

HISTORY OF UNITED STATES SENATE ROOF
AND CHAMBER IMPROVEMENTS AND
RELATED HISTORICAL DATA

REPORT

OF THE

SPECIAL COMMITTEE ON THE RECONSTRUCTION
OF THE SENATE ROOF AND SKYLIGHTS AND
REMODELING OF THE SENATE CHAMBER

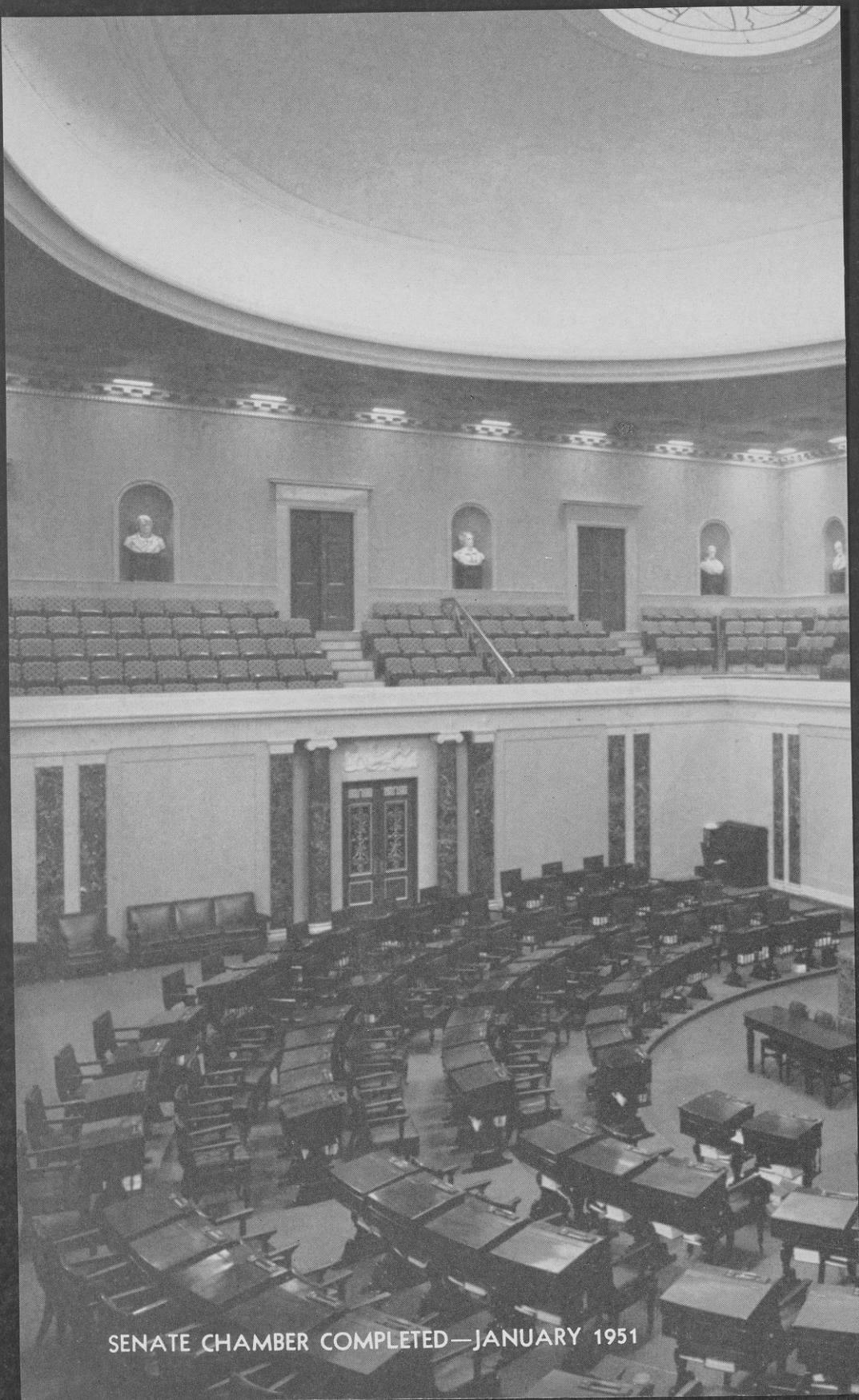


PRESENTED BY MR. CHAVEZ

APRIL 2 (legislative day, MARCH 26), 1951.—Ordered to be printed
with illustrations

UNITED STATES
GOVERNMENT PRINTING OFFICE

WASHINGTON : 1951



SENATE CHAMBER COMPLETED—JANUARY 1951



SPECIAL COMMITTEE ON RECONSTRUCTION OF ROOF AND
SKYLIGHTS OVER THE SENATE WING OF THE CAPITOL AND
REMODELING OF THE SENATE CHAMBER

DENNIS CHAVEZ, New Mexico, *Chairman*

HARRY FLOOD BYRD, Virginia

ROBERT A. TAFT, Ohio

THEODORE FRANCIS GREEN, Rhode Island

JAMES P. KEM, Missouri

LETTER OF TRANSMITTAL

ARCHITECT OF THE CAPITOL,
Washington, D. C., March 9, 1951.

Hon. DENNIS CHAVEZ,
Chairman, Special Committee on Reconstruction of Roof and Skylights over
the Senate Wing of the Capitol and Remodeling of the Senate Chamber,
United States Senate.

MY DEAR MR. CHAIRMAN: I am transmitting, herewith, report on the reconstruction of the roof and skylights over the Senate wing of the Capitol and remodeling of the Senate Chamber presented by subjects in the following sequence:

1. Historical preface:
 - (a) Introductory statement.
 - (b) Establishment of the seat of government at Washington, D. C.
 - (c) Construction of the Capitol.
 - (d) Housing of the Senate, House, and Supreme Court in the Capitol.
 - (e) Other quarters occupied by Congress.
 - (f) Quarters occupied by Senate and House during temporary and permanent reconstruction work in connection with the Senate and House roof and Chamber projects.
 - (g) Need for adequate housing accommodations.
2. Authority for roof and Chamber project.
3. Origin of project and work done prior to commencement of permanent construction program.
4. Studies, hearings, and reports preceding authorization of Senate Chamber improvements.
5. Senate committee—organization and membership.
6. Procedure followed up to time of award of contract for the construction work (1945-48).
7. Contract procedure.
8. Reconstruction of roof over the Senate wing of the Capitol.
9. Description of remodeling of the Senate Chamber and improvement of adjacent areas, divided into the following subheadings:
 - (a) Architects and other consultants retained for Senate Chamber improvements.
 - (b) Architectural treatment of Senate Chamber with relationship to other parts of the Capitol.
 - (c) Reconstruction and improvements, Senate Chamber ceiling.
 - (d) Improvements in gallery section of Senate Chamber.
 - (e) Improvements in lower section of Senate Chamber.
 - (f) Improvements in cloakrooms, lobby, and other adjacent areas.
10. Temporary structures for workmen and materials.
11. Comments on performance.
12. Authorization, appropriations, and expenditures.
13. Disposition of historic materials.
14. Appendixes:
 - (a) Legislative history of project, 1939 to 1950.
 - (b) Directives and resolution of Senate committee, dated June 18, 1948, July 11, 1950, and August 7, 1950, fixing the limit of cost for the Senate project and directing the Architect of the Capitol with respect to contract and other procedures.
 - (c) List of contracts and subcontracts entered into for the Senate roof and chamber improvements.
 - (d) Report of Thomas W. Marshall, consulting engineer, dated November 29, 1938, describing the defective condition of the old roofs over the House and Senate wings of the Capitol and recommending their replacement with new roofs.
 - (e) Senate agreement of November 22, 1940, and Senate resolutions of June 29, 1949, and August 9, 1950, ordering the Senate to meet in the old Senate Chamber, or Supreme Court room, while both the temporary and permanent construction work was done in connection with the Senate roof and chamber improvements.

A complete financial report will be made to the committee after all accounts in connection with the project have been settled.

Yours very truly,

DAVID LYNN,
Architect of the Capitol.



REPORT ON RECONSTRUCTION OF THE ROOF OVER THE SENATE WING OF THE CAPITOL AND REMODELING OF THE INTERIOR OF THE SENATE CHAMBER, INCLUDING IMPROVEMENT OF ADJACENT AREAS

HISTORICAL PREFACE

When Congress authorized the reconstruction of the roof and skylights over the Senate wing of the Capitol in 1940, no one ever thought that 9 years would elapse before the work would even commence. But war and financial stress stayed the project, adding another chapter to the history of delays and difficulties encountered in the construction of our Nation's Capitol.

