1870, and to some extent for a few years after that.

This series represents the aggregate value of building permits in the cities covered, divided by a combined population estimate for these cities. The population estimates are based on Census figures, with straight-line interpolation between Census years.

**B21. Value of Building Permits Per Capita, Constant Dollars, As Per Cent of Trend, Riggleman, Annual, 1830–1933.**

SOURCE: See source note to Series B20.

This series represents the per capita figures in Series B20, deflated by a cost index (1913 = 100), and expressed as percentages of the ordinates of a long-term trend line. The cost index was constructed by Riggleman using American Appraisal Co. indexes, *Engineering News-Record* indexes, and, for earlier years, a combination of building wage rates and



softwood lumber prices. See Colean and Newcomb, *Stabilizing Construction*, Appendix N, Table 4, fn. b, p. 240.

**B22.** *Index of Value of Building Permits, Riggleman Adjusted by Isard, Annual, 1830-1933.*

SOURCE: Miles L. Colean and Robinson Newcomb, *Stabilizing Construction: The Record and Potential*, New York, 1952, Appendix N, Table 2. See also source note to Series B20.

Riggleman's basic data were adjusted by Walter Isard in "The Economic Dynamics

of Transport Technology" (an unpublished Ph.D. dissertation, Yale University, 1947). The result was an index similar in construction to Long's indexes (see Series B1 and B2). The population adjustment of Riggleman's series is eliminated. The permit values in an individual city are converted to relatives of the average annual value of permits in the same city during the period 1920-29. The combined index for each year is then calculated as the weighted average of the relatives for the cities covered in that year, with weights proportional to permit values in these cities in the base period.

## C. Construction Expenditures and Related Measures

### ESTIMATES OF GROSS AND NET CONSTRUCTION, KUZNETS, ANNUAL

#### General Description

SOURCE: These series are a selection from the large number of annual estimates, partly unpublished, which underly the five-year moving averages published with explanatory notes in Simon Kuznets, *Capital in the American Economy: Its Formation and Financing*, Princeton University Press for NBER, 1961.

Many of the series incorporate BLS-Commerce estimates of construction put in place, which have been superseded, except for comparison with earlier years, by the revised figures given later in this volume and in the official publications.

Because the Kuznets series were presented only in the form of five-year averages, some crude extrapolations and interpolations could be used in constructing the series which are not suitable for use as annual series. These series, or parts of series, are not shown here, but some are noted in the individual series descriptions. The page and table numbers in the source notes to individual series all refer to *Capital in the American Economy* unless otherwise specified.

#### Individual Series

C1. *Gross Total Construction, Including Oil and Gas Well Drilling, Current Dollars, 1889-1955.*

C2. *Gross Total Construction, Including Oil and Gas Well Drilling, 1929 Dollars, 1889-1955.*

SOURCE: Annual estimates underlying five-year moving averages from Kuznets, Table R-30, pp. 576-586.

For years since 1915 these are mainly BLS-Commerce estimates. Therefore, aside from the 1915-28 figures for oil and gas well drilling, Series C1 is superseded, except for comparison with earlier years, by Series C65.

Kuznets' current price figures for 1952-55 are the Commerce Department estimates of "Total New Construction Activity" plus "Petroleum and Natural Gas Well Drilling" from the *Survey of Current Business*, July 1956, Table 31, p. 22. The constant (1929) price estimates for 1953-55 were calculated, for private construction, from the current price estimates and an implicit price index derived from current and constant dollar figures in the *Economic Report of the President*, January 1956, pp. 165 and 168, and for public construction, by extrapolating the 1952 estimate by the constant price series in *Construction Review*, October 1956, p. 18.

For earlier years, Kuznets calculated total gross construction as the sum of (1) cost of oil and gas wells drilled (see Series C84 and C85) and (2) all other construction.

The value of "all other construction" in 1929 dollars was calculated as follows: 1889-1914: Output of construction materials for domestic consumption, multiplied by 1.54056, the ratio of new construction to cost of construction materials consumed in 1919-33. The method of estimation is described in Kuznets, *Capital in the American Economy*, Table R-30, notes to col. 10, and Kuznets, *National Product since 1869*, Table II-5, notes to col. 7. For data on output of construction materials, see William H. Shaw, *Value of Commodity Output Since 1869*, New York, NBER, 1947 (Series D7). 1915-1920: Sum of (1) new private nonfarm residential construction including additions and alterations,

in Grebler, Blank, and Winnick, *Capital Formation in Residential Real Estate*, Appendix B, Table B-6, and (2) other new construction from *Construction and Building Materials, Statistical Supplement*, May 1954, Tables 15 and 16, adjusted to 1929 prices. **1921-1952:** Given in *Construction and Building Materials, Statistical Supplement*, May 1954, Tables 15 and 16, adjusted to 1929 prices.

The calculations for current prices were as follows: **1889-1918:** Calculated by multiplying the series in 1929 prices by the underlying price index. The latter was computed for 1915 and later years from *Construction and Building Materials, Statistical Supplement*, May 1954, pp. 33 and 82, and was extrapolated from 1915 by the total construction cost index described in Kuznets *National Product since 1869*, Table IV-4, notes to line 1. **1919-1951:** Sum of (a) new private nonfarm residential construction including additions and alterations and excluding non-housekeeping, from Grebler, Blank, and Winnick, *Capital Formation in Residential Real Estate*, Appendix B, Table B-6, and (b) all other new construction, from *Construction and Building Materials, Statistical Supplement*, May 1954, Tables 2 and 3.

**C3.** *Gross Private Nonfarm Residential Construction, Current Dollars, 1889-1955.*

**C4.** *Gross Private Nonfarm Residential Construction, 1929 Dollars, 1889-1955.*

SOURCE: Kuznets, Table R-30, pp. 576-587. See general description.

Gross private nonfarm residential construction is composed of housekeeping residential construction plus additions and alterations.

Current dollar figures were taken from the following sources: **1889-1920:** New construction, from David M. Blank, *The Volume of Residential Construction 1889-1950*, Table 18, plus a rough estimate of additions and alterations from Leo Grebler, David M. Blank, and Louis Winnick, *Capital Forma-*

*tion in Residential Real Estate*, Table D-2, p. 363. The new construction series was built up originally from the BLS-WPA building permit surveys (see Blank, *The Volume of Residential Construction*, p. 33). Blank estimated the permit value of construction started and the total cost of construction started (see notes to Series B14). He then converted construction started to construction put in place, by using an estimate of the average carry-over into the following year of construction started in a given year (*ibid.*, pp. 52-56). **1921-1952:** BLS-Commerce estimates published in *Construction and Building Materials, Statistical Supplement*, May 1952, p. 6, and *Survey of Current Business*, July 1956, Table 31. They have now been superseded by more recent Commerce Department estimates (Series C29).

For an allocation of nonfarm residential construction expenditures, 1837 to 1914, by type of structure, see Raymond W. Goldsmith, *A Study of Saving in the United States*, Princeton, 1955, Vol. I, pp. 616-619.

The constant (1929) dollar figures were calculated as follows: **1889-1955:** The series in current prices was deflated by residential construction cost indexes. For 1889-1952, the index in Grebler, Blank, and Winnick, *Capital Formation*, Table B-10, Column 1, was used. This is the Boeckh residential construction cost index extrapolated back from 1910 by building-trade wage rates and building material prices. The index for 1953-55 was the index implicit in the series for all private residential nonfarm building (including non-housekeeping) in 1947-49 prices, *Construction Review*, September 1956.

**C5.** *Gross Private Construction, Excluding Nonfarm Residential, Current Dollars, 1889-1955.*

**C6.** *Gross Private Construction, Excluding Nonfarm Residential, 1929 Dollars, 1889-1955.*

SOURCE: Kuznets, Table R-30, pp. 576-587. See general description.

These series are calculated as a residual by subtracting the following series from "Total Construction" (Series C1 and C2): (1) "Gross Private Residential" (Series C3 and C4); (2) "Gross Public Construction Excluding Military" (Series C7 and C8); (3) "Gross Military Construction." (An earlier version of BLS-Commerce Series C55 and C56. See notes to "Net Military Construction," Series C17 and C18.)

**C7. Gross Public Construction, Excluding Military, Current Dollars, 1889-1955.**

**C8. Gross Public Construction, Excluding Military, 1929 Dollars, 1889-1955.**

SOURCE: Kuznets, Table R-30, pp. 576-587. See general description.

Current dollar figures were taken from the following sources: **1889-1914:** Sum of separate estimates for federal, state, and local governments. The federal government series are derived mainly from those published in *Historical Statistics of the United States, 1789-1945*, U.S. Bureau of the Census, 1949 (see Series C71; C72; C73; C74; and C75 below), and the state and local government series are derived mainly from the Census Bureau's publications on government finances (see Series C19 below). A detailed description is given in Kuznets, notes to Table R-30, pp. 580-584. **1915-1955:** BLS-Commerce estimates published in *Construction and Building Materials Statistical Supplement*, May 1954, Table 3 ("total public construction" minus "military facilities"), and *Survey of Current Business*, July 1956, Table 31. They are superseded by revised estimates (see Series C49 and C51).

The constant (1929) dollar figures were taken from the following sources: **1889-1914:** The components of the current price series were converted to 1929 prices by separate price indexes, each derived by extrapolating that implicit in the estimate for 1915 by the cost of construction index described in *Na-*

*tional Product Since 1869*, Table IV-4, notes to line 1. (See Kuznets, Table R-30 notes for further detail.) **1915-1955:** BLS-Commerce estimates, from *Construction and Building Materials, Statistical Supplement*, May 1954, Table 16, adjusted to a 1929 price base, and extrapolated from 1952 to 1955 by the series in 1947-49 prices given in *Construction Review*, September 1956, Table 4, p. 11.

These BLS-Commerce figures have been superseded by later estimates (see Series C50 and C56).

**C9. Net Total Construction, Including Oil and Gas Well Drilling, Current Dollars, 1889-1955.**

**C10. Net Total Construction, Including Oil and Gas Well Drilling, 1929 Dollars, 1889-1955.**

SOURCE: Kuznets, Table R-31, pp. 592-595. See general description.

Net total construction was derived by adding the four components: nonfarm residential (Series C11 and C12), private nonresidential (Series C13 and C14), public, excluding military (Series C15 and C16), and military (Series C17 and C18).

Kuznets' measures of capital consumption are intended to include not only physical deterioration but also depletion, obsolescence, accidental losses or damage to capital, and demolition. They are calculated on a replacement-cost basis.

For an adjusted version of the Kuznets series, extended back to 1837, see Goldsmith, *A Study of Saving*, Vol. I, Tables R-22, p. 611; R-26, p. 617; and R-27, p. 619. Appendix B of Raymond W. Goldsmith, *The National Wealth of the United States in the Postwar Period* (Princeton for NBER, 1962) gives, for 1945-58, estimates of gross investment, depreciation, and net investment in many types of construction.

**C11. Net Nonfarm Residential Construction, Current Dollars, 1889-1955.**

C12. *Net Nonfarm Residential Construction, 1929 Dollars, 1889-1955.*

SOURCE: Kuznets, Table R-32, pp. 592-595. See general description.

Net nonfarm residential construction is obtained by subtracting capital consumption, including depreciation and demolition, from gross construction (Series C3 and C4). The depreciation and demolition figures for 1889-1953, published in Grebler, Blank, and Winnick, *Capital Formation*, Table E-2, pp. 384-385, and explained in Appendix E of that book, were extended to 1955 by Kuznets following the same methods.

For rough estimates of the corporate share of gross and net new nonfarm 1-4 family and multifamily construction, see Goldsmith, *A Study of Saving*, Vol. I, Tables R-4, p. 587; R-5, p. 588; R-7, p. 591, and R-8, p. 592.

C13. *Net Private Construction, Excluding Nonfarm Residential, Current Dollars, 1889-1955.*

C14. *Net Private Construction, Excluding Nonfarm Residential, 1929 Dollars, 1889-1955.*

SOURCE: Kuznets, Table R-32, pp. 592-595. See general description.

Net private construction excluding nonfarm residential was derived by subtracting depreciation and depletion from the gross series (Series C5 and C6).

The constant (1929) dollar figures were calculated as follows: **1889-1918:** Annual depreciation and depletion figures were derived by interpolation and extrapolation from decade estimates calculated from wealth data in Kuznets, *National Product Since 1869*. For details see notes to Kuznets, *Capital in the American Economy*, Table R-17, p. 531. **1919-1955:** (1) The Commerce Department series for depreciation on an original-cost basis, published in *National Income, 1954 Edition*, Table 4, and *Survey of Current Business*, July 1956, Table 4, were extended back to 1919 by Fabricant's

series (Solomon Fabricant, *Capital Consumption and Adjustment*, New York, NBER, 1938) and deflated by Fabricant's price index, extended to 1955 by Kuznets. For further description see Kuznets, *Capital in the American Economy*, Table R-8, p. 501. (2) Depletion was estimated as 8 per cent of depreciation (see *ibid.*).

Current dollar figures were calculated as follows: The depreciation series in 1929 prices was multiplied by the appropriate price index described in Kuznets, *Capital in the American Economy*, Table R-31, col. 4.

C15. *Net Public Construction, Excluding Military, Current Dollars, 1889-1955.*

C16. *Net Public Construction, Excluding Military, 1929 Dollars, 1889-1955.*

SOURCE: Kuznets, Table R-32, pp. 592-595. See general description.

"Net Public Construction, Excluding Military," was derived by subtracting depreciation from "Gross Public Construction, Excluding Military" (Series C7 and C8). The depreciation figures were derived as the sum of separate estimates for sewer and highway construction, on the one hand, and all other government nonmilitary construction on the other. The life for sewers and highways was assumed to be twenty-five years, and all other government construction, fifty years.

Depreciation in current prices was derived by multiplying the depreciation series in 1929 prices by the price index calculated for the given type of construction, described in the notes to Kuznets, Table R-30.

C17. *Net Military Construction, Current Dollars, 1914-1955.*

C18. *Net Military Construction, 1929 Dollars, 1914-1955.*

SOURCE: Kuznets, Table R-32, pp. 592-595. See general description.