It is probable that but few of the thousands who visit the Capitol ever consider that the cornerstone of this historic building was laid September 18, 1793; that the Supreme Court section of the Capitol has been occupied for over 150 years, the Statuary Hall section for over 143 years, the central section for over 121 years, the House and Senate wings for nearly a century; that the eight large paintings in the rotunda and certain other works of art have been in the Capitol for more than a century; that there is a space in the Capitol beneath the crypt, which was prepared in 1832 as a tomb for the remains of George and Martha Washington, and although their remains were never transferred from Mount Vernon to the Capitol, the space intended as the tomb is still preserved; that the statue of Freedom surmounting the dome of the Capitol was placed atop the dome on December 2, 1863, amidst the struggles of the Civil War; that each State has been authorized since 1864 to contribute two statues to Statuary Hall, and that a total of 75 statues have been contributed by the States in the intervening years; that the Capitol Building has never been completed architecturally—it having been the intention of Thomas U. Walter, in designing and constructing the House and Senate wings, that the old central portion of the building, which is constructed of Acquia Creek sandstone, be extended eastward and reconstructed in marble, so that there might be corrected the architectural defect in the building which exists due to the skirt or base of the dome extending over the east portico approximately 15 feet in such a manner as to give the appearance of an apparent lack of support to the dome; and also, in order that Members of the Congress might be provided with additional accommodations, and a durable construction be provided for the central portion of the building.

ESTABLISHMENT OF THE SEAT OF GOVERNMENT AT WASHINGTON, D. C.

No historic presentation would be complete without a short account of the various places at which Congress has assembled, of the struggles which preceded the permanent location of the seat of government,

and of the circumstances under which it was finally established on the banks of the Potomac.

The Congress of the Revolution was sometimes a fugitive, holding its sessions, as the chances of war required, at Philadelphia, Baltimore, Lancaster, Annapolis, and York. During the period between the conclusion of peace and the commencement of the present Government, it met at Princeton, Annapolis, Trenton, and New York.

After the idea of a permanent Union had been executed in part by the adoption of the Articles of Confederation, the question presented itself of fixing a seat of government, and this immediately called forth intense interest and rivalry.

That the place should be central, having regard to the population and territory of the Confederacy, was the only point common to the contending parties. Propositions of all kinds were offered, debated, and rejected. At length, on October 7, 1783, the Congress being at Princeton, to which they had been driven from Philadelphia by the insults of a body of armed men, it was resolved that a building for the use of Congress be erected near the falls of the Delaware. This was soon after modified by requiring suitable buildings to be also erected near the falls of the Potomac, that the residence of Congress might alternate between those places. But the question was not allowed to rest, and at length, after frequent and warm debates, it was resolved that the residence of Congress should continue at one place; and commissioners were appointed, with full power to lay out a district for a Federal town near the falls of the Delaware; and in the meantime Congress assembled alternately at Trenton and Annapolis; but the representatives of other States were unremitting in exertions for their respective localities.

On December 23, 1784, it was resolved to remove to the city of New York, and to remain there until the building on the Delaware should be completed; and accordingly, on January 11, 1785, the Congress met at New York, where they continued to hold their sessions until the Confederation gave place to the Constitution in March 1789. The First Congress of the United States under the Constitution met in New York City, March 4, 1789, and the first and second sessions of that Congress were held in New York City.

The commissioners appointed to lay out a town on the Delaware reported their proceedings to Congress; but no further steps were taken to carry the resolution into effect.

When the bonds of union were drawn closer by the organization of the new Government under the Constitution, in March 1789, the subject was revived and discussed with greater warmth than before. It was conceded on all sides that the residence of Congress should continue at one place, and the prospect of stability in the Government invested the question with a deeper interest. Opinions differed greatly as to where the permanent seat of government should be located and for a time, any agreement appeared to be impossible; but the good genius of our system finally prevailed, and in July 1790, an act was passed, authorizing the establishment of the permanent seat of government on the Potomac, and also providing that Congress, which had been meeting in New York City, should hold its ensuing sessions at Philadelphia, until removal of the Government to the district selected on the Potomac. Thus was settled a question which had produced much sectional feeling between the States.

From the beginning, George Washington had advocated the present seat of Government. Its establishment here was due, in a large measure, to his influence; it was his wisdom and prudence that computed disputes and settled conflicting titles; and it was chiefly through his personal influence that the funds were provided to prepare the buildings for the reception of the President and the Congress.

The account of the establishment of the seat of Government, as related in this section, is taken, largely, from Senate Document No. 67, Seventy-fourth Congress.

CONSTRUCTION OF THE CAPITOL

The Capitol at Washington was, as indicated, one of the first buildings undertaken at the new seat of Government of this country, its construction having started in 1793. It was burned by the British in 1814, and immediately rebuilt. It typifies the beginning and marks the growth of the Nation. It is in this building that the history of the country has been made.

Like the Nation, the Capitol is a growth, and it probably never will be finished. The selection of a plan for the original building was a matter of great concern to the two laymen who were at the time best qualified to judge of such things—George Washington and Thomas Jefferson.

Washington sought a combination of grandeur, simplicity, and convenience. Jefferson approved the plan of Dr. William Thornton, submitted in competition in 1792, because it was "simple, noble, beautiful." Thornton's design was conceived in terms of classic architecture, which appealed to the spirit of the times in which the Capitol was built.

The north wing of the old building, now known as the Supreme Court section of the Capitol, was the first unit to be built. It was erected during the period 1793 to 1800. The cornerstone of this wing was laid September 18, 1793, and the first meeting place of the Senate in this wing was ready for occupancy for the second session of the Sixth Congress, November 17, 1800.

The south wing of the building, in which the old Hall of Representatives, now known as Statuary Hall, is located, was next constructed, during the period 1800 to 1811, and the old Hall of Representatives was ready for occupancy for the first session of the Tenth Congress, October 26, 1807.

After the burning of the Capitol by the British in 1814, these sections of the building were reconstructed and the work of reconstruction, together with the construction of the central portion of the old building, was done during the period 1815 to 1829.

The old wooden dome was replaced with the present cast-iron dome during the period 1856 to 1865.

Construction of the Senate and House wings, in which the present Senate and House Chambers are located, was commenced in 1851. The present House Chamber was occupied for legislative purposes December 16, 1857, and the present Senate Chamber January 4, 1859.

The old portions of the building represent designs by Thornton, Latrobe, and Bulfinch, and the Senate and House wings and cast-iron dome represent designs by Thomas U. Walter.

HOUSING OF THE SENATE, HOUSE, AND SUPREME COURT IN THE CAPITOL

It is of interest to note that the north wing of the old building has in its day housed not only the United States Senate, but also the House of Representatives and the United States Supreme Court. The Senate held its first session in this wing in November 1800 and remained there until it assumed occupancy of its present Chamber in the new Senate wing January 4, 1859.

The House of Representatives occupied quarters in this wing in 1800; moved in 1801 to a temporary structure, known as the oven, erected on the site of the proposed south wing, which was later removed to make way for the construction of the south wing; moved back to quarters in the north wing in 1804 and continued such occupancy until October 1807, when the old Hall of Representatives, now Statuary Hall, was ready for occupancy, at which time the House moved from the north wing to its new quarters and remained in such quarters until December 1857, when the present House Chamber was ready for occupancy.

The United States Supreme Court held its first session in the old north wing in 1801 and continued to occupy quarters in the north wing for nearly 135 years, until the Court moved out of the Capitol and assumed occupancy of its own new building in 1935.

The Senate originally met from 1800 to 1808 in a room on the east side of the ground or basement floor of the old north wing. It may be well to state at this point, for purpose of identity, that this is the room that was recently vacated by the law library in December 1950. This room was originally two stories in height; and, in 1808-09, Latrobe divided the space into two rooms, one above the other.

While the remodeling work was being done, the Senate occupied a room on the west side of the ground or basement floor, and then the library room on the floor above now known as the disbursing office of the Senate. When the remodeling was sufficiently completed, the Senate moved in 1810 to its newly constructed Chamber on the upper or principal floor level, directly above the lower room which it had occupied from 1800 to 1808. The Senate occupied the upper room as its Chamber from 1810 until January 4, 1859, when it moved to its present Chamber in the new Senate wing.

The lower or ground floor room, occupied by the Senate from 1800 to 1808, was occupied from 1810 to 1860 by the Supreme Court, which had previously occupied other quarters in the north wing; and, thereafter, by the law library, which is, by law, a part of the Library of Congress. The law library continued its occupancy of this room, that had served as the first meeting place of the Senate, until December 1950, when the law library was moved to other quarters.

The Chamber on the upper or principal floor level, occupied by the Senate from 1810 to 1859, when vacated by the Senate, was occupied by the Supreme Court from 1860 to 1935, when the Court finally moved to its own building. This Chamber, occupied for so many years—first by the Senate and then by the Supreme Court—is now generally referred to either as the Old Senate Chamber, the Supreme Court Chamber, or the Old Supreme Court room.

OTHER QUARTERS OCCUPIED BY CONGRESS

Since original occupancy of the Capitol in 1800, the Senate and House were compelled to vacate the Capitol Building, temporarily, in 1814, due to the burning of the Capitol by the British on August 24, 1814, and to occupy other quarters while the Capitol was being restored. The burning of the Capitol occurred during the recess of Congress, and the President immediately convened the Congress. Both Houses met in a brick building known as Blodget's Hotel, located on E Street between Seventh and Eighth Streets NW., but the accommodations in that house being insufficient, a number of public-spirited citizens erected a more commodious building on Capitol Hill, on the corner of First Street and Maryland Avenue NE., and tendered it to the Congress. The offer was accepted, and the first session of the Fourteenth Congress was held in this building. Both Houses continued to occupy this building until 1819, when the Capitol was restored and the Senate and House returned to their respective quarters in the Capitol on December 6, 1819.

Following the departure of the Congress from its temporary home at First and Maryland Avenue NE., the building upon that site seems to have been used as a boarding and rooming house until the period of the Civil War, when it was again taken under Government control and used as a military prison for the temporary confinement of those whose political actions seemed hostile to the Government. During this period it was known as the Old Capitol Prison. After the Civil War, the building reverted to private occupancy, and at one time was occupied as a residence by people of distinction. In later years it was owned and occupied as the headquarters of the National Woman's Party, and was so occupied at the time of its acquisition, demolition, and removal by the Government in 1930 as part of the site for the United States Supreme Court Building.

During the period 1814-19, the Supreme Court met part of the time in quarters apart from Capitol Hill and part of the time in temporary quarters in the north wing while that wing was being restored.

QUARTERS OCCUPIED BY SENATE AND HOUSE DURING TEMPORARY AND PERMANENT RECONSTRUCTION WORK IN CONNECTION WITH THE SENATE AND HOUSE ROOF AND CHAMBER PROJECTS

In order that the recently completed Senate roof and chamber improvements might be accomplished, it was necessary for the Senate to vacate its Chamber on three different occasions and to hold its sessions in the Old Senate Chamber, or Supreme Court room, which it had vacated in 1859.

The first time was in 1940 when the temporary supports were installed under the old ceiling of the Senate Chamber. On this occasion, the Senate vacated its Chamber November 22, 1940, and returned to its Chamber January 3, 1941. The second time was in 1949 when the first-stage construction work was performed. On this occasion, the Senate vacated its Chamber July 1, 1949, and returned to its Chamber January 3, 1950. The third time was in 1950 when the second or final-stage construction work was performed. On this occasion, the Senate vacated its Chamber August 11, 1950, and returned to its Chamber January 3, 1951.

During the periods in which the House roof and chamber work was done, it was necessary for the House to vacate its Chamber and to meet in the caucus room in the New House Office Building, as no other suitable accommodations were available in the Capitol for the holding of the sessions of the House.

NEED FOR ADEQUATE HOUSING ACCOMMODATIONS

In 1800-1801, when the Senate, House, and Supreme Court were all originally housed in the old north wing of the Capitol it is well to remember that the city of Washington contained 109 brick and 263 frame houses; that the population was about 3,000; and that the Congress contained in the House and Senate 138 Members; also that by 1802 there were but 126 Federal employees in the city.

The Senate and House have been concerned with problems of space throughout the years, since 1800. As additional wings were added to the Capitol, available office space in the Senate wing went, generally, to committee chairmen. Not all of the Senators could be accommodated in the Senate wing of the Capitol at any time and no adequate or central office space was provided for them until the Senate, in 1891, acquired the old Maltby Building, which stood at the junction of New Jersey Avenue and B Street NW. This became the Senate's first office building and was thereafter called the Senate Annex.

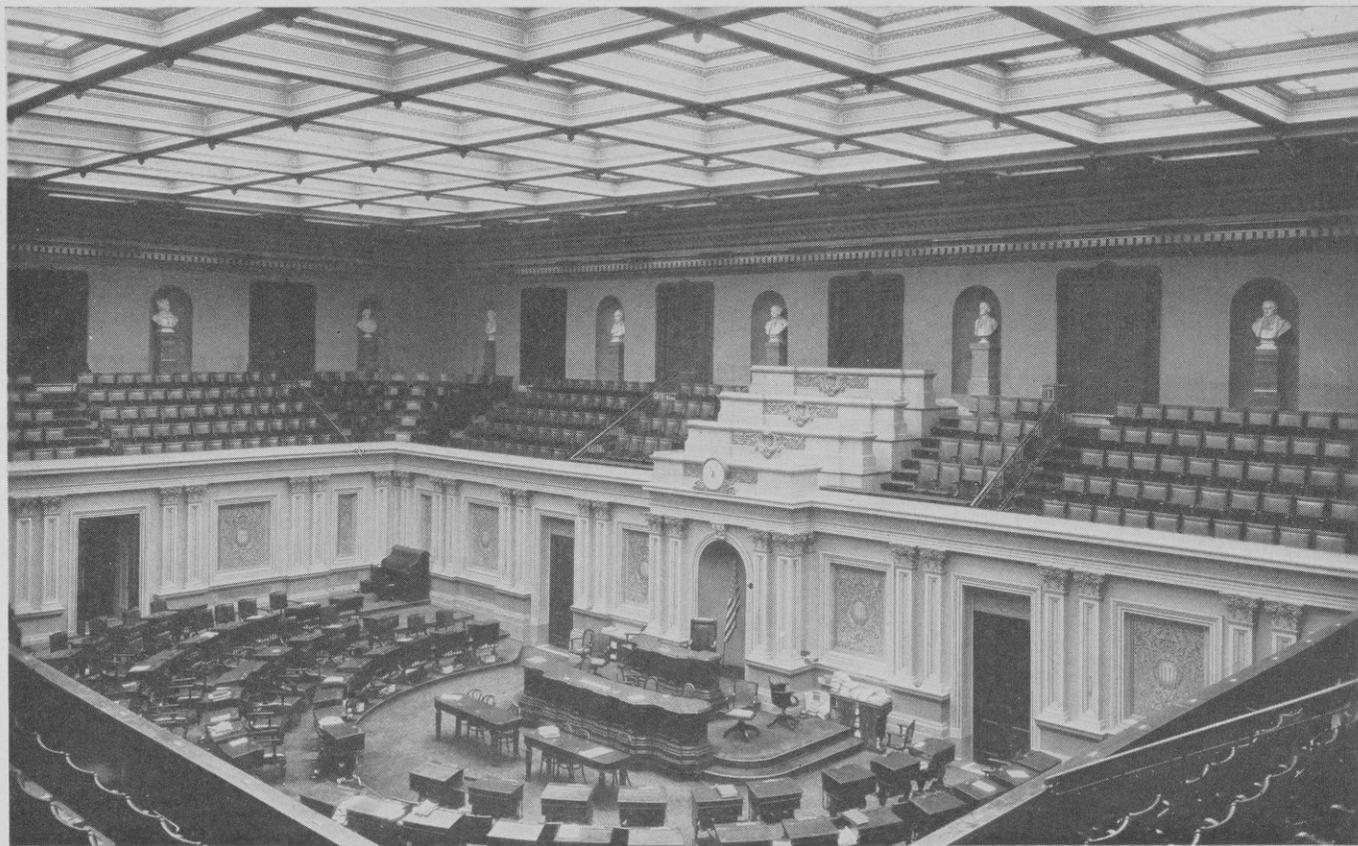
After the Library of Congress moved out of the central section of the Capitol and assumed occupancy of its new building in 1897, the old library space in the Capitol was converted into office and committee space, as a further effort to relieve the shortage of adequate housing requirements.