Net military construction is derived by subtracting depreciation from gross military construction. Kuznets' gross military construction series is taken from BLS-Commerce figures (Series C55). However, the Kuznets series adds an extension back to 1914 and does not include the latest revisions in the government series. Kuznets derived his 1914 figure by averaging the 1914 and 1915 government fiscal-year figures for military and naval construction (published in *Historical Statistics of the U.S. 1789-1945*, Series H29) to obtain a calendar-year figure. The BLS-Commerce figures Kuznets used were those published in *Construction Volume and Costs 1915-56*, Table 3, p. 7. Depreciation was calculated assuming a twenty-year life.

The current price depreciation series was derived by multiplying the series in 1929 prices by the implicit price index for military construction (gross military construction in current prices divided by gross military construction in 1929 prices). See note to Kuznets, Table R-6, col. 5.

For data through 1958 see Goldsmith, *National Wealth*, Tables B-169, B-170, B-171, and related tables.

**C19. Gross State and Local Government Construction, Current Dollars, 1902-1915.**

SOURCE: Kuznets, Table R-30, pp. 580-584. See general description.

These figures are the sum of estimates for highways (Series C20) and other construction. The latter are mainly extrapolations of the BLS-Commerce estimates for 1915-1918 given in *Construction and Building Materials, Statistical Supplement, May 1954*, by capital outlay figures from Census Bureau reports on government finances, particularly the censuses of *Wealth, Debt, and Taxation* for 1902 and 1913, the *Financial Statistics of States*, and the *Financial Statistics of Cities*.

Very rough further extrapolations back to 1819, partly for the purpose of calculating

depreciation, are described in the notes to Kuznets, Table R-30, but are not shown here.

For rough estimates of state and local government new construction back to 1837, see Goldsmith, *A Study of Saving*, Vol. I, Tables R-26, p. 617, and R-27, p. 619.

**C20. Gross State and Local Government Highway Construction, Current Dollars, 1902-1915.**

SOURCE: Kuznets, Table R-30, pp. 581-583. See general description.

These are the sum of separate estimates for state governments, counties, and local governments, all based mainly on Census Bureau reports on government finances, particularly the censuses of *Wealth, Debt, and Taxation*, for 1902 and 1913, the *Financial Statistics of States*, and the *Financial Statistics of Cities*. A considerable amount of interpolation was required to derive the estimates for states, counties, and small cities.

This series is treated in the source as a continuation of the BLS-Commerce series published in *Construction and Building Materials, Statistical Supplement, May 1954*, even though there were some differences between the two for 1915 and later years.

A series for highway expenditures of 145 cities, based on the same sources, was constructed by Harold Wolkind in *Fluctuations in Capital Outlays of Municipalities*, U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Economic Series No. 10, 1941.

Raymond Goldsmith has also published estimates back to 1897 of the capital outlay (which includes equipment) of state governments for total and highway construction, and of local governments for streets and highways. See Goldsmith, *A Study of Saving*, Vol. I, Tables G-6, p. 1053, and G-15, p. 1067; and *The National Wealth of the United States in the Postwar Period*, Princeton for NBER, 1962, Tables B-136, p. 364, and B-137, p. 365.

*VALUE OF NEW CONSTRUCTION PUT IN PLACE, IN CURRENT AND CONSTANT DOLLARS, BLS-COMMERCE DEPARTMENT, ANNUAL AND MONTHLY*

*General Description*

SOURCE: For 1946 and subsequent years, the monthly and annual estimates were prepared by the Bureau of the Census. The monthly and annual estimates for the years 1939 through 1945, and annual estimates for 1915 through 1938, were prepared and published jointly by the Business and Defense Services Administration of the Department of Commerce and the Bureau of Labor Statistics.<sup>1</sup> The Census estimates for 1946 through 1959 represent revisions of the former BLS-BDSA series. For series in which the revisions result in a break in comparability, an overlap for the year 1946 is shown. The series presented here, unless otherwise noted, are from the following sources:

**1915-1944:** *Construction Volume and Costs, 1915-1956*, Statistical Supplement to Volume 3 of *Construction Review*, Business and Defense Services Administration and Bureau of Labor Statistics, 1958. **1945-1946:** *Value of New Construction Put in Place (New Construction Expenditures), 1945-58*, Revised June 1959, Business and Defense Services

<sup>1</sup> Effective July 1, 1959, responsibility for compilation of the construction activity estimates was transferred to the Bureau of the Census from the Bureau of Labor Statistics and the Business and Defense Services Administration. Prior to that time, the BLS was responsible for the estimates on new private nonfarm housekeeping residential construction and all public construction, while the BDSA was responsible for those on all other types of private construction. The series prepared by these two agencies were an extension of estimates covering the years 1915 to 1937, developed originally in the late 1930's by the Bureau of Foreign and Domestic Commerce.

Since the preparation of this description, the Bureau of the Census has initiated some new procedures for deriving the estimates of new construction. (See *Construction Reports, Construction Activity*, C30-65S, January 1966; and *Construction Statistics, 1915-1964*, Supplement to *Construction Review*, BDSA, January 1966.)

Administration and Bureau of Labor Statistics. **1946-1963:** *Value of New Construction Put in Place, 1946-1963 Revised, Construction Reports, Construction Activity*, C30-61 Supplement, Bureau of the Census, October 1964. After the tables for this volume were completed, new summaries, revisions, and descriptions of these data were published in *Construction Statistics, 1915-1964*, Supplement to *Construction Review*, January 1966, and in *Construction Reports, Series C30-65S, Value of New Construction Put in Place, 1962-65*, January 1966.

Additional series have been derived by NBER by combining certain construction categories, shown separately in the source. These are indicated in the individual series descriptions.

Seasonal adjustment is by the compiling agency, except for the following, which were adjusted by NBER: (1) 1939-46 segment of series on new dwelling units, current dollars, (2) 1939-46 segment of all constant dollar series, and (3) 1939-45 period for residential additions and alterations.

Current data for the series presented here (except those derived by NBER) are available in *Construction Reports, Construction Activity*, Bureau of the Census, C30 reports (monthly); and in *Construction Review*, Business and Defense Services Administration. The current dollar series except "Other Private Nonfarm Nonresidential Building" are also carried in *Survey of Current Business*.

CONTENT: New construction as measured by these series is defined by the Bureau of the Census as the complete, original erection of structures and essential service facilities, as well as major additions and alterations. Maintenance and repairs, while considered part of construction, are not included in these series on *new* construction. The value of such work

is estimated separately. When added to that of new construction, it yields estimates of the value of total construction. (For annual data on maintenance and repairs, see *Construction Statistics, 1915-1964*, and various issues of *Construction Review*.) Structures include buildings; dams and silos; highways; roadways; water and signal towers; electric light and power transmission and distribution lines; petroleum and gas pipe lines and distribution lines; telephone and telegraph lines; radio, television, and radar towers; water supply lines; sewers; and all similar work which is built into or affixed to the land. Service facilities considered part of construction are those types of general purpose equipment which, when installed, become integral parts of the structure, e.g., plumbing, heating, central lighting and air-conditioning equipment, and elevators. Not included are special purpose fixtures, such as steam tables, conveyor lines, home refrigerators, church pews, school lockers, and printing presses. Major additions and alterations include such projects as new wings or stories, conversion of space to other uses, or the initial installation of fixed equipment in existing structures. Construction covers clearing and development of the site, including any necessary demolition performed as part of the construction contract. It also includes force-account work, and work done by owners or their families on homes or farm buildings. It excludes oil and gas well drilling, digging and shoring of mines, and work considered an integral part of farming operations.

The concept of "value of construction put in place" is defined as the value of work installed or erected at the site during a given period. For a particular category of construction, the figures represent the total value of such work for all projects under way during the period, regardless of when work on each project was started. Value put in place is estimated as the sum of (1) the cost of construction materials actually consumed and labor actually performed during the period, and (2) proportionate shares of charges for

construction equipment used, overhead costs of the project owners, contractor's profit on construction operations, costs of architectural and engineering services, and miscellaneous costs chargeable to the project. It excludes speculative profits, sales costs, and cost of land. The estimates thus include only that part of the total construction cost of a project which is proportional to actual construction activity during a given period.<sup>2</sup> In this respect they may be thought of as measures of "expenditures," as differentiated from the value of contracts awarded or the value of housing starts.

Geographic coverage was modified slightly in 1959, with the inclusion of Alaska and Hawaii. The addition of the two new states raised the national totals by approximately one-half of 1 per cent. (The estimates for new private nonfarm housing units are to be interpreted as including Alaska and Hawaii beginning 1946.)

Definitions of the various categories into which new construction has been classified are included in the descriptions of the individual series.

DERIVATION OF ESTIMATES: Estimates of "value put in place" for the various categories of construction are derived from a variety of basic sources, and different estimating procedures are used for different types of construction. Over the period covered by the series, there have been some changes in procedures, but the general approach has remained the same. An attempt has been made here to supplement information on current procedures with references to the most important modifications.

The three general procedures for deriving estimates of "value put in place," in order of their importance as measured by dollar volume, are: (1) use of progress patterns applied

<sup>2</sup> For a broader definition of expenditures, including speculative builders' margins, see Goldsmith, *A Study of Saving*, Vol. I, Table R-30, p. 622, and *The National Wealth of the United States in the Postwar Period*, Princeton for NBER, 1962, Tables B-1, p. 225, and B-3, p. 227.



to starts data, which in turn are derived from contract award or building permit data, supplemented in the case of residential building by sample surveys; (2) imputing monthly values from annual expenditure data obtained from public utility companies, trade associations, or public agencies; and (3) tabulation of data from progress reports of federal agencies, and a few state and local government agencies supervising construction of public works.

Estimating procedures for the different types of construction are discussed in the individual series descriptions.

Estimates of the physical volume, or value in constant dollars, of new construction put in place are made by deflating the current dollar series for each type of construction by a cost index.<sup>3</sup> (See individual series descriptions for specific deflators used.) Constant dollar series which are aggregates are obtained by adding constant dollar figures for the various components. The price indexes used for the deflation of construction expenditures are essentially wage rates and building material prices combined into an index under the assumption that there has been no change in productivity in construction. For a discussion of these indexes see *The Price Statistics of the Federal Government*, NBER, 1961, Appendix B, and "Notes on the Measurement of Price and Quality Changes" by Zvi Griliches, in *Models of Income Determination*, Studies in Income and Wealth, Vol. 28, NBER, 1964, pp. 386-388.

REVISIONS: Preliminary estimates of value put in place are prepared each month for the various categories of construction, and these are later revised as more complete information becomes available from primary sources. For some categories the revisions are only slight, because most of the data involved are available when the preliminary estimate is made.

<sup>3</sup> For a description of the indexes used, see *Construction Reports, Construction Activity*, C30-61 Supplement, Bureau of the Census, October 1964, pp. 81-83.

For other series, however, the preliminary and revised estimates may be significantly different.<sup>4</sup> About the end of May of each year, revisions are made, when indicated, in the figures for the previous two years.

Over the period 1960 to 1963, in addition to such routine revisions, substantial changes were made in the level of estimates for four types of construction: new private housing units, private residential additions and alterations, farm construction, and public utilities. These revisions were carried back to 1959, creating a break in comparability with data for earlier years, both for these four categories and for the aggregate series of which they are components. In 1963, all constant dollar series for 1959 and subsequent years were changed from a 1947-49 to a 1957-59 base.

In 1964 further revisions were introduced which extended all series, both in current and constant dollars, back to 1946 on a basis comparable to the current series. See individual series descriptions for further discussion of the revisions and the extent of comparability with years prior to 1946.

The revised constant dollar series, beginning with data for 1946, are available from the source only in the form of seasonally adjusted data at annual rates, in 1957-59 dollars. The earlier segment for each of these series, covering 1939-46, is available from the source only in the form of unadjusted data at monthly rates, in 1947-49 dollars. We have derived a seasonally adjusted series at annual rates, in 1947-49 dollars, for 1939-46, by applying the implicit seasonal factors from the corresponding current dollar series, and multiplying by 12. Conversion factors, for use in changing the constant dollar values from a 1947-49 to a 1957-59 base, have been developed by the Bureau of the Census. These are available in *Construction Reports, Construction Activity*, C30-61 Supplement, p. 5.

REFERENCES: For more detailed descriptions and evaluations of the Department of

<sup>4</sup> See, for example, descriptions of series on private public utilities, and on public construction.

Commerce series, including the historical development of the present program, see:

*Construction Reports, Construction Activity*, C30-61 Supplement, U.S. Bureau of the Census, October 1964.

*1961 Proceedings of the Business and Economic Statistics Section*, American Statistical Association, papers and discussions included in "Statistical Coverage of the Construction Industry: A Critique," pp. 168-190.

Elmer Clark Bratt, *Appraisal of Statistical Information on Construction in the U.S.* (and *Appendices*), Office of Statistical Standards, U.S. Bureau of the Budget, 1957-1958.

*Construction Volume and Costs, 1915-1956*, Statistical Supplement to Volume 3 of *Construction Review*, Business and Defense Services Administration and Bureau of Labor Statistics, 1958.

Lowell J. Chawner, *Construction Activity in the United States, 1915-37*, Domestic Commerce Series No. 99, Bureau of Foreign and Domestic Commerce, U.S. Department of Commerce, 1938.

#### *Individual Series*

**C21.** *Total New Construction, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C22.** *Total New Construction, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

These include all new construction. They are the sum of private construction (Series C23 and C24) and public construction (Series C49 and C50). For definition and derivation of estimates, see general description.

**C23.** *Private Construction, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C24.** *Private Construction, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

The distinction between private and public construction is based on ownership, rather

than source of funds or financing. These series therefore represent all privately owned construction, including projects of nonprofit organizations subsidized by federal, state or local governments, e.g., hospitals built under the National Hospital Program. The categories of construction included are those covered by the component series for private nonfarm residential buildings (Series C25 and C26); private nonfarm nonresidential buildings (Series C33 and C34); farm construction (Series C41 and C42); public utilities (Series C43 and C44); and an "all other private" category (not presented here as a separate series), which includes water supply dams and reservoirs (not constructed by public utility companies), waterfront improvements, sewer and water facilities, airfield construction other than buildings, parks and playgrounds, and other miscellaneous nonbuilding items.

The procedures for deriving the current and constant dollar estimates for the various categories of private construction are described below under the individual component series. The current dollar estimates for "all other private" are based on F. W. Dodge Company contract award data in thirty-seven eastern states, and building permit data. The estimating procedure is the same as for private nonresidential buildings (see Series C33). The constant dollar figures for "all other private" are derived by using as a deflator the unweighted average of two monthly cost indexes—Associated General Contractors, and *Engineering News-Record*.