With the continued growth of the Nation, the increased population of the city of Washington, the increased membership of the Senate and House, the growth of the Government, and the general increase of public business, it became necessary for the Congress in 1903 to authorize the construction of an office building for the House of Representatives, and in 1904 to authorize the construction of an office building for the United States Senate. The Senate Office Building, consisting of a U-shaped, three-wing building was erected and occupied March 5, 1909, and all but eight Senators (who remained in the Capitol) moved their quarters to it. Upon occupancy of the new building, the Senate discontinued occupancy of the Maltby Building in 1909.

By 1931, it became necessary for the Congress to authorize completion of the Senate Office Building by erection of the First Street wing, and the new wing was completed and occupied by the Senate in June 1933, as a further effort to relieve overcrowded conditions. In the meantime, it had been necessary for the Congress in 1929 to authorize construction of a second office building for the House of Representatives, which was completed and occupied by the House in 1933.

The demands for increased office and committee space still continue, and each year that has passed since 1865 has served to emphasize the wisdom of such long-range planning, as contemplated by Thomas U. Walter in his plans for extension and completion of the Capitol.

The years have passed and although the Capitol Building has never been completed, the years 1949 and 1950 have witnessed the preservation of the Capitol by the reconstruction of the roofs over the Senate and House wings and the remodeling of the Senate and House Chambers, and have marked another milestone in the history of the Capitol.



Senate Chamber prior to remodeling.

AUTHORITY FOR SENATE ROOF AND CHAMBER PROJECT

Congress, by act of June 27, 1940, Public Law 668, Seventy-sixth Congress, authorized and directed the Architect of the Capitol to reconstruct the roofs over the Senate and House wings of the Capitol, and by act of July 17, 1945, Public Law 155, Seventy-ninth Congress, enlarged the scope of the project, which had in the meantime been delayed by the war, to include elimination of skylights over the two Chambers in lieu of their retention as contemplated under the 1940 statute, and provided also for other improvements within the two Chambers. The 1945 statute provided, specifically, for the substitution of reinforced concrete roof slab for the skylights over the two Chambers, reconstruction of the ceilings of the Chambers, acoustical treatment, improved lighting, redecoration, and other alterations, changes, and improvements within the Chambers.

The 1945 statute also provided that the Senate roof and chamber project be carried forward under the direction of a committee of five Senators to be appointed by the President pro tempore of the Senate, and the House roof and chamber project under the direction of a committee of five Representatives to be appointed by the Speaker of the House of Representatives.

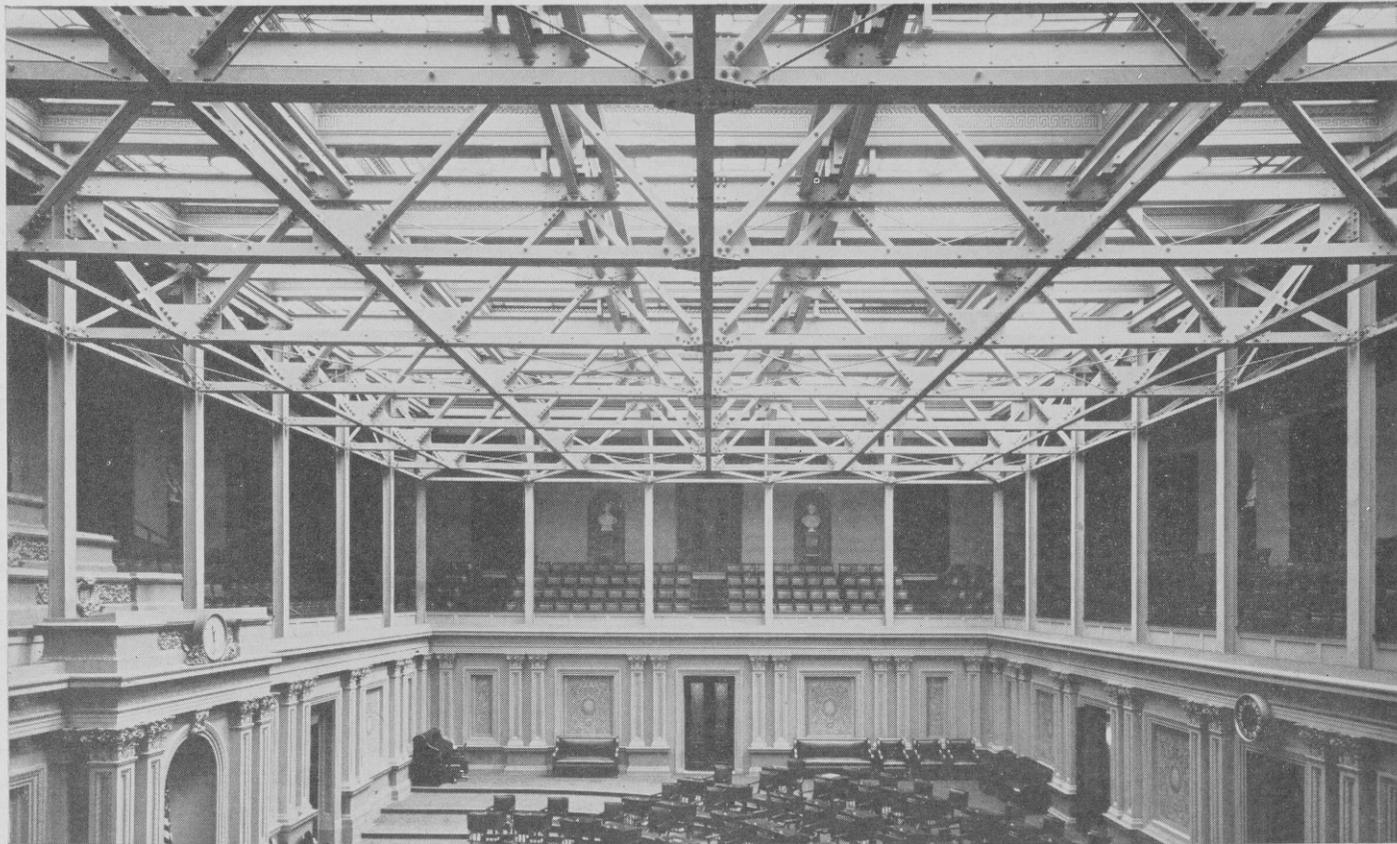
ORIGIN OF PROJECT AND WORK DONE PRIOR TO COMMENCEMENT OF PERMANENT CONSTRUCTION PROGRAM

The Senate roof and chamber project had its origin in engineering surveys made in 1938, under the direction of the Architect of the Capitol, by Thomas W. Marshall, consulting engineer, of Washington, D. C., an expert specializing in this field of construction, which disclosed that the wrought-iron and cast-iron roof framing of the House and Senate wings of the Capitol, constructed in the 1850's, was obsolete and far short of present-day safety requirements, and should in the interest of safety be replaced without delay because of serious deficiencies in the roof trusses. Mr. Marshall's findings were reviewed and concurred in by four Government engineers in 1939; also by two private practicing engineers, Herman F. Doeleman of Baltimore, Md., and F. H. Frankland of New York City, in 1940, who made their studies under the direction of a special joint congressional committee.

Following hearings before the House and Senate Committees on Appropriations and submission of a formal report to Congress by the special joint congressional committee recommending replacement of the old roofs, funds and authority for reconstructing the roofs and skylights over the House and Senate wings were provided in the Second Deficiency Appropriation Act, 1940, approved June 27, 1940.

On June 29, 1940, the Architect of the Capitol entered into a contract with Thomas W. Marshall and James M. Gongwer, consulting engineers of Washington, D. C., for furnishing the consulting engineering services, including surveys, preparation of drawings, specifications, and supervision, for reconstruction of the roofs and skylights over the Senate and House wings of the Capitol.

As indicated, it was the defective condition of the old roof construction, particularly deficiencies in the roof trusses, which gave rise to the roof and chamber project.



View showing temporary supports under ceiling of Senate Chamber 1940-49.

The war made it impossible to proceed with the permanent project as planned. As a temporary expedient, temporary steel supports were installed under the ceiling of the Senate Chamber in the fall of 1940 to relieve the old trusses of the dead-weight load of the ceiling, thereby removing the danger of a collapse of the ceiling pending its permanent reconstruction. The ceiling was jacked up and the ceiling load transferred to the temporary trusses. The temporary trusses were supported by a series of columns which started at the gallery level on top of the brick wall at the front of the gallery. During the 9 years that these temporary trusses were in place they were called many things from "barn rafters" on down. But they served a very useful purpose and set many minds at rest concerning the safety of our legislators during the critical war years.

STUDIES, HEARINGS, AND REPORTS PRECEDING AUTHORIZATION OF SENATE CHAMBER IMPROVEMENTS

About 8 months after the temporary supports had been installed, the Senate decided to have studies made of the lighting, acoustics, and air conditioning of the Senate Chamber, with a view to improving these facilities as a part of the roof reconstruction program.

On September 8, 1941, the Senate considered and agreed to Senate Resolution 150, Seventy-seventh Congress, introduced by Senator Charles O. Andrews, of Florida, authorizing and instructing the Senate Committee on Public Buildings and Grounds to make a study of (a) better lighting system for the Senate Chamber and the Senate Office Building; (b) plans for redecorating and providing better acoustics in the Senate Chamber; and (c) better system of lighting for the Senate library, Senators' reading rooms, and library stack rooms; and to submit to the Senate a report with recommendations regarding the same.

The studies were made by a subcommittee of the Senate Committee on Public Buildings and Grounds, consisting of Senator Charles O. Andrews, chairman, Senator Theodore F. Green, of Rhode Island, and Senator Hugh A. Butler, of Nebraska. Hearings were held before the subcommittee on October 24 and 27, 1941. The subcommittee made a report to the full committee, which, after consideration by the full committee, was adopted as its report. The report, Senate Report 1043, Seventy-seventh Congress, was submitted to the Senate by the committee February 5, 1942. The report recommended an appropriation to provide for the replacement of the existing iron and glass roof over the Senate Chamber with a steel and concrete metal covered roof; the replacement of the iron and glass panel ceiling with a vaulted type of plaster ceiling acoustically treated and decorated and arranged with a series of oval coves, with incandescent lights installed in the coves; the installation of acoustical material on the gallery walls and replacement of existing gallery seats with new noiseless seats; also improvements in the air-conditioning system serving the Senate Chamber. The report also recommended better lighting for the Senate library and the Senate Office Building.

The following information developed at the hearings and included in the 1942 committee report is considered of interest to include in this report. The information referred to was stated in Senate Report 1043, as follows:

The Senate Chamber was constructed between 1851 and 1865 from the designs and plans prepared by Thomas U. Walter as a part of the extension of the north wing of the Capitol Building.

The Chamber was first occupied by the Senate in 1859, previous to which time it had been occupying the room in the Capitol recently vacated by the United States Supreme Court.

Originally, the Chamber was partially lighted by gas. In 1897, electric lights were substituted. These artificial lights occupied a space between the ceiling and glass roof, and this method of lighting has been continued with some modifications and improvements until the present time.

The present ceiling is composed of cast iron and weighs 90 tons. Panels of stained glass are inserted in the central panels of the ceiling and skylights over them admit daylight to the room. When artificial light is necessary, it is supplied by the large clusters of electric lights located between the glass ceiling and the glass roof.

This method of lighting is far from satisfactory. The variation produced by changes of the weather makes the natural lighting through the skylight uncertain and of varying intensity, and, when artificial illumination is used to aid skylighting, the contrast between the lighted glass panels and the unlighted portion of the ceiling is not agreeable and is more or less injurious to the eyes.

In 1929 the present air-conditioning system was installed in the Chamber. The system has been very successful.

The acoustics of the Chamber room are very defective. Senators speaking from certain parts of the floor are heard with difficulty and this, added to the noise of spectators moving in the gallery, results in considerable confusion and creates a generally disturbing situation. For these reasons, the Committee on Public Buildings and Grounds was authorized and instructed by Senate Resolution 150 of the Seventy-seventh Congress to make a study of the problem and make recommendations for installing a better lighting system in the Senate Chamber, also plans for redecorating the interior and for providing better acoustics in the Senate.

In the course of the hearings it was brought out that the time of reconstructing a permanent roofing, for which an appropriation has been made, would be a propitious one to improve the acoustics of the Chamber, and also to provide a much better lighting system. This would involve replacing the present cast iron and glass ceiling with a plastered ceiling made of acoustical material arranged with a series of oval coves in which incandescent lights could be installed in such a manner that the light would be thrown upon the ceiling and reflected down from it without casting shadows.

We find that the acoustic properties of the Senate Chamber can and should be improved. The present glass ceiling is a reflector of sound and it is so high that the sound which is reflected to a listener on the floor returns a fraction of a second later than the direct sound, with the result that it is more difficult to understand speech than it would be if this reflected sound were eliminated. Also noise which originates in the galleries is reflected to the floor, and this increased noise level makes it more difficult to understand the speaker.

In remodeling the Senate Chamber it is proposed that the sound-absorption material be placed so as to eliminate objectionable reflections from the ceiling and to absorb as far as possible the noise which is created in the galleries.

* * * * *

The air which is supplied to the Senate Chamber is conditioned in equipment located in the basement, and then forced through ducts to the attic space above the Senate Chamber where it is distributed through branch ducts to slots in the ceiling. These slots are located in the sides of the coffers, directly below the glass panels. Provision for new air-supply outlets and the installation of new distributing ducts above the ceiling will constitute the only major changes to the air-conditioning system. The new outlets could be hidden in coves, or ornamental plaques might be hung slightly lower than the main surface of the ceiling and air distributed from their perimeters. By careful design there should be no difficulty in securing proper distribution of the air, which will result in a satisfactory movement of air free from drafts.

* * * * *

In providing these various improvements, it will be necessary to remove entirely the present iron and glass roof over the Senate Chamber and replace it with a steel and concrete roof, and to replace the iron and glass panel ceiling with an oval plaster ceiling constructed partially of acoustic material.

* * * * *

In redecorating the Senate Chamber, we recommend that such material and color shall be used as will agreeably reflect and brighten the Senate Chamber at all times when in use; that appropriate designs in the panels immediately around the Senate Chamber floor be such as would be in harmony with the general design of the interior, and that persons with the best artistic experience should be employed to perform this service. * * *

As a result of the committee's findings and recommendations, the legislative branch appropriation bill, 1943, was amended by the Senate to include an appropriation to carry out the Senate Chamber improvements recommended by the committee, but the amendment was stricken from the bill in conference.

Further studies were made with a view to improving the interior of both the Senate and House Chambers, but no further legislative action occurred until 1945. On February 15, 1945, Senate Joint Resolution 31, Seventy-ninth Congress, was introduced in the Senate by Senator Andrews, of Florida, authorizing the Senate roof-reconstruction project to be amended to include improvements to the interior of the Senate Chamber and elimination of the skylight over the Senate Chamber. Informal hearings were held before the Senate Committee on Public Buildings and Grounds in May 1945 on this joint resolution. The improvements proposed were recommended by the committee in Senate Report 322, Seventy-ninth Congress, June 1, 1945, in reporting the proposed legislation to the Senate. The joint resolution was passed by the Senate June 21, 1945. Hearings were held on the proposed legislation before the House Committee on Public Buildings and Grounds on July 6 and 10, 1945, and, upon recommendation of the House committee, the joint resolution was amended to authorize elimination of the skylight over the House Chamber, and improvements and changes in the House Chamber similar to those authorized for the Senate Chamber.

Senate Joint Resolution 31 was enacted as Public Law 155, Seventy-ninth Congress, July 17, 1945, and, as enacted, enlarged the scope of the House and Senate roof and chamber project to provide for the elimination of the skylights over the Senate and House Chambers and their replacement with concrete roof slab; the removal of the cast-iron and glass ceilings from the Chambers and the installation of acoustically treated plaster ceilings, or ceilings of other suitable material, to replace the same; also, other alterations and changes considered desirable to improve the interior of the Chambers—the plans for the Senate improvements, as previously indicated, to be approved by a special committee of five Senators, and those for the House improvements to be approved by a special committee of five Representatives, to be appointed by the President pro tempore of the Senate and the Speaker of the House, respectively.

SENATE COMMITTEE—ORGANIZATION AND MEMBERSHIP

Pursuant to the provisions of Public Law 155, Seventy-ninth Congress, approved July 17, 1945, the following Senators were appointed, July 23, 1945, members of the Special Senate Roof and Chamber Committee created by that law:

Senator Charles O. Andrews, chairman
 Senator Harry F. Byrd, member
 Senator Theodore F. Green, member
 Senator Arthur H. Vandenberg, member
 Senator Robert A. Taft, member

The chairmanship became vacant in September 1946, due to the death of Senator Andrews September 18, 1946; and a second vacancy occurred in February 1947, due to the resignation of Senator Vandenberg as a member of the committee.