**C25.** *Private Nonfarm Residential Buildings, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C26.** *Private Nonfarm Residential Buildings, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

This category of construction is the sum of new housing units (as defined in Series C27 and C28); residential additions and alterations (Series C31 and C32); and a "nonhousekeep-

ing" category. The last is not presented here as a separate series. For definitions and derivation of estimates, see Series C27, C28, C31, and C32.

The nonhousekeeping classification includes fixed structures, such as transient hotels, motels, dormitories, clubhouses, nurses' homes, etc. Data are estimated from F. W. Dodge Company contract award data for thirty-seven eastern states, and from building permit data. The estimating procedure is the same as for private nonresidential buildings (see Series C33).

The constant dollar series for private nonfarm residential buildings was derived by deflating the current dollar figures by the monthly residential construction cost index of E. H. Boeckh and Associates—an unweighted average of indexes for frame and brick residences.

**C27.** *Private Nonfarm New Housing Units, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C28.** *Private Nonfarm New Housing Units, Constant Dollars, Monthly, 1946-1963.*

This category covers new nonfarm houses and apartments, at all levels of value and quality, which are *housekeeping* dwellings. It includes those built for permanent or seasonal occupancy. Excluded are mobile homes, new units created by remodeling or conversion of existing structures, and dwelling units in buildings which are primarily nonresidential.

Estimates of the value put in place are derived from monthly estimates of the value of housing starts. The starts data are converted to value-put-in-place estimates by applying activity or progress patterns, which indicate the percentage of the value of construction projects started which will be completed in successive months. The derivation of the starts data begins with estimates of the number of units started, as described in Series

B14. The value of housing starts is then calculated by applying average construction cost figures, estimated separately for starts in permit-issuing areas and starts in nonpermit areas. For permit-issuing areas, cost estimates are based on permit values, adjusted for understatement and for cost of architectural and engineering work. For nonpermit areas, the cost estimates were based, until 1962, on information from field surveys. Currently they are based on an assumed linear relationship between costs in nonpermit areas and permit valuations in permit-issuing areas.

The data on value put in place, beginning in 1946, reflect major revisions in the housing starts' series introduced in 1960 and 1964 (see Series B14 for description of revisions). The data for 1946-63 therefore represent a continuous series. There is a break in the series in 1946, since revisions were not carried back to prior years. However, the new publication on *Construction Statistics, 1915-1964* treats the series as continuous.

The current dollar series, C27, has been extended back to 1889, and the data for 1915-20 modified by David M. Blank (see Series C58). Official monthly constant dollar data are available for private nonfarm new housing units only for 1946 and subsequent years but could be extended back to 1939 because the deflating index, which is the same as for Series C26, is available monthly. Official annual estimates for 1915-1945 in constant dollars, not available when these tables were prepared, have now been published in *Construction Statistics, 1915-1964*. For a constant dollar series back to 1889 see Series C59.

**C29.** *Private Nonfarm Housekeeping Residential Buildings, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C30.** *Private Nonfarm Housekeeping Residential Buildings, Constant Dollars, Monthly, 1946-1963.*

These series have been compiled by NBER as the sum of private nonfarm new housing

units (Series C27 and C28) and residential additions and alterations (Series C31 and C32). For definitions and derivation of estimates, see descriptions of these component series.

**C31.** *Private Nonfarm Residential Additions and Alterations, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C32.** *Private Nonfarm Residential Additions and Alterations, Constant Dollars, Monthly, 1946-1963.*

Residential additions and alterations consist of such projects as addition of floor area or living space by finishing basements or attics, enclosing porches, or construction of a new wing or story; conversion of space to provide an additional dwelling unit; new retaining walls, walks, driveways and patios; general remodeling or modernization by installing an additional bathroom, enlarging a kitchen, etc.; additional landscaping; initial installation of a furnace, hot-water heater, electrical wiring, plumbing, air conditioning, etc. Excluded are appliances, such as refrigerators, stoves, and window air conditioners; and normal maintenance and repair work.

Separate data on residential additions and alterations are not shown in the source for 1960 and following years. Imputed values for this category are, however, included in the figures for private nonfarm residential buildings. Data for 1960-63 have been derived here by subtracting data for new housing units from private residential buildings.

A quarterly survey of owners and renters of residential properties, conducted by the Bureau of the Census from 1960 through 1963, is the basis for estimating the over-all level of expenditures for this type of construction. (This survey also covers expenditures for residential maintenance and repairs. For a detailed description of the survey, see *Construction Reports, Residential Alterations and Repairs*, No. C50-1, June 1961, and for an analysis of the quality of the survey, see *Response Errors in Collection of Expenditures*

*Data by Household Interviews: An Experimental Study*, Technical Paper No. 11, U.S. Bureau of the Census, 1965.) The average annual outlay derived from the survey for the 1960-62 period is imputed for each of the years 1960-62. For 1963, the imputation is based on the average annual outlay for the years 1960-63. Monthly figures for 1960-63 were derived by distributing the annual totals according to seasonal indexes interpolated from quarterly seasonal movements. "Old series" estimates for 1945 to 1959 had been prepared by the Bureau of Labor Statistics based on a procedure developed in 1957. (For details, see Marvin Wilkerson, "Revised Estimates of Residential Additions and Alterations, 1945-56," *Construction Review*, June 1957.) In 1964, the "old series" estimates for 1951 through 1959 were revised to levels approximately comparable with the current series by linking the percentage difference between the old and new series estimates for 1960 to the previous base year-1950. For 1950 and prior years, data were considered comparable to the current series without revision. Estimates for years previous to 1945 were made in 1950 by the BLS, primarily on the basis of its Family Expenditures Surveys.

The constant dollar series for private nonfarm residential additions and alterations was derived by deflating the current dollar figures by the monthly residential construction cost index of E. H. Boeckh and Associates—an unweighted average of indexes for frame and brick residences. Monthly data in constant dollars are available only from 1946 on, and only in seasonally adjusted form.

**C33.** *Private Nonfarm Nonresidential Buildings, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C34.** *Private Nonfarm Nonresidential Buildings, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

Includes private industrial buildings (Series C35 and C36), commercial buildings (Series

C37 and C38), and other private nonresidential buildings (Series C39 and C40).

Buildings are classified according to their specific function, rather than the function of any broader facility of which they are a part. However, in the case of most complex industrial projects, it is not possible to separate data for the various components. The entire project in these cases is classified by its major function.

The current dollar estimates of value put in place for each type of construction are developed in three steps:

1. Estimation of the value of construction contracts awarded. The basic contract data used cover thirty-seven eastern states and the District of Columbia and are compiled by F. W. Dodge Company (see general description of Dodge series in Section A). The thirty-seven-state Dodge contract data are adjusted to approximate the national total by applying annual ratios of the value of building permits in the area covered to that in the total U.S. These ratios are computed separately for each major type of construction. Further adjustments are made for undercoverage of projects, and for architectural and engineering fees.

2. Use of the adjusted value of contracts awarded in a given month as an estimate of the value of starts in the following month.

3. Application to the starts estimates of a progress pattern, developed for the particular type of building, which indicates the percentage of total value that will be put in place each month, taking into account the average size of project and the season in which work is begun.

The constant dollar figure for each period is the sum of the deflated values for that period in the three component series. Each component has a different deflator, which is described under the individual series.

For estimates of "all other private" construction and institutional construction back to 1837, and an allocation between corporate and unincorporated business since 1897, see Goldsmith, *A Study of Saving*, Vol. I, Tables

R-17, p. 604; R-18, p. 605; R-26, p. 617; R-27, p. 619; and R-28, p. 620.

C35. *Private Industrial Buildings, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

C36. *Private Industrial Buildings, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

Included in this category are production, assembly, and warehouse buildings in all manufacturing industries; refrigeration, ice, and cold storage plants of warehouses; industrial grain elevators and storage silos; dry cleaning plants and laundries. In practice, the data may include auxiliary facilities in manufacturing establishments (e.g., restaurants, parking lots, sewers) although they are excluded in concept.

For derivation of current dollar estimates, see Series C33.

The deflating index used for the constant dollar data is the annual cost index of Turner Construction Company, interpolated monthly by the "Commercial and Factory" cost index of E. H. Boeckh and Associates.

For estimates of unincorporated business expenditures for new industrial structures back to 1897, see Goldsmith, *A Study of Saving*, Vol. I, Table R-13, p. 599.

C37. *Commercial Buildings, Current Dollars, Annual, 1920-1963; Monthly, 1939-1963.*

C38. *Commercial Buildings, Constant Dollars, Annual, 1920-1963; Monthly, 1939-1963.*

This category is composed of two subgroups, for which separate data are available in the source for 1920 and following years. (For the years 1915-19, data on commercial buildings are not separate from "other private nonfarm nonresidential buildings," as defined in Series C39 and C40.) The two subgroups are as follows.

1. Office Buildings and Warehouses, which includes office buildings, except those built by public utility companies for their own use; loft buildings; banks and building and

loan association buildings; warehouses and storage buildings (other than cold storage buildings, grain elevators, storage silos, and warehouses built by industrial or public utility companies for their own use). Because of a change in the F. W. Dodge Corporation's classification, beginning with data for 1956, warehouses for commercial establishments not engaged in selling storage space (e.g., department store warehouses) are included, while prior to that date they were excluded from this category and included in "miscellaneous nonresidential buildings." Estimates for these categories are therefore not strictly comparable between the two periods.

2. Stores, Restaurants, and Garages, which includes all buildings and structures intended for use primarily in the wholesale, retail, and service trades. For example, complete shopping centers, department stores, drug stores, restaurants, public garages, and auto service stations are in this category.

For derivation of current dollar estimates, see Series C33.

The constant dollar series is derived by adding deflated values for each of the two subgroups defined above. Office buildings and warehouses data are deflated by the annual cost index of George A. Fuller Company, interpolated monthly by the "Apartment, Hotel, and Office" cost index of E. H. Boeckh and Associates. Data on stores, restaurants, and garages are deflated by the monthly cost index of the American Appraisal Company.

For estimates back to 1897 of noncorporate expenditures for new commercial structures, see Goldsmith, *A Study of Saving*, Vol. I, Tables R-10, p. 595, and R-11, p. 596.

**C39.** *Other Private Nonfarm Nonresidential Buildings, Current Dollars, Annual, 1920-1963; Monthly, 1939-1963.*

**C40.** *Other Private Nonfarm Nonresidential Buildings, Constant Dollars, Annual, 1920-1963; Monthly, 1939-1963.*

These series represent the sum of five building categories: religious, educational, hospital

and institutional, social and recreational, and miscellaneous nonresidential. Separate data for each group are available in the sources for 1920 and following years. For the years 1915-19, data on this category are not separable from "commercial buildings," as defined in Series C37 and C38. In general, this category covers all private nonfarm nonresidential buildings not included in "industrial" or "commercial," except buildings constructed by railroads, local transit companies, and public utility companies for their own use. For a detailed listing of types of buildings included, see *Construction Reports, Construction Activity*, C30-61 Supplement, U.S. Bureau of the Census, October 1964, p. 73. Because of a change in the classification of one type of warehouse from "miscellaneous nonresidential" to "commercial," the data beginning in 1956 for these two categories, and for "other private nonresidential buildings" are not strictly comparable to those for the period before that date (see Series C37 and C38 for details).

For derivation of current dollar estimates, see Series C33.

The deflating index used to derive the constant dollar series is the monthly construction cost index of the American Appraisal Company.

**C41.** *Private Farm Construction, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C42.** *Private Farm Construction, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

Included in this category are: (1) new housing units and additions and alterations to existing units on places classified as farms, according to the 1960 Census definition; and (2) other buildings and structures used in farm production, such as barns, storage houses, smoke houses, fences, wells, etc. Excluded are operations which are an integral part of farming, such as plowing, terracing, and digging of drainage ditches.

Current dollar estimates of value put in place are prepared separately for farm residential and nonresidential construction. Separate data for the two components are available on an annual basis only. The annual estimates are prepared by the Farm Income Branch of the Economic Research Service, U.S. Department of Agriculture. The current estimates are based primarily on benchmark data from a 1955 sample survey of farm construction expenditures. Estimates for other years are interpolated and extrapolated on the basis of income and expenditure data from past benchmark years, and other relevant economic data available currently. (For further details, see *Major Statistical Series*, U.S. Department of Agriculture, "Gross and Net Farm Income," Volume III, December 1957.) Monthly estimates of farm construction, seasonally adjusted, are then prepared by the Bureau of the Census by fitting a trend line to the monthly averages of successive annual estimates. A constant seasonal pattern is then applied to derive the "unadjusted" monthly data.

In 1964 the series was revised back to 1946, on the basis of revised annual estimates of the Department of Agriculture. There is a break in comparability in 1946, pending extension of the revisions to years prior to that year.

Earlier data, in million dollars (see below), are published in the U.S. Department of Agriculture publication, *Income Parity for Agriculture*, Part II, Section 5, 1941, p. 2.

	<i>Operators' Dwellings</i>	<i>Service Buildings</i>	<i>Total</i>
1910	185	250	435
1911	175	240	415
1912	190	260	450
1913	190	260	450
1914	190	260	450
1915	195	270	465

Estimates of farmers' expenditures for total, residential, and other buildings, back to 1897,

extrapolated on the basis of a fixed percentage of gross farm income, are available in Goldsmith, *A Study of Saving*, Vol. I, Table A-7, p. 761. A rough extrapolation back to 1837, on the basis of the number of farms and the increase in the number of farms, is available in the same source, Tables R-26, p. 617, and R-27, p. 619.

Estimates for the residential and nonresidential components are deflated separately and added together to obtain the constant dollar series. The annual farm construction cost index of the Agricultural Marketing Service is used for both components. Monthly figures for farm housing units are interpolated by the Boeckh residential index, and for other farm construction by the American Appraisal Company index.

C43. *Private Public Utility Construction, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

C44. *Private Public Utility Construction, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

This category consists of six subgroups: railroads, telephone and telegraph, electric light and power, gas, petroleum pipe lines, and, prior to 1959, local transit. (Beginning 1959, local transit company expenditures for buildings are included in the appropriate category under "nonresidential buildings," and expenditures for nonbuilding projects are in the "all other private" category.) Separate annual data for these subgroups are available in the source. Separate monthly data are shown only for telephone and telegraph (1939 and following) and for railroads (1939-45).

In general, the private public utility construction series include all private capital expenditures in public utility industries for buildings or outside plant, and exclude machinery and equipment. They therefore include not only types of construction peculiar to the operation of the type of utility, but also

other types of nonresidential construction built by these companies for their own use. For a detailed list of types of projects covered, see *Construction Volume and Costs, 1915-1956*, Statistical Supplement to *Construction Review*, p. 72.

Current dollar estimates for each industry are based on expenditure data taken from the fiscal records of the utility companies. These data are compiled by federal regulatory agencies or cooperating private organizations. They are adjusted by the compilers for undercoverage and to eliminate nonconstruction items.

Monthly construction expenditures data are available only for the telephone and telegraph component. The American Telephone and Telegraph Company reports monthly construction expenditures by Bell System companies, with estimates for independent companies. The Western Union Telegraph Company reports its monthly construction expenditures.

For railroads, electric light and power, gas, and petroleum pipelines, sources of data are: the Interstate Commerce Commission (for railroads and petroleum pipelines); the Federal Power Commission and the Rural Electrification Administration (for annual estimates on electric light and power); the Edison Electric Institute (for preliminary quarterly estimates on electric light and power); and the American Gas Association.

Data for local transit expenditures prior to 1955 were based on annual estimates compiled by the American Transit Association. For 1955-58 they are projections based on an assumed gradual decline from the 1954 level to zero in 1959.

Revisions in the public utilities construction series, resulting from changes in estimating procedures for all categories except telephone and telegraph, were introduced by the Bureau of the Census in 1963 and carried back to 1959. In 1964 these revisions were extended back to 1946, resulting in a break in the series in that year. However, the new publication

*Construction Statistics, 1915-1964* treats the series as continuous. The 1946-49 revisions were not based on actual data from the primary sources, but on assumptions drawn from the revisions for later years.

The constant dollar series is the sum of the individually deflated component series. Values for railroads, local transit, and (prior to 1946) telephone and telegraph are deflated by an appropriate Interstate Commerce Commission annual cost index, interpolated monthly by the *Engineering News-Record* index. Beginning with data for 1946, the deflator for the telephone and telegraph component is an annual cost index of the American Telephone and Telegraph Company. Current monthly deflators are extrapolated from the AT&T index by the *Engineering News-Record* index. The monthly data are revised by interpolation from the succeeding year's AT&T index, when this becomes available. Electric light and power expenditures are deflated by a weighted average of two Handy-Whitman semiannual indexes—electric plant, weighted 9, interpolated monthly by ENR index; and utility building, weighted 1, interpolated monthly by Boeckh's commercial and factory index. Gas expenditures are deflated in the same manner, except that an index on gas plant instead of electric plant is used. Petroleum pipe lines data are deflated by an unweighted average of: (1) Handy-Whitman index on electric plant, interpolated by ENR index, (2) Handy-Whitman index on gas plant, interpolated by ENR index, (3) Handy-Whitman index on utility building, interpolated by Boeckh's commercial and factory index, and (4) ICC railroad annual cost index, interpolated by ENR.

For rough estimates back to 1897 of public utility construction expenditures, derived as a fixed percentage of total commercial, industrial, and public utility construction, see Goldsmith, *A Study of Saving*, Vol. I, Table R-16, p. 603.

Additional estimates of gross capital expenditures for "all regulated industries,"



with a breakdown into steam railroads, electric light and power, telephones, street and electric railways, local bus lines, and all other, have been developed by Melville Ulmer. These measures include plant and equipment. See Melville J. Ulmer, *Capital in Transportation, Communications, and Public Utilities: Its Formation and Financing*, Princeton University Press for NBER, 1960.

**C45.** *Nonfarm Building Construction, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C46.** *Nonfarm Building Construction, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

These series have been compiled by NBER as the sum of private nonfarm residential buildings (Series C25 and C26), private nonfarm nonresidential buildings (Series C33 and C34), public nonfarm residential buildings, and public nonresidential buildings. Data on the latter two categories are available in the Bureau of the Census source material but are not presented here as separate series. The aggregate series on nonfarm building construction include all nonfarm buildings with the following exceptions: (1) private public utility buildings; (2) all buildings on military installations, excluding federal industrial installations and housing under the armed services housing programs; (3) buildings connected with state or local public service enterprises or federal conservation and development projects. They also include nonbuilding items associated with federally owned industrial plants, such as those constructed by the Defense Plants Corporation, the Department of Defense, and the Atomic Energy Commission. For a description of the derivation of the estimates for the current and constant dollar values, see series C25 and C26; C33 and C34; and C49 and C50.

**C47.** *Commercial, Industrial, and Public Utility Construction, Current Dollars, Annual, 1920-1963; Monthly, 1939-1963.*

**C48.** *Commercial, Industrial, and Public Utility Construction, Constant Dollars, Annual, 1920-1963; Monthly, 1939-1963.*

These series have been compiled by NBER as the sum of commercial buildings (Series C37 and C38), private industrial buildings (Series C35 and C36), and private public utility construction (Series C43 and C44). For definitions and derivation of estimates, see descriptions of these component series. For rough estimates of these series back to 1837, see sources mentioned in notes to Series C33 and C34.

**C49.** *Public Construction, Current Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

**C50.** *Public Construction, Constant Dollars, Annual, 1915-1963; Monthly, 1939-1963.*

Included in these series are all new construction projects owned by federal, state, or local government. Privately owned projects financed or subsidized by government funds are excluded. These series are aggregates of the following categories, for which separate data are presented in the source: residential building; nonresidential building (including subcategories of industrial, educational, hospital and institutional, administrative and service, and other nonresidential); military facilities (Series C55 and C56); highways (Series C51 and C52); sewer and water systems (shown separately and combined); public service enterprises; conservation and development; and "all other public." For a description of the classification scheme and a list of types of projects included, see *Construction Reports, Construction Activity*, C30-61 Supplement, U.S. Bureau of the Census, October 1964, pp. 79-80.

Estimating procedures for the various types of public construction are developed according to the kind of basic data available. For most federally owned projects and for a few categories of state and local construction (e.g., New York City Housing Authority), monthly progress reports are provided by the agencies

administering the construction programs. Normally, the progress reports are based on the engineer's evaluation of the physical progress of the project. In some instances they represent expenditures rather than work put in place. Where this kind of information is not available, the general method is to estimate construction starts from contract award data, adjusted for omissions and duplications and for architectural and engineering costs—then to convert starts to value-put-in-place estimates by using progress patterns. The contract award data are obtained from the F. W. Dodge Corporation reports for thirty-seven eastern states, and from various construction news services in the western states. This procedure is used for most state and locally owned projects, except highways, and for some federal projects. In converting contract award data to work-put-in-place estimates, a progress pattern is normally applied to the sum of monthly contract award for a particular type of construction. However, in some cases sufficient information is obtained on individual projects, so that estimates of value put in place are developed for each project on the basis of an appropriate progress pattern for that project. The latter procedure is used for the new housing units component of the state and local residential category, for Capehart and Wherry armed services housing, and for Navy industrial facilities. For a few relatively minor federal construction programs, value-put-in-place estimates are based on information in the federal budget document, rather than on reports from individual agencies.

The constant dollar series is the sum of the separately deflated components. Residential building values are deflated by the E. H. Boeckh residential index; industrial buildings by the Turner Construction Company annual index, interpolated monthly by Boeckh's commercial and factory index; and other nonresidential buildings by the American Appraisal Company monthly index. Data on military facilities are deflated by an unweighted average of (1) the American

Appraisal Company monthly index, (2) the Bureau of Public Roads quarterly index, interpolated monthly by the *Engineering News-Record* index, (3) the George A. Fuller Company annual index, interpolated monthly by Boeckh's index for apartments, hotels and offices, and (4) the Turner Construction Company annual index, interpolated monthly by Boeckh's commercial and factory index. Data on public service enterprises are deflated by a weighted average of two Handy-Whitman semiannual indexes—electric plant (weighted 9), interpolated monthly by the *Engineering News-Record* index; and utility building (weighted 1), interpolated monthly by Boeckh's commercial and factory index. Data on sewer and water systems, conservation and development, and all other public construction, except highways, are deflated by an unweighted average of two monthly indexes—Associated General Contractors, and *Engineering News-Record*.

See Series C51 and C52 for estimating procedures for highway construction. See also Series C53 and C54 for annual data on public construction, by type of ownership. For rough estimates back to 1837 of expenditures for new public construction by U.S. and state and local governments, see Goldsmith, *A Study of Saving*, Vol. I, Tables R-26, p. 617, and R-27, p. 619.

C51. *Highway Construction, Current Dollars, Annual, 1915–1963; Monthly, 1939–1963.*

C52. *Highway Construction, Constant Dollars, Annual, 1915–1963; Monthly, 1939–1963.*

These series cover public construction of streets, roads, alleys, bridges, vehicular tunnels, viaducts, sidewalks, curbs, and gutters; new culverts and extensions of old ones; right-of-way drainage, erosion control, lighting, and guard rails; and earthwork protective structures in connection with road improvements.

The annual value-put-in-place data represent annual expenditure estimates prepared by the Bureau of Public Roads. Monthly data

on value put in place for federal-aid highways (interstate and state) are based on BPR monthly estimates, adjusted to the level of the annual expenditure estimates for this category of highways. Monthly data for all other highways are based on the annual expenditure estimates, distributed monthly by applying seasonal indexes computed from final data for federally aided state highways. The final BPR annual estimates do not become available until two years after the period reported. Data published before that time are preliminary figures based on projections made by the BPR. The procedure for estimating value of highway construction put in place was revised in 1963. In 1964 data were revised back to 1946. The revised data are considered comparable with data for earlier periods.

The constant dollar series is derived from a quarterly cost index of the Bureau of Public Roads, interpolated monthly by the *Engineering News-Record* index.

See Series C20 for data on highway construction by state and local governments prior to 1915, and for references to similar Goldsmith series extending back to 1897.

**C53. *Public Construction, Federally Owned, Annual, 1915-1963.***

**C54. *Public Construction, State and Locally Owned, Annual, 1915-1963.***

**SOURCE:**

**1915-1946:** *Construction Volume and Costs, 1915-1956*, Statistical Supplement to Volume 3 of *Construction Review*, 1958. **1947-1963:** *Value of New Public Construction Put in Place, by Sources of Funds, Ownership and Type of Construction, 1947-1963 Revised*, November 1964.

These two series represent a breakdown by ownership of the official series on total public construction (Series C49). The source also presents a breakdown by source of funds and a cross classification by ownership and type of

construction, annually (for 1915-1946) and monthly, unadjusted for seasonal variation (for 1947-1963). The current monthly series are available in *Construction Review*.

Federally owned construction (Series C53) covers projects on federal property financed with federal funds. State and locally owned construction (Series C54) includes projects financed entirely by state and local governments, as well as those financed in part by federal grants-in-aid. Both series include work done either by force-account or by contract. Beginning with data for 1959, Alaska and Hawaii are included.

Estimating procedures for value of new public construction put in place are described in Series C49. For a more detailed description, see source.

**C55. *Military Facilities, Current Dollars, Annual, 1915-1962.***

**C56. *Military Facilities, Constant Dollars, Annual, 1915-1962.***

These series represent one component of the official series on new public construction (Series C49 and C50). Monthly data are available in the source for 1939-62.

The data include all *federally owned* construction projects at military establishments except for: (1) Capehart housing, and rehabilitation of Wherry housing for the armed services, (2) industrial facilities, and (3) the Corps of Engineers-Civil works program. Military construction by states, such as armories and rifle ranges, is excluded. Types of projects covered include troop housing, administration and training buildings, warehouses, mess halls, recreation centers, educational facilities, hospitals, airfields, missile sites, fleet facilities, communication networks, etc.

Estimates of value of construction put in place are based on monthly reports from the agencies supervising construction; or, for programs consisting of a number of small projects, on annual data from the federal budget.

The constant dollar series (C56) was derived by applying a deflating index as described in Series C50. The 1915-46 figures are shown in 1947-49 dollars; and the 1946-62 figures in 1957-59 dollars. The series is continuous in the source except for the change in the base. The values in 1947-49 dollars can be converted to approximate estimates in 1957-59 dollars by multiplying by a conversion factor of 1.353.

For later data, see *Construction Statistics, 1915-1964*, pp. 7 and 12.

**C57.** *Federal Nonmilitary Construction, Annual, 1915-1962.*

SOURCE: This series was computed by NBER as the difference between federally owned public new construction (Series C53) and military facilities (Series C55).

#### MISCELLANEOUS ESTIMATES OF RESIDENTIAL CONSTRUCTION, ANNUAL

**C58.** *Expenditures for New Private Nonfarm Housekeeping Units, Blank, Current Dollars, 1889-1921.*

**C59.** *Expenditures for New Private Nonfarm Housekeeping Units, Blank, 1929 Dollars, 1889-1946.*

SOURCE: David M. Blank, *The Volume of Residential Construction, 1889-1950*, Technical Paper 9, New York, NBER, 1954, Table 18.

The concept of expenditures in these series, and the type of construction covered, are the same as those defined in the Commerce Department series on "value of new construction put in place, private nonfarm residential new housing units." (See descriptions of Series C27 and C28.)

The two series as presented in the source cover the period 1889-1950. The current dollar estimates are shown here only through 1921, since for that year and subsequent years the official estimates of the Bureau of Labor Statistics and the Department of Commerce were incorporated in the Blank series. These official estimates, including subsequent revisions for 1946 and following, are shown in this volume as Series C27. The Blank constant dollar series (value in 1929 dollars) is shown through 1946, since, when these tables were prepared, official estimates in constant dollars were not available for prior years. (The 1946 figure in 1929 dollars corresponds to the

current dollar figure for that year before the 1964 Census revisions.) Series C28 shows the revised Bureau of the Census estimates in 1957-59 dollars for 1946-63; estimates for 1915-45 were published, too late for inclusion here, in *Construction Statistics, 1915-1964*. Aside from the difference in the base periods used, the Blank constant dollar series is not comparable to Series C28 because of the 1946 break in the current dollar estimates.

Blank's estimates were intended primarily to extend the official current dollar series, which begins in 1915, to earlier years. After comparing his 1915-29 estimates with the official series, Blank presented his data for 1915-20 as an improvement over the official series, and accepted the official series for 1921 and following years, since the differences in these years were small. Although Blank's estimating procedure was, in general, the same as that used in the BLS-Census series, more comprehensive source material and more refined techniques were used for the Blank estimates. (See source, Section 4, for details.)