On February 24, 1947, the chairmanship vacancy was filled by the appointment of Senator Revercomb, and Senator Vandenberg's vacancy by the appointment of Senator Brooks, resulting in the following membership:

Senator Chapman Revercomb, chairman
Senator Robert A. Taft, member
Senator C. Wayland Brooks, member
Senator Harry F. Byrd, member
Senator Theodore F. Green, member

Two vacancies occurred in the membership of the Senate committee on January 3, 1949, due to the expiration on that date of the services of Senator Revercomb and Senator Brooks as members of the United States Senate.

On March 17, 1949, the chairmanship vacancy was filled by the appointment of Senator Chavez, and Senator Brooks' vacancy by the appointment of Senator Kem, resulting in the following membership which remained unchanged during the first and second sessions of the Eighty-first Congress; and has not been changed during the first session of the Eighty-second Congress, as of March 1951:

Senator Dennis Chavez, chairman
Senator Harry F. Byrd, member
Senator Theodore F. Green, member
Senator Robert A. Taft, member
Senator James P. Kem, member

PROCEDURE FOLLOWED UP TO TIME OF AWARD OF CONTRACT FOR THE CONSTRUCTION WORK (1945-1948)

Shortly after the enactment of Public Law 155, the Senate committee directed the Architect of the Capitol to contract for the necessary architectural, engineering, and other consultant services required for the project. Francis P. Sullivan, architect of Washington, D. C., was engaged as associate architect, and Harbeson, Hough, Livingston, & Larson, architects of Philadelphia, Pa., successors to Paul Cret, were engaged as architectural consultants. Thomas W. Marshall and James M. Gongwer, consulting engineers of Washington, D. C., who had made the original engineering surveys of the roof structures in 1938, which resulted in the original 1940 legislation authorizing reconstruction of the Senate and House wing roofs, were retained as consulting engineers for the Senate project. Dr. Paul E. Sabine, acoustical expert of Geneva, Ill., was engaged as acoustical consultant; Charles S. Leopold, of Philadelphia, Pa., for air-conditioning design, and Leo H. Cleary, of Washington, D. C., for lighting design. Dr. R. P. Teele of the Bureau of Standards assisted with advice as an expert in the field of lighting.

During the period July 1945 to May 1946, the Senate committee conferred with the Architect of the Capitol and his consultants in the development of the plans for the Senate improvements, and also secured the advice of the Commission of Fine Arts. The plans for the Senate Chamber improvements were approved by the Senate committee May 22, 1946. The committee made a formal report of their approval to the Senate May 23, 1946, in Senate Report 1389, Seventy-ninth Congress, and presented in the report a description of the improvements provided for in the plans.

In this report, the Senate committee advised the Members of the Senate that the plans for the Senate Chamber improvements, as approved, represented designs developed by Francis P. Sullivan, associate architect, and Harbeson, Hough, Livingston & Larson, consultants, in collaboration, and had been approved by the Commission of Fine Arts and the Architect of the Capitol; that the designs were acceptable to the several consultants on air conditioning, lighting, and acoustics, and to the structural engineers; that the plans were the result of the combined efforts and ideas of all concerned with their preparation.

In this report, the Senate committee also indicated that bids for the roof and chamber work would be invited within the next 6 months, with a view to awarding contracts in time for the construction work to commence in the summer of 1947. The committee report also indicated that construction costs had risen materially, since enactment of the original and amendatory legislation, and that the approved plans were more extensive than originally contemplated. The committee also stated in its report that while the plans and the descriptions, together, presented a view of the Senate Chamber substantially as it was intended to be when remodeled, it was anticipated that some changes might be found necessary or desirable in materials, methods, and design as the working drawings were developed, and opportunity was afforded for more detailed study of the problems involved; but that the architectural character would be preserved, and the necessities of air conditioning, illumination, acoustics, and other practical features would have the most serious consideration.

In the following month, the plans for the House roof and chamber improvements were approved by the special House committee June 24, 1946.

Competitive bids for reconstructing the roofs over the Senate and House wings of the Capitol and remodeling the Senate and House Chambers, in accordance with the approved plans, were invited by the Architect of the Capitol, at the direction of the Senate and House committees, October 29, 1946, and opened December 19, 1946. Only one firm bid was received and the bidder frankly admitted that because of unsettled postwar conditions existing in the construction industry at that time it had been necessary to include in his bid, allowances for expenditures which, depending upon the trend of market prices and labor productivity, might prove excessive. Proposals to perform the work at an estimated lower cost, on a cost-plus-a-fixed-fee basis, not permitted under the invitations to bid or the existing legislation, were received from two firms. The lowest estimate indicated a total cost of \$3,900,000 for all items of expenditure necessary for the Senate and House roof and chamber improvements.

The results of the December 1946 bidding emphasized such abnormal conditions in the construction industry that the Architect of the Capi-

tol felt constrained to make a further study of the whole situation before making any recommendations to the Senate and House committees with respect to the award of contracts. Such study disclosed that because of the uncertainty of scarce building materials and the disturbance of the normal flow of such materials and the scarcity of skilled labor, a proper scheduling of construction at the time was impossible and that vital materials, such as steel and electrical equipment, required for reconstruction of the roofs and remodeling of the Chambers could not be obtained, with reasonable assurance, in less than 8 to 17 months. These and other factors made it manifest that it would be contrary to the Government's interest to proceed with the proposed improvements until a later date, and upon recommendation of the Architect of the Capitol, both the Senate and House committees decided that the work should be postponed for at least a year.

As indicated in the "Senate Committee—Organization and Membership" section of this report, on February 24, 1947, the membership of the Senate committee was changed by appointment of Senator Revercomb, of West Virginia, and Senator Brooks, of Illinois, to fill vacancies caused by the death of Senator Andrews, of Florida, and by the resignation of Senator Vandenberg, of Michigan, as a member of the committee—resulting in the following committee membership: Senator Chapman Revercomb, West Virginia, chairman; Senator Robert A. Taft, Ohio; Senator C. Wayland Brooks, Illinois; Senator Harry F. Byrd, Virginia; and Senator Theodore F. Green, Rhode Island, members. This committee met from time to time to consider various matters in connection with the Senate project, including refinement of the detailed plans and determination of the proper time and manner for performance of the Senate work.

The Senate committee decided in June 1948 to proceed with the Senate improvements and to have the Senate work done in two construction stages—the first construction stage to extend from July 1949 to December 1949, and the second construction stage from July 1950 to December 1950. This decision was reached after the Architect of the Capitol developed satisfactory evidence that conditions in industry, although improved, were still such that the complete work required for either the Senate or the House project could not be done in a single 6-month construction period. In the meantime, construction costs had risen another 20 percent. The Senate committee, based also on facts presented by the Architect of the Capitol, agreed that the most economical manner in which the Senate work could be done was on a cost-plus-a-fixed-fee basis.

The necessary contract authority to perform the Senate work in accordance with the Senate committee's recommendations, together with funds required for the fiscal year 1949 for such purpose, were requested of the Senate Appropriations Committee, through the Budget, in Senate Document 184, Eightieth Congress; hearings were held by the Appropriations Committee on the Budget request, June 17, 1948; the item was reported favorably to the Senate by the Appropriations Committee in Senate Report 1769, Eightieth Congress, June 18, 1948; and the requested funds and contract authority were approved by the Senate and House, and included in the Second Deficiency Appropriation Act, 1948, approved June 25, 1948.

At the direction of the Senate Roof and Chamber Committee, the Architect of the Capitol entered into a general contract for the Senate

roof and chamber improvements October 28, 1948, with the Consolidated Engineering Co., Inc., of Baltimore, Md., on a cost-plus-a-fixed-fee basis, pursuant to new proposals received from the three firms who had originally submitted proposals in December 1946.

CONTRACT PROCEDURE

After the contract for reconstruction of the roof over the Senate wing of the Capitol and remodeling the Senate Chamber was awarded to the Consolidated Engineering Co., Inc., of Baltimore, Md., under a cost-plus-a-fixed-fee agreement, October 28, 1948, the contractor, with the approval of the Architect of the Capitol, immediately proceeded to place his subcontracts for various branches of work involved, so that the necessary materials would be on hand at the start of the construction work when the House adjourned for its 1949 summer-fall recess.