Blank estimated the permit value of new construction from BLS-WPA permit data by the same methods as described for housing starts (see Series B14, General Description), except that the calculation for all nonfarm dwelling units had to take account of the fact that rural nonfarm units had lower average values than urban nonfarm units. The permit valuations were then increased to allow for undervaluation of construction costs and to

cover architects' and engineers' fees, land development costs, and builders' profit margins on construction operations. They were then converted to a construction-put-in-place basis, by extending the carryover of construction from one year to the next.

The expenditure series does not include "speculative profits of operative builders" or closing costs on new houses. Some estimates of these amounts can be found in Raymond W. Goldsmith, *The National Wealth of the United States*, pp. 225-227, for 1945-58, and *A Study of Saving*, Vol. I, Table R-30, p. 622.

The constant dollar series was derived by deflating the current dollar data by a construction cost index developed by Blank. The index for 1910-50 is based on the Boeckh index of residential construction. Earlier years are extrapolated by indexes of building-trade wage rates and building materials prices (for details, see source, Table 21; for reference to Goldsmith estimates back to 1837, see the note to Series C3 and C4).

These Blank estimates were included in the study by Leo Grebler, David M. Blank, and Louis Winnick, *Capital Formation in Residential Real Estate: Trends and Prospects*, Princeton University Press for NBER, 1956. For a discussion of the merits of the data and conclusions presented in this work and replies by Grebler, Blank, and Winnick, see the following articles: Margaret G. Reid, "Capital Formation in Residential Real Estate," *Journal of Political Economy*, April 1958, pp. 131-153; Grebler, Blank, and Winnick, "Once More: Capital Formation in Residential Real Estate," *ibid.*, December 1959, pp. 612-619; Margaret Reid, "Reply," *ibid.*, pp. 619-626; Grebler, Blank, and Winnick, "Rejoinder," *ibid.*, pp. 626-627.

**C60.** *Estimated Production of Nonfarm Residential Housekeeping Units, Gottlieb, 1840-1939.*

SOURCE: Manuel Gottlieb, *Estimates of Residential Building, United States, 1840-*

*1939*, New York, NBER, Technical Paper 17, 1964.

The data represent estimates of the number of new nonfarm housekeeping units erected each year. They are presented as a suggested revision of the official estimates for the period 1890-1939, and an extension of this series back to 1840. The estimates are intended primarily for use in the study of long-swing movements of residential construction, and, according to the author, may not do justice to short cyclical movements.

The procedure was first to establish decade totals and then to interpolate annual movements for each decade. Decade estimates for the period 1890-1940 are described below in connection with the annual data. For the period 1860-90, the decade totals were estimated from Ohio data on number and value of new buildings erected,<sup>5</sup> projected into national aggregates. The estimates for the U.S. were derived from Ohio data in two ways. The first involved multiplying the U.S. decade increments in the stock of nonfarm occupied dwelling units (from the 1890 and 1910 Population Censuses), by the ratio, for Ohio, of the number of new dwelling units built to the increment in the stock of nonfarm dwelling units. The second method involved multiplying the U.S. labor force increment in the decade by the Ohio ratio of dwelling units built to the labor force increment. The two variants were then averaged and the resulting level of decade estimates was adjusted upward by 1.58 per cent to fit the previously accepted estimates of 1900-20. For the decade of the 1850's, the estimate was based mainly on Census data of stocks of dwelling units. The decade total for the 1840's was roughly estimated, primarily from data in the 1840 Census

<sup>5</sup> For a description of the Ohio data, see Manuel Gottlieb, "Building in Ohio Between 1837 and 1914," *Output, Employment, and Productivity in the United States After 1800*, Studies in Income and Wealth 30, New York, NBER, 1966.

of Manufactures on number of dwellings erected in that year.

In order to derive annual figures for 1840-59, decade totals were distributed on the basis of decade indexes made up of the geometric average of Riggleman-Isard (Series B22) and an Ohio building value index prepared by Gottlieb. Annual figures for 1860-89 were derived by distributing the decade totals by the geometric average of three indexes equally weighted: Gottlieb's Ohio index; Riggleman-Isard, deflated by a Riggleman cost-of-building index; and Long's index of number of residential buildings (Series B6). For 1890-99, Blank's yearly estimates (Series B14) were reduced by 15.3 per cent. Chawner's<sup>6</sup> decade estimates were used for 1900-19 and were distributed by index relatives made up of a simple average of the Blank and Chawner series. Blank's "new series"<sup>7</sup> (slightly higher than the official series) was used for 1920-29, except that the 1920 and 1929 figures were adjusted upwards for linking purposes. The 1930-39 figures are official BLS estimates,<sup>8</sup> raised by 47 per cent to reach the level indicated by the "vintage" report of the 1940 *Census of Housing*.

C61. *Expenditures for Additions and Alterations, One- to Four-Family Nonfarm Dwellings, Goldsmith, Current Dollars, 1867-1914.*

C62. *Expenditures for Additions and Alterations, One- to Four-Family Nonfarm Dwellings, Goldsmith, 1929 Dollars, 1897-1914.*

SOURCE: Raymond W. Goldsmith, *A Study of Saving in the United States*, Vol. I, Prince-

<sup>6</sup> Lowell J. Chawner, *Residential Building*, Housing Monograph Series, No. 1, prepared for National Resources Committee, Washington, D.C., 1939, p. 13.

<sup>7</sup> David M. Blank, *The Volume of Residential Construction*, p. 59.

<sup>8</sup> *Construction During Five Decades, Historical Statistics, 1907-52*, BLS Bulletin 1146, 1953, p. 3.

ton, 1955, Tables R-4, p. 587; R-5, p. 588; and R-31, p. 623.

The current dollar estimates were derived by multiplying Goldsmith's construction estimates by the ratio of expenditures for alterations and additions to expenditures for new residential construction. This ratio is extrapolated back from 1920-30 (estimated at 10 per cent on the basis of Department of Commerce estimates) by an index of the movement of the ratio in Long's estimates. See Clarence D. Long, Jr., *Building Cycles and the Theory of Investment*. (A description of the Long series, B1-B9, is included in this volume.)

The constant dollar series was derived by applying a building cost index to the current dollar estimates. (See Table R-20, pp. 607-609, in the source.)

C63. *Expenditures for Additions and Alterations, Housekeeping Units, Grebler, Blank, and Winnick, Current Dollars, 1889-1953.*

C64. *Expenditures for Additions and Alterations, Housekeeping Units, Grebler, Blank, and Winnick, 1929 Dollars, 1889-1953.*

SOURCE: Leo Grebler, David M. Blank, and Louis Winnick, *Capital Formation in Residential Real Estate: Trends and Prospects*, Princeton University Press for NBER, 1956, pp. 40-52, 336, and 362.

Additions and alterations are defined as in the BLS-Commerce series (Series C31 and C32). Official BLS-Commerce estimates were carried back from 1921 by a crude graphic extrapolation using the movement of housekeeping construction expenditures but reducing the amplitude of fluctuation.

*INVESTMENT IN STRUCTURES, INCLUDING OIL AND GAS WELL  
DRILLING, ANNUAL AND QUARTERLY*

**C65.** *Total New Construction Expenditures, and Oil and Gas Well Drilling, BLS-Commerce, Annual, 1939-1963.*

SOURCE: Sum of Series C21, value of total new construction put in place; and Series C84, expenditures for petroleum and natural gas well drilling. The resulting series matches in coverage Kuznets' estimates of "Gross Total Construction," 1889-1955 (Series C1), but includes more recent data from the official sources. For derivation of the estimates, see component series.

**C66.** *Gross Private Domestic Investment in Structures, Annual, 1929-1963, OBE; Quarterly, 1921-1939, Barger and Klein; Quarterly, 1939-1963, OBE.*

**C67.** *Gross Private Domestic Investment in Structures Other than Residential Nonfarm, OBE, Annual, 1929-1963; Quarterly, 1939-1963.*

SOURCE:

**Annual, 1929-1963:** *Survey of Current Business*, U.S. Department of Commerce, Office of Business Economics, August 1965, Table 1. **Quarterly, 1921-1938:** Unpublished estimates, Barger and Klein. **Quarterly, 1939,** Barger and Klein segment: *National Income Supplement to Survey of Current Business*, July 1947, Table 43. **Quarterly, 1939-1945,** OBE old series: *National Income, 1954 Edition, A Supplement to the Survey of Current Business*, Table 45. **Quarterly, 1946,** OBE old series: *U.S. Income and Output, a Supplement to the Survey of Current Business*, 1958, Table I-3. **Quarterly, 1946-1963,** OBE revised series: *Survey of Current Business*, August 1965, Table 1.

These series represent the investment-in-structures component of gross private domestic investment included in the National

Income and Product Accounts, prepared by the National Income Division, Office of Business Economics, U.S. Department of Commerce. Major revisions of these accounts in 1965 provide estimates of fixed investment in nonresidential, nonfarm residential, and farm residential structures, annually from 1929, and quarterly from 1946 to the present. Series C66 includes all three types of structures; Series C67 is the sum of nonresidential and farm residential. The quarterly data are available only on a seasonally adjusted, annual rate basis. In the revised estimates, fixed investment in structures includes (1) the value of new private construction put in place, as estimated by the Bureau of the Census (see Series C23); (2) crude-petroleum and natural-gas well drilling (see Series C84); (3) commissions on the sale of structures; and (4) net transfers of used structures from or to government.

Prior to the 1965 revisions, OBE estimates were prepared for a "new construction" component of gross private domestic investment which did not include the sales commissions and net transfers components and which were based on earlier estimates of the value of new construction put in place. These data, which extended back to 1939 on a quarterly basis, are included here in Series C66 and C67 for purposes of historical comparison. A one-year overlap in 1946 is provided. The break in comparability in the series at this point represents differences in estimating procedures as well as definitional changes, as explained above.

The quarterly series for total new construction (C66) can be further extended to 1921 on a seasonally adjusted basis by using estimates prepared by Harold Barger and Lawrence R. Klein for their article "A Quarterly Model for the United States Economy," *Journal of the American Statistical Association*,

September 1954, pp. 413-437. These data were developed from a series presented by Harold Barger in *Outlay and Income in the United States, 1921-1938*, New York, NBER, 1942. The quarterly series on "private construction," seasonally adjusted, in that publication was revised by Barger and Klein to conform to the level of the OBE annual series for the period 1929-1938 published in *National Income Supplement to Survey of Current Business*, July 1947. Annual ratios of the OBE estimates to the Barger estimates, 1929 to 1938, were interpolated to derive quarterly raising factors for this period. The raising factor for the first quarter of 1929 was used for the entire period 1921 to 1928. The resulting quarterly series for 1921-1938, presented here, was comparable to the OBE quarterly series for 1939-1946,

published in 1947. The original Barger quarterly series underlying the Barger-Klein revision was derived from annual Department of Commerce estimates. Those for 1921-31, by Lowell J. Chawner, appear in *Construction Activity in the United States 1915-37*, U.S. Dept. of Commerce, 1938. The estimates for 1932-37, by Samuel J. Dennis, were published in *Survey of Current Business*, August 1939; those for 1938, in *ibid.*, February 1940. The quarterly movements were obtained by interpolation from Dodge contracts data, lagged two months.

The cyclical analysis shown for Series C66 is limited to the period beginning 1945. The figures used are from the 1965 OBE revisions for 1946 and later years, extrapolated back to 1945 by the old OBE series.

### ABRAMOVITZ INDEXES OF URBAN BUILDING AND PUBLIC UTILITIES CONSTRUCTION

#### *General Description*

SOURCE: Moses Abramovitz, *Evidences of Long Swings in Aggregate Construction Since the Civil War*, New York, NBER, 1964.

Abramovitz constructed three aggregate indexes for the period from 1870 to 1918 on the basis of existing series measuring construction activity, or some closely related variable, such as permits or contracts. These indexes cover a combination of urban residential, urban nonresidential excluding government, and railroad and public utilities construction. These categories accounted for 75 to 80 per cent of total construction in the period covered. Public building was excluded because some unknown fraction of public building was exempt from permits and the series constructed depend on permit data. However, two indexes use an adjusted form of the Riggelman index, which includes some permits for public building.

The three series may be thought of as a

single index of urban building and public utilities construction, expressed in three variants: (1) an index of value in current prices, (2) an index of value in constant prices, and (3) an index of volume of physical units. Each index is divided into two overlapping segments in order to take advantage of more reliable and comprehensive data in the period after 1889. Public utilities other than railroads are not represented in the first segment of any of the indexes because the data are unsatisfactory. However, railroad expenditures in this period were about three times as great as those of other public utilities. Railroad and public utilities construction is represented in the second segment of the first two indexes by a series which includes expenditures for equipment. The third index includes only railroads, since there were no satisfactory data on physical units for public utilities.

In order to combine the components of each series (urban residential, nonresidential, and railroads and public utilities) weights representing their relative importance were



applied. In estimating the proper weight to be assigned to each component, two sources were used: (1) Kuznets' estimates of total construction (Series C1), and (2) Kuznets' data on real estate improvements (based on wealth figures), adjusted for depreciation by using Goldsmith's data on average life of structures in different industries. The source discusses these indexes in more detail.

#### *Individual Series*

**C68.** *Index of Urban Building and Public Utilities Construction, Value in Current Dollars, Annual* (Segment I, 1870-97; Segment II, 1889-1918).

Segment I: Weighted average of the following two series, each expressed as a relative of its average standing in 1870-1897 before being combined.

1. Riggleman's index of value of building permits, adjusted by Isard. Includes urban residential and urban nonresidential building; see Series B22 of this volume. Weight: 0.75.
2. Gross capital expenditures of railroads in current dollars, Ulmer. Includes road and equipment; see Melville J. Ulmer, *Capital in Transportation, Communications and Public Utilities: Its Formation and Financing*, Princeton for NBER, 1960, Table C-1. Weight: 0.25.

Segment II: Weighted average of the following three series, each expressed as a relative of its average standing in 1889-1918 before being combined.

1. Expenditures for new private nonfarm housekeeping dwelling units, in current dollars, Blank; see Series C58 of this volume. Weight: 0.41.
2. Long's index of value of nonresidential building; see Series B4 of this volume. Weight: 0.23.
3. Gross capital expenditures of all regulated industries in current dollars,

Ulmer. Includes construction and equipment; see Ulmer, *Capital in Transportation*, Table B-1. Weight: 0.36.