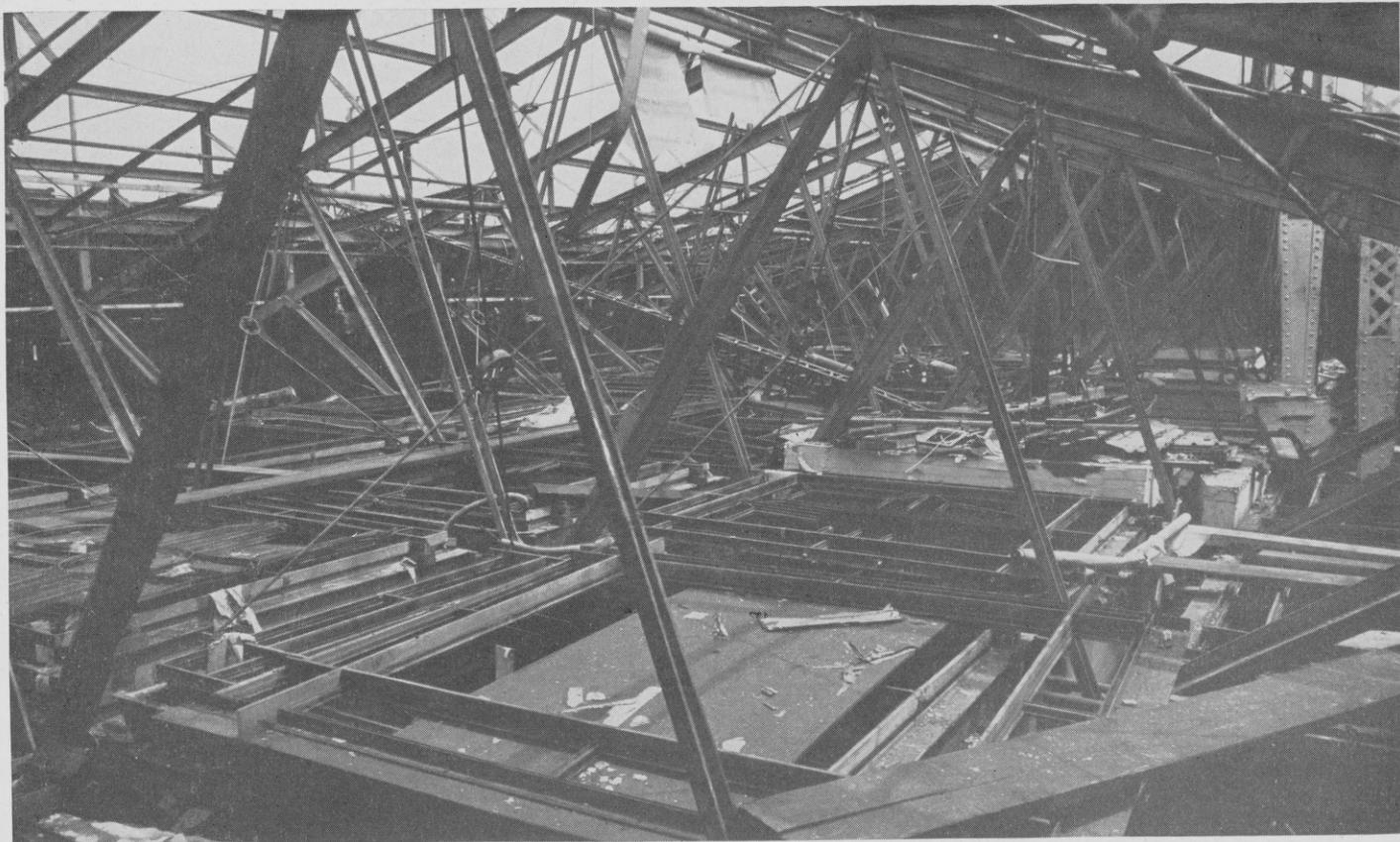
The contract required that the work be done in two stages—the first stage during the recess period July to December 1949, and the second stage during the recess period July to December 1950. During the first stage, it was required not only that the old roof and skylight over the Senate wing be replaced with the new steel and reinforced concrete roof, but also that the interior alterations within the Chamber be completed above the gallery floor level, together with all related mechanical and electrical work wherever located. During the second stage, it was required that the interior alterations within the Chamber be completed from the gallery floor level down to the floor of the Chamber, together with improvements in any other areas not included in the first stage, such as the cloakrooms. All work in connection with the project was required to be completed by January 1951.

RECONSTRUCTION OF THE ROOF OVER THE SENATE WING OF THE CAPITOL

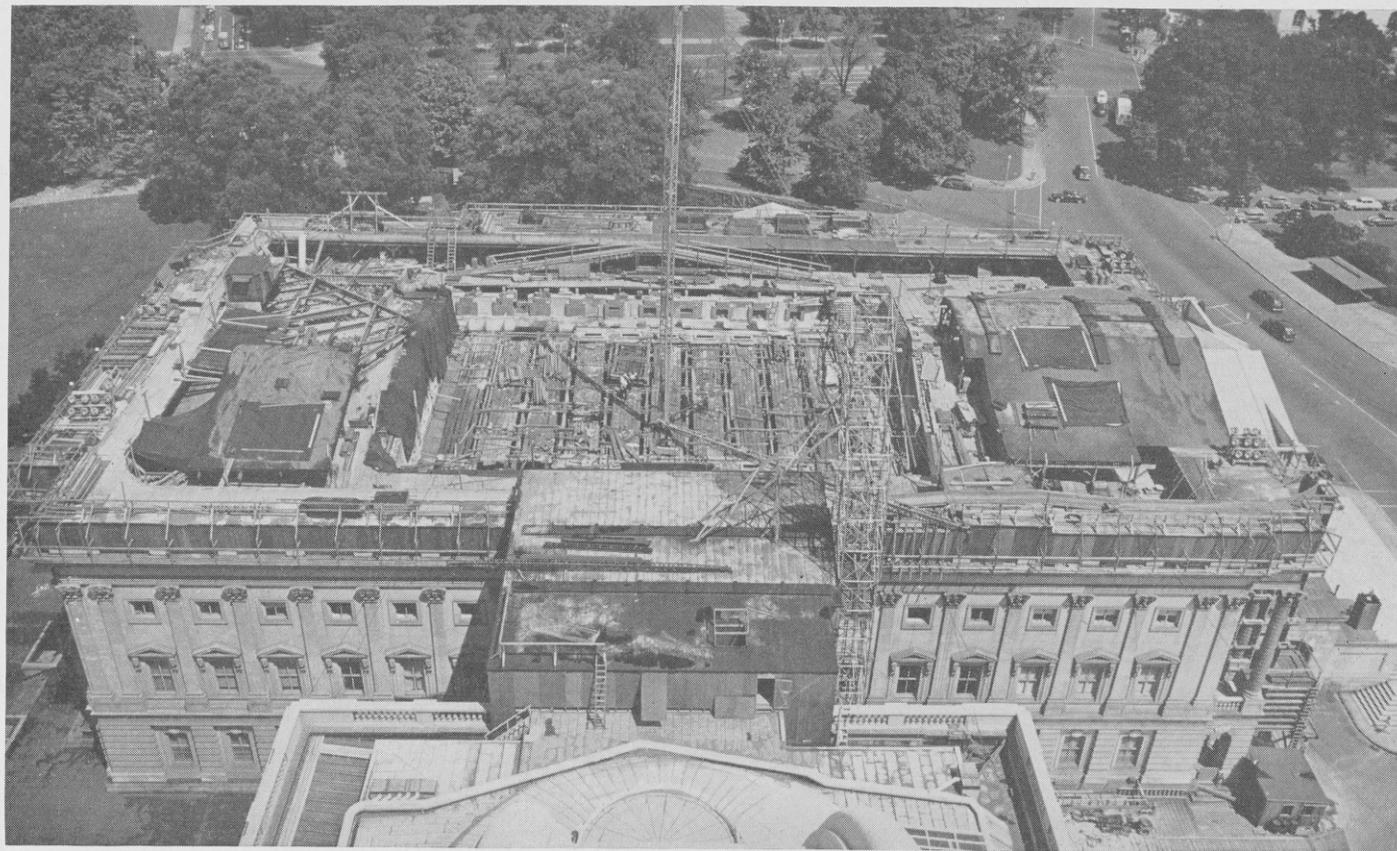
The original 1940 legislation, as previously indicated, provided for retention of the skylight structures over the two Chambers, but was amended by the act of July 17, 1945, to provide for elimination of the skylight structures and for installation of a new roof of concrete and steel construction in replacement of the old roof and skylight construction.