**C69.** *Index of Urban Building and Public Utilities Construction, Value in Constant Dollars, Annual* (Segment I, 1870-97; Segment II, 1889-1918).

Segment I: Weighted average of the following two series, each expressed as a relative of its average standing in 1870-1897 before being combined.

1. Riggleman's index of value of building permits, adjusted by Isard (Series B22 of this volume), deflated by price index implicit in Kuznets' estimates of total new construction in current dollars and in 1929 dollars (Series C1 and C2 of this volume). Weight: 0.75.
2. Gross capital expenditures of railroads in 1929 prices, Ulmer. See Ulmer, *Capital in Transportation*, Table C-1. Weight: 0.25.

Segment II: Weighted average of the following three series, each expressed as a relative of its average standing in 1889-1918 before being combined.

1. Expenditures on new private nonfarm housekeeping dwelling units, in 1929 prices, Blank. See Series C59 of this volume. Weight: 0.41.
2. Long's index of value of nonresidential building (Series B4 of this volume), deflated by price index implicit in Kuznets' current dollar and constant dollar estimates of total new construction (Series C1 and C2 of this volume), less private nonfarm residential (series C3 and C4) and military construction. Weight: 0.23.
3. Gross capital expenditures of all regulated industries, in 1929 prices, Ulmer. Includes construction and equipment; see Ulmer, *Capital in Transportation*, Table B-1. Weight: 0.36.

**C70.** *Index of the Physical Volume of Urban Building and Public Utilities Construction, Annual* (Segment I, 1856–97; Segment II, 1889–1918).

Segment I: Weighted average of the following three series, each expressed as a relative of its average standing in 1856–1897 before being combined.

1. Long's index of number of residential buildings; see Series B6 of this volume. Weight: 0.51.
2. Long's index of number of nonresidential buildings; see Series B7 of this volume. Weight: 0.23.
3. Rail consumption, American Iron and

Steel Institute; see Series D16 of this volume. Weight: 0.26.

Segment II: Weighted average of the following three series, each expressed as a relative of its average standing in 1889–1918 before being combined.

1. Number of new private nonfarm dwelling units started, Blank; see Series B14 of this volume. Weight: 0.49.
2. Long's index of number of nonresidential buildings; see Series B7 of this volume. Weight: 0.27.
3. Rail consumption, American Iron and Steel Institute; see Series D16 of this volume. Weight: 0.24.

#### FEDERAL CONSTRUCTION EXPENDITURES, FWA-TREASURY, ANNUAL

**C71.** *Federal Construction Expenditures, Total Public Works, Fiscal Years 1791–1939.*

SOURCE: *Historical Statistics of the U.S. 1789–1945*, U.S. Bureau of the Census, Series H27, p. 169, and Series H33, p. 170.

Statistics were compiled by the Federal Works Agency for 1920–39 and by the Department of the Treasury at the request of the Federal Works Agency for 1791–1919.

Construction was defined in the source (notes on Series H33–35, p. 162) as “the erection of any new structural or nonstructural improvement to land, ships, and floating equipment, additions to and complete replacement of existing works.”

Repair comprises “work necessary for the restoration and preservation of structures, nonstructural improvements to maintain land and floating equipment in a sound and serviceable condition, and minor alterations.”

Despite the definitions, the series does appear to include certain expenditures that were not construction or repair. For example, the purchase of the Panama Canal for \$50

million in fiscal year 1904 was included in “other.”

The definitions of construction and repair are said by the source to be identical in the two segments of the series. The second segment is described as covering only permanent federal construction agencies, but this term is not defined and it is not clear whether any discontinuity is introduced by this limitation. The two segments are treated as continuous by Raymond Goldsmith (*A Study of Saving*, Vol. I, pp. 974–975), who appears to have had access to the Public Works Administration worksheets giving a more detailed breakdown than the published data.

The components of this series are “military and naval” (Series C73), “public building” (Series C72), “rivers and harbors” (Series C74), and two other series not covered here, “reclamation” and “other.”

The BLS-Commerce series for federal public construction (Series C53) is not continuous with this one because the BLS-Commerce series includes only new construction, not repairs.

The source does not indicate the type of

year, but it is probably the federal government fiscal year. From 1791 through 1842 these ended December 31; from 1844 to date, on June 30. The 1843 year covered only six months, January 1 to June 30. The fact that the construction total for 1843 was roughly half that of the preceding and following years supports this assumption. For fiscal year dates see *Annual Report of the Secretary of the Treasury on the State of the Finances*, Fiscal Year 1964, p. 402.

**C72. Federal Construction Expenditures, Public Buildings, Fiscal Years 1791-1919.**

SOURCE: *Historical Statistics of the United States, 1789-1945*, Series H30, p. 169.

The BLS-Commerce series on federal non-residential building in *Construction Volume and Costs 1915-56*, Table 4, p. 11, appears to be continuous with this series, even though the BLS-Commerce data purport to include only new construction put in place, not repairs. The BLS-Commerce calendar-year figures are very close to averages of adjoining fiscal-year figures of this series. See also notes to Series C71.

**C73. Federal Construction Expenditures, Military and Naval Construction, Fiscal Years 1791-1919.**

SOURCE: *Historical Statistics of the United States, 1789-1945*, Series H28, p. 169.

Military and naval construction expenditures exclude naval vessels. The BLS-Commerce data (Series C55) include only new construction put in place, not repairs, and are for calendar years. See also notes to Series C71.

**C74. Federal Construction Expenditures, Rivers and Harbors, Fiscal Years 1822-1919.**

SOURCE: U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial*

*Times to 1957*, Series Q245. Statistics were compiled by the Department of the Treasury at the request of the Federal Works Agency. The following were the original sources (see *Historical Statistics*, p. 443):

**1822-1882:** *Statement of Appropriations and Expenditures for Public Buildings, Rivers and Harbors, Forts, Arsenal, Armories, and Other Public Works from March 4, 1789 to June 30, 1882*, U.S. Senate Ex. Doc. Vol. 7, No. 196, 47th Congress, 1st Session (Treasury Department Doc. No. 373), pp. 521-522. **1883-1919:** Federal Works Agency records (compiled from Treasury Department accounts).

This series is also found in *Historical Statistics, 1789-1945*, Series H29, and is one of the components of "U.S. Federal Construction Expenditures, Public Works, Total," (Series C71).

The data cover construction and repair work, and include expenditures for flood control as well as for rivers and harbors.

Data for 1920-57, compiled by the Corps of Engineers of the U.S. Army, are available in the source. For data covering navigation only, 1936-62, see *Historical Statistics, Continuation to 1962 and Revisions*, Series Q245.

Data on rivers, harbors, and flood control construction are included in the BLS-Commerce series on "conservation and development." See *Construction Volume and Costs 1915-1956*, Statistical Supplement to Vol. 3 of *Construction Review, 1958*; and *Value of New Construction Put in Place 1946-1963 Revised, Construction Reports, Construction Activity*, C30-61 Supplement, Bureau of the Census, October 1964.

**C75. U.S. Federal Construction Expenditures, Nonmilitary, 1791-1919.**

SOURCE: This series was derived by NBER as the difference between total federal expenditures for public works (Series C71) and military and naval construction (Series C73).

## TRANSPORTATION AND PUBLIC UTILITIES, ANNUAL

**C76. Miles of Railroad Built, Census-Railway Age, 1830-1952.**

## SOURCE:

**1830-1879:** *Historical Statistics of the United States, Colonial Times to 1957*, Bureau of the Census, Series Q43. **1880-1952:** *Railway Age*, Simmons-Boardman Publishing Corp., New York, January 1, 1938, and later annual review issues.

These data refer to miles of first track completed in a calendar year. It is not clear at what stage the building of a mile of road was reported. If construction of a line took several years, a company may have reported each year, or might have waited until the whole line was completed. Sometimes the year of completion differed from the year in which traffic was first carried; in such cases the mileage may have been assigned to either year.

The data for 1830-79 are originally from the Tenth Census Report, Vol. IV, *Report on the Agencies of Transportation in the United States*. These data were compiled by the Bureau of the Census from reports of railroads known to exist in 1880. They are limited to mileage still in operation in the census year 1880.

*Railway Age* obtained its figures at annual intervals from individual railroads and from state railroad commissions.

For data on gross capital expenditure, including road and equipment, beginning in 1870, see Melville J. Ulmer, *Capital in Transportation, Communications, and Public Utilities: Its Formation and Financing*, Princeton University Press for NBER, 1960, p. 255 ff.

Railroad investment data for the pre-Civil War period, beginning in 1828, are available in Albert Fishlow, *American Railroads and the Transformation of the Ante-Bellum Economy*, Harvard University Press, 1965.

**C77. Increases in Railroad Track Mileage Operated, ICC, 1877-1963.**

## SOURCE:

**1877-1890:** *Historical Statistics of the United States, Colonial Times to 1957*, Bureau of the Census, Series Q17. **1891-1956:** *Ibid.*, Series Q48. **1957-1962:** *Ibid.*, *Continuation to 1962 and Revisions*, Bureau of the Census, February 1965, Series Q48. **1963:** *Transport Statistics in the United States, Part 1*, Interstate Commerce Commission, Bureau of Transport Economics and Statistics.

These data are year-to-year changes in total operated track mileage as published in the above sources. Data on increases for the years 1877-90 and 1917-63, are for calendar years; those for 1891-1916 are for years ending June 30. Data on operated track mileage are compiled by the Interstate Commerce Commission. Data for 1876-90 are from *Railway Statistics before 1890*, ICC Statement No. 32151 (mimeographed), 1932. For these historical data the ICC used the annual *Poor's Manual of Railroads*. Data for 1891-1954 are from ICC, *Statistics of Railways in the United States*. Later data are from *Transport Statistics in the United States, Part 1*.

Operated track includes main tracks, yard tracks, and sidings. The data cover Class I, II, and III railroads. Prior to 1908 they also included switching and terminal companies. "Circular" and unofficial roads are excluded. Alaska and Hawaii are included beginning with data for 1960. Each company reported its total operated track mileage; since two companies might operate the same track, there is some duplication. Data for different years are often not entirely comparable because of changes in accounting and reporting methods.

**C78.** *Capital Expenditures for Additions and Betterments, Roadway and Structures, Class I Railroads, ICC, 1921-1963.*

SOURCE:

1921-1955: *Railroad Transportation, A Statistical Record*, Association of American Railroads, Bureau of Railway Economics, December 1956. 1956-1963: *Selected Income and Balance-Sheet Items of Class I Railroads in the U.S.*, Bureau of Transport Economics and Statistics, Interstate Commerce Commission, Statement No. M-125, December issues through 1961; No. Q-125, 4th quarter issues for later figures.

These data are collected by the Bureau of Transport Economics and Statistics from reports of individual Class I railroads. Switching and terminal companies are included. Additions refer to new facilities, such as tracks, building and other structures; and additions to these facilities. Betterments comprise improvements to existing facilities such as the application of heavier rail in tracks, strengthening of bridges by substitution of heavier members, and construction of superior floors or roofs in buildings.

These data are also published in *Historical Statistics of the United States, Colonial Times to 1957*, Bureau of the Census, Series Q105.

**C79.** *Increase in Wire Mileage of Western Union Telegraph Company, Annual, 1867-1962.*

SOURCE: *Statistical Abstract of the United States*, Bureau of Census, issues of 1913, 1920, 1935, 1943, 1947, 1952, 1957, 1963.

Data on wire mileage, published in the above source, are based on annual reports of

the Western Union Telegraph Company. Increases were computed by subtracting the previous year's mileage from the mileage in the year reported. Increases for 1867-1913 are for years ending June 30; data for 1914-1962 are for calendar years. Alaska and Hawaii are excluded. The large increase in mileage in 1943 reflects the acquisition of Postal Telegraph Companies.

**C80.** *Increase in Telephone Wire Mileage, 1881-1963.*

SOURCE:

1881-1936: American Telephone and Telegraph Company. 1937-1963: *Statistical Abstract of the United States*, Bureau of the Census, issues of 1943, 1957, and 1962 to 1965.

Increases were derived from annual data on wire mileage in the above sources. The figure for the previous year was subtracted from the figure for the year being computed.

For 1881-1956, the annual figures refer to wire mileage in all systems. They were estimated by the American Telephone and Telegraph Company, except for four benchmark years (1922, 1927, 1932, and 1937) in which Bureau of the Census data were used. For the segment 1956-1963, the annual figures were derived by adding wire mileage reported by Bell Telephone Companies and by independent companies. Data for the independent companies are based on operating reports submitted by each company to the U.S. Independent Telephone Association. However, not all such companies report. The data from Bell Telephone Companies exclude drop and block wire.

Because of technological improvements, increases in wire mileage do not completely indicate the increase in telephone capacity.

## SHIPBUILDING, ANNUAL

**C81.** *Merchant Vessels Built and Documented, Gross Tonnage, Annual, 1797-1962.*

## SOURCE:

1797-1957: *Historical Statistics of the United States, Colonial Times to 1957*, Bureau of the Census, Series Q179. 1958-1962: *Historical Statistics of the United States, Continuation to 1962 and Revisions*, Bureau of the Census.

The basic sources used for compilation of this series were various annual issues of *Merchant Marine Statistics* (originally prepared by the Commerce Department and now issued by the Bureau of Customs), supplemented by records of the Bureau of Customs.

This series covers documented merchant vessels of five gross tons or more that were granted registers, enrollments and licenses, or licenses as "Vessels of the United States." Documentation, which implies ownership by United States citizens, confers certain benefits and privileges, such as that of engaging in coasting trade.

These data are reported in "gross tonnage," which refers to space capacity rather than weight. Currently one ton is considered equivalent to 100 cubic feet; before 1865, one ton equaled 95 cubic feet. For 1797-1834 data, years ended December 31; 1835-1842, September 30; 1843-1940, June 30; and 1941-1962, January 1. Figures for 1835 and 1843 cover only nine months. Figures for 1938-62 are not comparable with those for earlier years as they represent only those vessels still in existence as part of the merchant fleet at the end of the twelve-month period in which they were built. Therefore, they exclude those vessels which were lost, sold to the U.S. government, sold to aliens, or removed from the merchant fleet for any other reason, before the end of the period.

For a history and more detailed description, and a discussion of the limitations of the data,

see *Historical Statistics of the United States, Colonial Times to 1957*, pp. 438-441.

**C82.** *Ships and Boats Built for Domestic Consumption, Value in Current Dollars, Shaw, Annual, 1889-1937.*

**C83.** *Ships and Boats Built for Domestic Consumption, Value in 1913 Dollars, Shaw, Annual, 1889-1937.*

SOURCE: William Howard Shaw, *Value of Commodity Output Since 1869*, National Bureau of Economic Research, 1947, pp. 57, 69, and 75-76. In addition to the annual data beginning 1889, estimates are given in the source for 1869 (\$11.5 million), and 1879 (\$19.4 million).

The data represent value of work on vessels of five gross tons and over. For the period 1889-1919, estimates of value of output were used as estimates of value destined for domestic consumption. (No adjustment was made for exports and imports.)

The primary source for the 1869-1919 estimates was the *Census of Manufactures*, decennially 1869-1899 and quinquennially 1899-1919. State statistical reports from Pennsylvania, Massachusetts, and New Jersey were used to estimate the intercensal years from 1889 to 1919. For the period 1919-33 the data are based on Kuznets' estimates. (*Commodity Flow and Capital Formation*, I, New York, NBER, 1938) adjusted to improve comparability with earlier years. (Shaw's figures include all work done; Kuznets' total included work done on completed vessels only.) After 1933 the estimates are rough extrapolations.

Values in 1913 prices were derived by applying price indexes to the current price series. For 1915-1937 the deflator was an Interstate Commerce Commission index for floating

equipment, published in a mimeographed release by the ICC, Engineering Section, Bureau of Valuation, July 1, 1940. For 1889–1914 two indexes of cost to railroads of floating equipment were averaged. These indexes

were reported in *Cost of Floating Equipment* (President's Conference Committee, Eastern Group Pamphlet 290). The average was linked to the index for later years.

For a detailed description, see source.

### OIL AND GAS WELL DRILLING, ANNUAL

**C84.** *Expenditures for Petroleum and Natural Gas Well Drilling, Current Dollars, Kuznets, 1889–1928; Commerce Department, 1929–1963.*

**SOURCE:**

**1889–1928:** Unpublished annual estimates which underly five-year moving averages published, with explanatory notes, in Simon Kuznets, *Capital in the American Economy*, Princeton University Press for NBER, 1961, Tables R-5, pp. 492–493; R-15, pp. 526–527; and R-30, pp. 576–587. **1929–1938:** *National Income*, 1954 Edition, Supplement to *Survey of Current Business*, Footnote 8 to Table 31, p. 209. **1939–1945:** *Construction and Building Materials, Statistical Supplement*, May 1954, U.S. Department of Commerce, Business and Defense Services Administration, Table 24, p. 56. **1946–1956:** *U.S. Income and Output*, Supplement to *Survey of Current Business*, 1958. **1957–1963:** *Survey of Current Business*, July issues, 1962 and 1964.

The Kuznets data were calculated by multiplying the series in 1929 prices (see Series C85) by the price index for petroleum pipe lines. For 1915–28, this price index was calculated from *Construction and Building Materials, Statistical Supplement*, May 1954, pp. 33 and 82, and it was extrapolated back from 1915 by the total construction cost index described in Kuznets, *National Product Since 1869*, Table IV-4, notes to line 1.

The Commerce Department estimates were prepared by the Building Materials and Construction Division of the Business and Defense Services Administration. They represent all costs of drilling, including the cost of casings. The cost of installed production equipment,

such as flowing and pumping equipment, is excluded.

The figures are based on the cost of drilling oil and gas wells, as reported in the Census of Mineral Industries, 1939 and 1958, interpolated and extrapolated by annual data on the number of wells completed (from trade sources) and on average cost per well (estimated by the compiling agency).

For an extrapolation back to 1897 of expenditures for oil and gas well drilling, on the basis of the value of output, see Goldsmith, *A Study of Saving*, Vol. I, Table R-33, p. 626.

**C85.** *Expenditures for Petroleum and Natural Gas Well Drilling, Constant Dollars, Kuznets, 1889–1945; Commerce Department, 1946–1963.*

**SOURCE:**

**1889–1945:** Unpublished annual estimates which underly five-year moving averages published, with explanatory notes, in Simon Kuznets, *Capital in the American Economy*. **1946–1963:** Same as above for current dollar series (C84).

The Kuznets data, in 1929 dollars, for 1889–1918 were extrapolated from the 1919 figure by the number of wells drilled each year (see pp. 526–527 of Kuznets, *Capital in the American Economy* for derivation). For 1919–28, data were extrapolated from the 1929 figure by the series described in Kuznets, *National Income and Its Composition, 1919–1938*, p. 645. This series is based on individual state data for number of wells drilled and 1935 costs. For 1929–45, Kuznets used the Com-

merce series in current prices (C84) divided by the price index for petroleum pipe lines, calculated from *Construction and Building Materials, Statistical Supplement*, May 1954, pp. 33 and 82, and adjusted to a 1929 base.

The Commerce Department series, in 1954 dollars, 1946–1963, is the 1954 value figure (Series C84), extrapolated by total footage drilled annually.

*PRIVATE INVESTMENT IN MANUFACTURING  
STRUCTURES, COMMERCE, ANNUAL*

**C86.** *Private Purchases of Structures for Manufacturing Establishments, Current Dollars, 1929–1962.*

**C87.** *Private Purchases of Structures for Manufacturing Establishments, Constant Dollars, 1929–1962.*

SOURCE:

**1929–1955:** *U.S. Income and Output*, Supplement to the *Survey of Current Business*, 1958, Table V-12, pp. 196–197. **1956–1958:** *Survey of Current Business*, July 1962, Table 40, p. 25. **1959–1962:** *Survey of Current Business*, July 1963, Table 40, p. 30.

For 1929–55, estimates of expenditures for structures from the 1939 and 1947 Censuses of Manufactures and the Annual Surveys of Manufactures for 1949–53 were used as benchmarks for the privately built structures part of this series, after adjustment of the earlier figures to cover expenditures by establish-

ments not in operation during the year, and to allow for other undercoverage. These were interpolated and extrapolated by Commerce data on industrial construction put in place (Series C35).

Purchases of structures built for the federal government, of some significance after World War II, were derived from data of the War Assets Administration, the General Services Administration, and the Federal Facilities Corporation. Land and pipelines were excluded.

The constant dollar series was derived using the Commerce deflator for industrial buildings (Series C36). The figures for 1956–62 are an extension of the earlier series, using similar data and “short-cut methods.” No description of methods for this segment of the series has been issued. This set of estimates has been discontinued and a revision is being prepared by the Department of Commerce.



## D. Construction Materials

**D1.** *Manufacturers' New Orders of Construction Materials, Supplies, and Intermediate Products, Census, Monthly, 1953-1963.*

**D2.** *Manufacturers' Shipments of Construction Materials, Supplies, and Intermediate Products, Census, Monthly, 1953-1963.*

SOURCE:

**January 1953-July 1963:** *Manufacturers' Shipments, Inventories and Orders: 1947-1963 Revised*, Series M3-1, Bureau of the Census, 1963. **August-December 1963:** *Current Industrial Reports, Manufacturers' Shipments, Inventories and Orders*, Series M3-1, monthly issues, October 1963 to January 1964.

These two series were initiated by the Bureau of the Census in 1963, in connection with a major revision of the former monthly *Industry Survey* of the Office of Business Economics. Data on six market categories, which cut across major industry groupings were introduced in the new series.

The market category "construction materials, supplies, and intermediate products" includes lumber and wood products, excluding wooden containers; building paper; paints and related products; paving and roofing materials; all stone, clay, and glass products, excluding glass containers and kitchen articles; and fabricated metal building materials and wire products.

Data are collected from a sample panel of manufacturing companies. They are reported separately for units within a company which are reasonably homogeneous as to type of activity. These units may be subsidiaries, divisions, departments, or plants, depending upon the structure and activities of the particular firm.

Monthly shipment estimates are based on the sample, and data from the *Annual Survey of Manufactures* are used as annual benchmarks. The latter are establishment-based data, in contrast to the company-based data from *Statistics of Income* which were used as benchmarks in the former *Industry Survey*. As an interim procedure, pending further study of the proper level for unfilled orders, a benchmark level for August 1962 was established by relating the ratio of unfilled orders to shipments (from the sample) to the August 1962 shipments estimates for each detailed category. The estimates for new orders are net of cancellations. They are derived by adding the change in unfilled orders between the current and previous month to the shipments estimate. Tabulation of the series on the new benchmark basis was begun with January 1960 data. Approximately comparable monthly data were developed for 1953-59.

Seasonal adjustment is by the source. Data shown without seasonal adjustment have been adjusted for trading-day and calendar-month variation.

The source includes a detailed description of the series and a comparison of the shipment data (Series D2) with the Federal Reserve Board indexes of industrial production (Series D5).

**D3.** *Index of Shipments of Construction Materials, Federal Employment Stabilization Board, Monthly, 1925-May 1942 (1929 = 100).*

SOURCE:

**1925-1937:** Standard and Poor's *Basic Statistics*, Section 5, 1942. **1938-1942:** Standard and Poor's *Current Statistics*, Vol. 97, No. 9, Section 1, September 1942.

This series was compiled by the Federal Employment Stabilization Board, whose functions were taken over in the late thirties by the Federal Stabilization Office, and in 1939 by the National Resources Planning Board. The series was discontinued in May 1942.

By 1930, the index was composed of thirty individual series on the quantity of shipments of construction materials. Twelve series were used beginning in 1925, and additional series were added as they became available. The individual series are weighted in the index according to relative cost of the construction materials.

The materials included in the index as of January 1925 were: terra cotta, floor and wall tile, steel plate, enameled sanitary ware, asphalt, cement, explosives, face brick, cast iron boilers, radiators, oak flooring, and maple flooring. These were added to as follows: July 1925, vitreous china plumbing; January 1926, water softening apparatus; January 1927, pumps and water systems, limestone, concrete reinforcing steel; February 1927, steel boilers; September 1927, plumbing porcelain; January 1928, prepared roofing, gas-fired boilers, rubber flooring, window glass; January 1929, oil burners, paint and varnish, lead pipe, oakum; January 1930, range boilers, plumbers' woodwork, plastic paints.

Seasonal adjustment is by the compiling agency.

For the period January 1941 to May 1942 the unadjusted and seasonally adjusted data are inconsistent as to level. Since it has not been possible for us to determine which is correct, we do not show an annual figure for 1941.

An earlier index, which was a simple average of six items, was compiled by Associated General Contractors and published in the *Survey of Current Business*, May 1927, p. 22, the 1932 Annual Supplement, p. 36, and later issues. It covered 1913 through 1920, annually, and 1921 through March 1932, monthly.

D4. *Index of Output of Construction Materials, BDSA, Monthly, 1947-1963 (1947-49 = 100.)*

SOURCE:

1947-1954: *Construction Review*, January 1959. Revised figures for January 1952 were obtained directly from the Office of Business Economics. 1955-1958: Office of Business Economics, U.S. Department of Commerce (unpublished revisions). 1959-1962: *Business Statistics*, Supplement to *Survey of Current Business*, 1963 Edition. 1963: *Survey of Current Business*, monthly issues, 1964.

The Building Materials and Construction Industries Division of the Business and Defense Services Administration is responsible for compiling these data. The composite index measures changes in the physical volume of output of ten groups of construction materials, which together represented about 50 per cent of the estimated value of shipments of all construction materials in 1947. Materials included are iron and steel products; lumber and wood products; portland cement; millwork; paint, varnish, and lacquer; asphalt products; heating and plumbing equipment; clay construction products; gypsum products; and plumbing fixtures.

An index for each of the ten groups is constructed from data on production, sales, or shipments of one or more specific materials. Data are compiled quarterly for gypsum products and plumbing fixtures, and monthly for the other eight groups. Indexes are derived on a 1947-49 base, using physical output data multiplied by 1947 prices.

Seasonal adjustment is by the source.

D5. *Index of Production of Construction Materials, Federal Reserve Board, Monthly, 1947-1963 (1957-59 = 100).*

SOURCE:

1947-1960: *Industrial Production, 1957-1959 Base*, Board of Governors of the Federal Reserve System, 1962. 1961-1963: *Industrial*

*Production Indexes, 1961-1963*, Board of Governors of the Federal Reserve System, September 1964.

Construction materials is one of the market groupings introduced in the 1959 revisions of the Federal Reserve industrial production indexes. Indexes for most of the eighteen series which are classified as construction materials have been published monthly since 1919, but the composite index begins in 1947 (for a list of components and sources for each, see *Industrial Production, 1957-1959 Base*, pp. S-4 to S-19). These series, which include products of both the mining and the manufacturing sectors, are from the Bureau of the Census, the Bureau of Mines, and trade association sources. Some of the monthly production estimates are derived from Bureau of Labor Statistics man-hour data, adjusted for productivity change, but the annual indexes are all based on production or shipments data.

The index is a weighted average of relatives. Beginning in 1953, the weights are based on value added, 1957-59, which is estimated by extrapolating from 1957 value added by the ratio of production in 1957-59 to production in 1957. For 1947-52, the weights were based on 1947 value-added data; however, the weighted index was linked in January 1953 to a 1957 weighted index (in the 1959 revision) and subsequently converted to the present reference period of 1957-59. The component monthly series are adjusted to benchmark data from the Census of Manufactures and to independently derived annual indexes.

The indexes represent average production per working day with public annual holidays counted as working days but allowed for in the seasonal adjustment. Seasonal adjustment is by the source.

For a detailed description of the index, see *Industrial Production, 1959 Revision* (1959); *Industrial Production, 1957-1959 Base* (1962); and *Industrial Production Measurement in the United States: Concepts, Uses, and Com-*

*pilation Practices* (February 1964)—all publications of Board of Governors of the Federal Reserve System.

This series differs from Series D4 in the base years and methods of weighting used. It also includes a wider range of products.

D6. *Output of Construction Materials Destined for Domestic Consumption, Current Dollars, Shaw, Annual, 1889-1939.*

D7. *Output of Construction Materials Destined for Domestic Consumption, 1913 Dollars, Shaw, Annual, 1889-1939.*

SOURCE: William Howard Shaw, *Value of Commodity Output Since 1869*, pp. 64-65, 69, and 76-77. In addition to the annual data beginning in 1889, estimates are given in the source for 1869 and 1879 as follows: 1869 (\$ million), current dollars, 377.4; 1913 dollars, 351.4. 1879 (\$ million), current dollars, 444.2; 1913 dollars, 545.7.

Data represent total output of construction materials, less exports and plus imports. Construction materials include (1) nonmanufactured commodities, such as lumber (destined for direct use in construction), crossties, sand and gravel, and crushed stone; and (2) manufactured products, such as lumber products, cement, brick, rails, structural ironwork, etc. (For complete list of manufactured products, see source, pp. 133-135.) These covered commodities include some which were classified directly as construction materials, and another group of "mixed commodities," such as lumber, wrought pipe, and statuary and art goods, for which the proportion allocable to construction materials was estimated. Value estimates exclude costs after production, such as transportation and distribution costs.

For the period 1869-1919, output, exports, and imports were estimated as follows. Estimates of the value of output are based primarily on the *Census of Manufactures*, decennially, 1869-1899, and quinquennially,

1899–1919. Intercensal estimates were developed from state statistical reports for seven states (see source, pp. 232–233), figures from governmental agencies such as the Bureau of Mines, and the Department of Agriculture, and from trade associations such as the American Iron and Steel Institute (see source, pp. 241–242). Exports were compiled from detailed statistics in the December issues of the *Monthly Summary of Foreign Commerce* for 1893–1919. For 1869, 1879, and 1889–1893, calendar-year totals were derived from the *Quarterly Report of the Chief of the Bureau of Statistics*, U.S. Treasury Department. These basic export statistics were modified as to classification of commodities, and were adjusted to price levels comparable with the output data (manufacturers' or producers' prices). Imports for consumption, including duties, were obtained from fiscal-year data in *Foreign Commerce and Navigation*, and were adjusted to a calendar-year basis.

For the period 1919–33, the data are based on Kuznets' estimates (*Commodity Flow and Capital Formation*, I, New York, NBER, 1938), adjusted to improve comparability with earlier years. Ratios of Kuznets' unadjusted value of domestic consumption to his unadjusted value of domestic output were computed for 1919 and 1929 and interpolated for intervening years. These ratios were applied to Kuznets' adjusted output values. After 1933 the estimates are rough extrapolations.

Values in 1913 prices were derived by applying price indexes to the current price series. For 1914–39, Bureau of Labor Statistics indexes for lumber and building materials and for steel rails were combined, using 1926 weights. For 1890–1913, a similar composite, using 1909 weights, was combined with an index of structural steel prices, computed from *Metal Statistics*, 1938. For years before 1890, series on eleven commodities were combined, using 1909 BLS weights, and the resulting index was linked to the series for later years.

**D8.** *New Orders of Rails (Tonnage) by Railroads, Quarterly, 1870–1926; 1924–1950.*

SOURCE:

**1870–1926:** John E. Partington, *Railroad Purchasing and the Business Cycle*, The Brookings Institution, 1929. **1924–1950:** Compiled by NBER from *Railway Age* files on weekly orders.

In the 1870–1926 segment, orders for rails refer only to steam railroad purchases, where possible, and exclude streetcar and interurban transit lines. Partington gathered his information from news items appearing in trade journals such as *Railway Age*, *Iron Age*, and *Iron Trade Review*. The main source for the early years, *Bulletin of the American Iron and Steel Association*, was used only through 1912, as weekly data were not published after this time.

In determining the month in which orders for rails occurred, it was assumed that there was as a rule an average lag of two to three weeks between the placing of the order and the appearance of a corresponding news item in a periodical. Therefore, an order was generally attributed to the month preceding the one in which it was reported, unless the exact date of the order was given.

No attempt was made by Partington to adjust for possible undercoverage in the series. A comparison with data on apparent consumption (see Series D16) suggests very large undercoverage in the earlier years and possibly considerable fluctuations in coverage in later years (Partington, pp. 230–231). The series was intended for use in studying cyclical fluctuations and is clearly unsuitable for judging trends. To the extent that variations in the ratio of reported orders to apparent consumption reflect year-to-year coverage fluctuations, rather than differences in timing between orders and consumption, the usefulness of the series for cyclical analysis is also reduced.

The 1924–50 segment of the series was compiled from rail orders reported weekly in *Railway Age* news items. For this segment, the dat-

ing of orders assumed only a three-to-twelve-day lag between the placing of an order and the date it was published. Therefore, orders falling anywhere between the first and the sixth of a month were placed in the preceding month.

Seasonal adjustment is by NBER.

**D9.** *New Orders of Oak Flooring (Board Feet), Monthly, 1912-1963.*

**D10.** *Shipments of Oak Flooring (Board Feet), Monthly, 1912-1963.*

**D11.** *Production of Oak Flooring (Board Feet), Monthly, 1912-1963.*

SOURCE:

**1912-1922:** *Survey of Current Business*, May 1924. **1923-1933:** Supplements to *Survey of Current Business*, 1932 and 1936. **1934-1948:** *Lumber Industry Report, August 1950 Statistical Supplement*, Department of Commerce, Office of Industry and Commerce. **1949-1962:** *Business Statistics*, Statistical Supplement to *Survey of Current Business*, Biennial editions, 1953-1963. **1963:** *Survey of Current Business*, December 1964.

The statistics were compiled by the National Forest Products Association (formerly National Lumber Manufacturers Association), from monthly reports from members and nonmembers, with estimates for nonreporting mills. The mills reporting represent about 75 per cent of total industry output in recent years.

Beginning in 1941, the figures include prefinished flooring. Relatively small amounts of heavy hardwood flooring other than oak have been included since 1945. (Approximately 5 per cent of the total is usually maple, beech, birch, and pecan.)

Seasonal adjustment is by NBER.

**D12.** *New Orders of Southern Pine Lumber (Board Feet), Monthly, 1916-1963.*

SOURCE:

**1916-1929:** Southern Pine Association. **1929-1947:** *Lumber Industry Report*, Statistical Supplement, U.S. Department of Commerce,

Office of Industry and Commerce, August 1950. **1948:** Office of Business Economics, U.S. Department of Commerce (unpublished revisions). **1949-1960:** *Business Statistics*, supplement to *Survey of Current Business*, Biennial Editions, 1951 through 1963; and (for 1954 data) *Survey of Current Business*, November 1957, p. 24, U.S. Department of Commerce. **1961-1962:** Office of Business Economics, U.S. Department of Commerce (unpublished revisions). **1963:** *Survey of Current Business*, February and September 1964.

Data were compiled by the National Forest Products Association (formerly National Lumber Manufacturers Association), from monthly reports from individual mills. Figures for the 1916-1929 segment cover 192 mills; those for the 1929-63 segment are estimates for all producers of Southern yellow pine, based on data from reporting mills accounting for approximately one-sixth of total output in recent years.

Data are adjusted to the level of the annual production figures published by the Bureau of the Census (except for 1948, when no Census survey was made). Since there was considerable undercoverage in the Census data prior to 1942, data for those years are understated to an unknown degree. ◊

Seasonal adjustment is by NBER.

**D13.** *New Orders of Fabricated Structural Steel (Tonnage), Monthly, 1909-1963.*

SOURCE:

**1909-1922:** *Record Book of Business Statistics, Part II*, U.S. Department of Commerce, 1927. **1923-1932:** *Survey of Current Business*, 1932 Supplement and issue of March 1933. **1933-1963:** American Institute of Steel Construction, Inc. Current data are available in *Survey of Current Business*.

Data represent estimates for the total fabricated structural steel industry. They cover

only structural steel fabricated to order for use in construction. Products such as window and door frames, stairs, and ornamental iron are not included. Beginning in 1952 certain items not previously covered were included (intercompany and export work). New orders are net and pertain to actual contracts closed.

Estimates for 1909–32 were prepared by the Bureau of the Census, based in part on data compiled by the Bridge Builders and Structural Society and the Central Fabricators' Association. Percentages of capacity for covered firms were applied to total capacity to derive total industry estimates. For 1933–42 and 1946–63, estimates for the entire industry were prepared by the American Institute of Steel Construction, based on reports from members who account for over 50 per cent of total industry shipments. For the years 1943–45, the Institute compiled data only on tonnage actually reported. Industry totals shown for these years were derived by NBER on the assumption that coverage was 80 per cent.

The latest revision of the series by the A.I.S.C., to the level of the 1958 Census of Manufactures, covers only the years from 1947 on. We have therefore shown an overlap in 1947.

Seasonal adjustment is by NBER.

**D14.** *Index of Lumber Production, Federal Reserve Board, Monthly, 1919–1947 (1935–39 = 100); and 1947–1963 (1957–59 = 100).*

SOURCE:

**1919–1942:** *Federal Reserve Index of Industrial Production*, Board of Governors of the Federal Reserve System, October 1943. **1943–1947:** *Federal Reserve Bulletin*, Board of Governors of the Federal Reserve System, monthly issues, 1944–48. **1947–1960:** *Industrial Production, 1957–59 Base*, Board of Governors of the Federal Reserve System, 1962. **1961–1963:** *Industrial Production Indexes, 1961–1963*, Board of Governors of the Federal Reserve System, September 1964.

This index measures changes in the physical volume of lumber production, and does not cover logging and lumber products (millwork, etc.). The basis for the index is the National Lumber Manufacturers Association series on lumber production, in board feet. This series is currently available in the *Survey of Current Business*, and a brief description of it appears in *Business Statistics*, 1963 edition.

This index is a component of the Federal Reserve Index of Production of Construction Materials, 1947–1963 (Series D5). The indexes for individual series are available on the 1957–59 base only from 1947; for earlier years the latest data are on a 1935–39 base. This series is therefore shown here in two segments with an overlap of one year.

For a summary of the methods used in calculating the indexes, see notes to Series D5. Lumber production constituted about 10 per cent of total output of products classified as construction materials in 1957–59.

Seasonal adjustment for 1919–47 is by the source; and for 1947–63 by NBER. The original and seasonally adjusted data have been adjusted for variations in the number of working days.

For a detailed description, see above sources, references given in Series D5, and *Federal Reserve Bulletin*, December 1953.

**D15.** *Index of Production of Clay, Glass, and Stone Products, Federal Reserve Board, Monthly, 1919–1947 (1935–39 = 100); and 1947–1963 (1957–59 = 100).*

SOURCE: Same as that for Series D14.

This index measures changes in the physical volume of production of clay, glass, and stone manufactured products. It does not cover stone and earth minerals. It is based on production or shipments data from the Bureau of the Census, the Bureau of Mines, and trade associations, such as the American Glassware Association; and on BLS man-hours data.

The index is available on the 1957–59 base only from 1947; for earlier years the latest

data are on a 1935-39 base. This series is therefore shown here in two segments with an overlap of one year.

For a summary of the methods used in calculating the index, see notes to Series D5. Most clay, glass, and stone products (85 per cent of output in 1957-59) are classified as construction materials and are included in the index for that market group. In 1957-59 they accounted for over one-quarter of total production of construction materials.

Major revisions of the clay, glass, and stone index were made in 1940, 1943, 1953, 1959, and 1962. In addition to changes in the base period, the revisions affected the composition of the index, weighting, adjustment to benchmark levels, types of basic data used, and method of seasonal adjustment.

Seasonal and working-day adjustments are by the source.

For a detailed description of the index and the revisions, see above sources, references given in Series D5, and *Federal Reserve Bulletin*, December 1953.

**D16. Rail Consumption (Tonnage), Annual, 1849-1961.**

SOURCE:

1849-1940: American Iron & Steel Institute, *Annual Statistical Reports*. 1941-1961: *Metal Statistics*, American Metal Market, 1962 and 1963.

Rail consumption estimates are computed as rail production plus imports and minus exports. Prior to 1872 figures are only for production plus imports. Data through 1940 were computed by the American Iron and Steel Institute. Data beginning 1941 from *Metal Statistics* are based on AISI production figures, and import and export data are from the U.S. Department of Commerce.

The data cover total production of iron and steel rails. They include rerolled rails, girder and high tee rails, and streetcar rails.

**D17. Portland Cement Production, Monthly, 1911-1963.**

**D18. Portland Cement Shipments, Monthly, 1911-1963.**

SOURCE:

1911-1920: George Otis Smith, *et al.*, "Fluctuations in Mineral Output," *The Problem of Business Forecasting*, papers presented at the Eighty-Fifth Annual Meeting of the American Statistical Association, edited by Warren M. Persons, William Trufant Foster, and Albert J. Hettinger, Jr., Cambridge, 1924. 1921-1962: *Survey of Current Business*, September 1923, and Supplements, 1932-63. 1963: *Survey of Current Business*, monthly issues, March 1964 to February 1965.

The data relate to finished portland cement, measured in number of barrels, for the entire industry. They include high-early-strength cement which, beginning 1955, is separately reported by the compiling agency. Clinker cement, an intermediate product, is excluded.

The 1911-1920 data were compiled by E. F. Burchard of the U.S. Geological Survey, from data furnished by the Portland Cement Association. The original data, representing 93 to 99 per cent of industry production, were supplemented with estimates for nonreporting plants.

Data after 1920 are from the Bureau of Mines, U.S. Department of the Interior. They include 48 states and the District of Columbia; Puerto Rico (where operation was started in 1940); and Hawaii (for September 1944 through 1946 and beginning 1961).

Seasonal adjustment is by NBER.

**D19. Asphalt Production, Monthly, 1917-1950 (Short Tons), 1951-1963 (Barrels).**

SOURCE:

1917-1930: *Petroleum Refinery Statistics*, U.S. Bureau of Mines, Bulletins 280, 289, 297, 318, 339, 367. 1931-1940: *Minerals Year Book*, U.S. Bureau of Mines, 1931-1940. 1941-1962: *Sur-*

*vey of Current Business*, Biennial Supplements, 1947–1963. 1963: *Survey of Current Business*, monthly issues, February 1964 to February 1965.

The Bureau of Mines is the official source for these data. Figures through 1958 are for the U.S., excluding Alaska, Hawaii, and Puerto Rico. Alaska and Hawaii were included beginning January 1959. The data cover only

asphalt made from petroleum, domestic and imported.

Monthly data for years through 1950 were reported in thousands of short tons; beginning in 1951, data were reported in thousands of barrels. We have converted the earlier annual figures to barrels, on the basis of 5.5 barrels to a short ton. Monthly data presented here are as reported in the source.

Seasonal adjustment is by NBER.