With the approval of the Senate Roof and Chamber Committee, appointed under the 1945 act, the original engineering services contract of June 29, 1940, entered into by the Architect of the Capitol with Thomas W. Marshall and James M. Gongwer for the engineering services required for the design of the new roof and all related work, was modified September 20, 1945, to conform to the roof-construction changes required by the 1945 amendatory act.

During the period July to December 1949—the first construction stage under the project—the old roof construction over the Senate wing, with its skylights and iron trusses, was removed and replaced by a new roof constructed of structural steel beams, trusses, and reinforced concrete slabs. The skylights in the Senate connection between the central portion of the building and the Senate wing were also eliminated and replaced by a concrete and steel roof. The new roof structure is fireproof throughout, is insulated, and covered with



Old roof trusses and supporting steel for old skylights, from attic level, August 1, 1949.



View of roof from dome during early stage of construction work, August 16, 1949.

sheet copper. The old air-conditioning ducts on top of the roof were eliminated and replaced with new ducts which were installed below the new roof, thereby materially improving the air view of the Capitol.

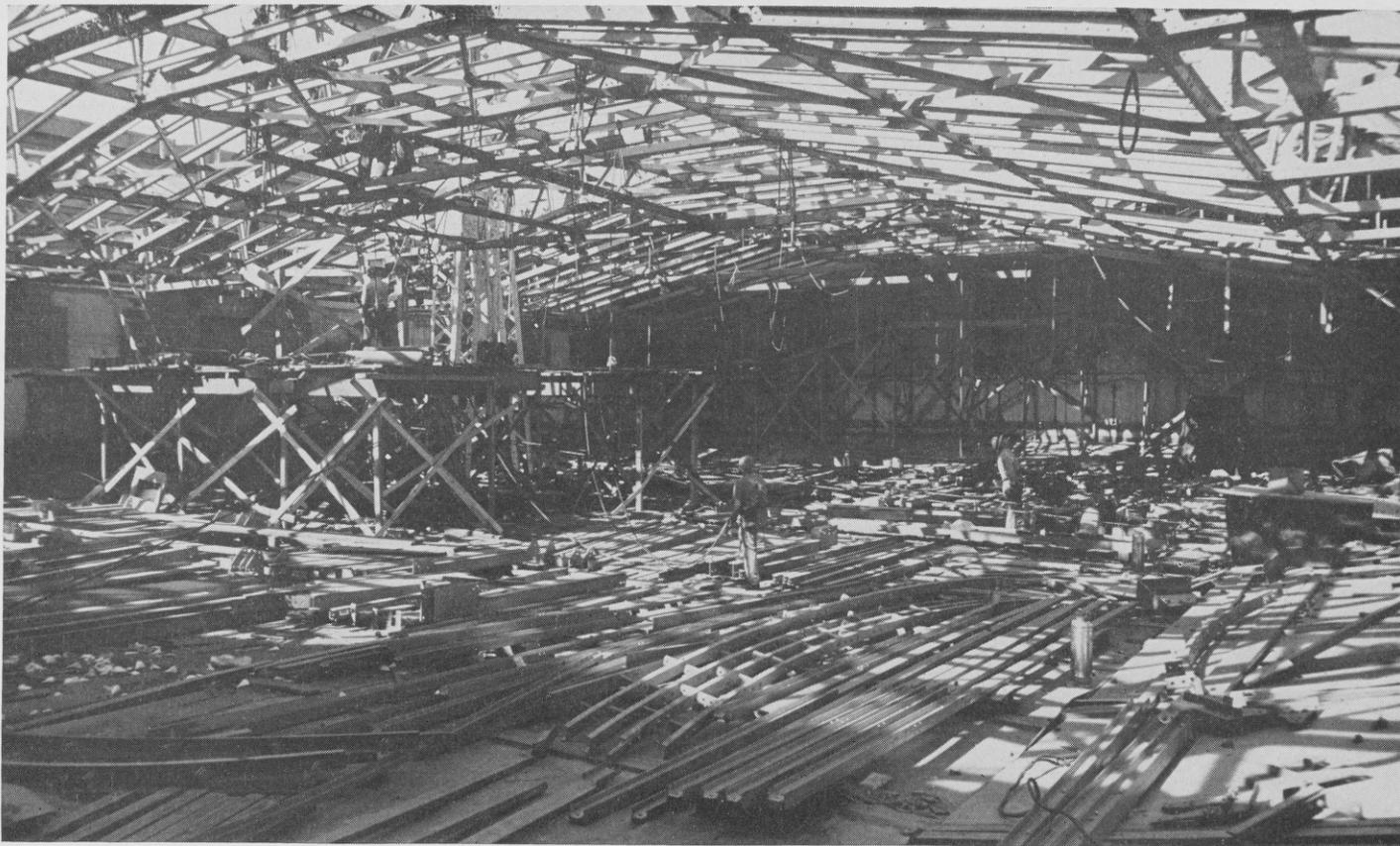
The Capitol Building is of wall-bearing, masonry construction. The consulting engineers considered that it was of primary importance to place the new loads, as nearly as possible, in the same location where existing loads were being carried and also to be sure that in all cases they were located over main bearing supports. Over the Senate Chamber this dictated that the location and spacing of trusses must be the same as those originally in place. In the areas outside the Chamber the solution was not so simple. A complete survey of the existing conditions had to be made to determine the answer. The old roof was drained by a very large cast-iron gutter, copper lined, which was located parallel to and immediately inside the outside wall of the building. It was necessary to get over this gutter to a bearing on the main wall. It was also found that that main wall contained many flues from fireplaces down through the building.

It was considered desirable to maintain the over-all roof lines of the building. The ridge of the new roof is located at the elevation of the ridge of the skylights which were a part of the original roof. The low points were raised to clear the old gutters and get a bearing on the outside wall. This, being behind the balustrade, did not change the sight lines of the building. The cornices in the original building sloped back toward the balustrade and drained through scuppers into the gutters. Since the roof was raised above the gutters this slope had to be reversed. A fill of plastic rock has been applied to these cornices, they have been covered with lead-coated copper and now drain to the outside. The beams resting on the outside walls were located to clear the fireplace flues.

The old gutters were very deep and were a constant source of trouble from expansion stresses which were set up in the copper. It was, therefore, decided to eliminate them and a plan was worked out whereby a series of flat dished areas were provided at the bottom of the roof slope and these are drained at intervals of about 20 feet. The several areas are covered with flat-seam copper work and are provided with expansion joints at the midpoints, that is, about 20 feet apart. The main area of the roof is made of concrete using a light-weight aggregate to keep the dead weight of the roof to a minimum and still have a permanent fireproof material. These slabs are covered with 2 inches of foam glass for insulation and then have a batten-type copper roof applied to them. The covering of this roof is entirely of copper, including the battens themselves.

The flat areas of the roof over the porticoes are filled with a vermiculite aggregate concrete with a conventional concrete topping to receive and hold the copper cleats for the flat-seam copper work.

All work in connection with this part of the project was completed during the first construction stage, and was done by the Consolidated Engineering Co., Inc., under its cost-plus-a-fixed-fee contract of May 12, 1949.



Interior view of new steel trusses, September 2, 1949.

REMODELING OF THE SENATE CHAMBER

ARCHITECTS AND OTHER CONSULTANTS RETAINED FOR SENATE CHAMBER IMPROVEMENTS

Following the enactment of Public Law 155, Seventy-ninth Congress, July 17, 1945, and amendment of the June 29, 1940, consulting engineering service contract with Thomas W. Marshall and James M. Gongwer to conform to the engineering changes required by the 1945 statute, the following contracts, previously referred to in this report, were entered into by the Architect of the Capitol, with the approval of the Senate committee, under the following dates:

Contract, September 20, 1945, with Francis P. Sullivan, architect of Washington, D. C., for furnishing services as associate architect for the architectural services required for remodeling the interior of the Senate Chamber, including preparation of architectural designs, sketches, working drawings, large-scale and full-size detail drawings, specifications, and supervision.

Contract, October 15, 1945, with Dr. Paul E. Sabine, acoustical expert of Geneva, Ill., for furnishing services as acoustical expert for the Senate Chamber improvements.

Contract, December 4, 1945, with Harbeson, Hough, Livingston, & Larson, architects of Philadelphia, Pa. (successors to Paul Cret), for furnishing services as consultants to examine and review the drawings and specifications prepared by the associate architect, as well as the construction work, for the remodeling of the Senate Chamber, and to act as censor and critic of such plans and to make recommendations for changes and improvements.

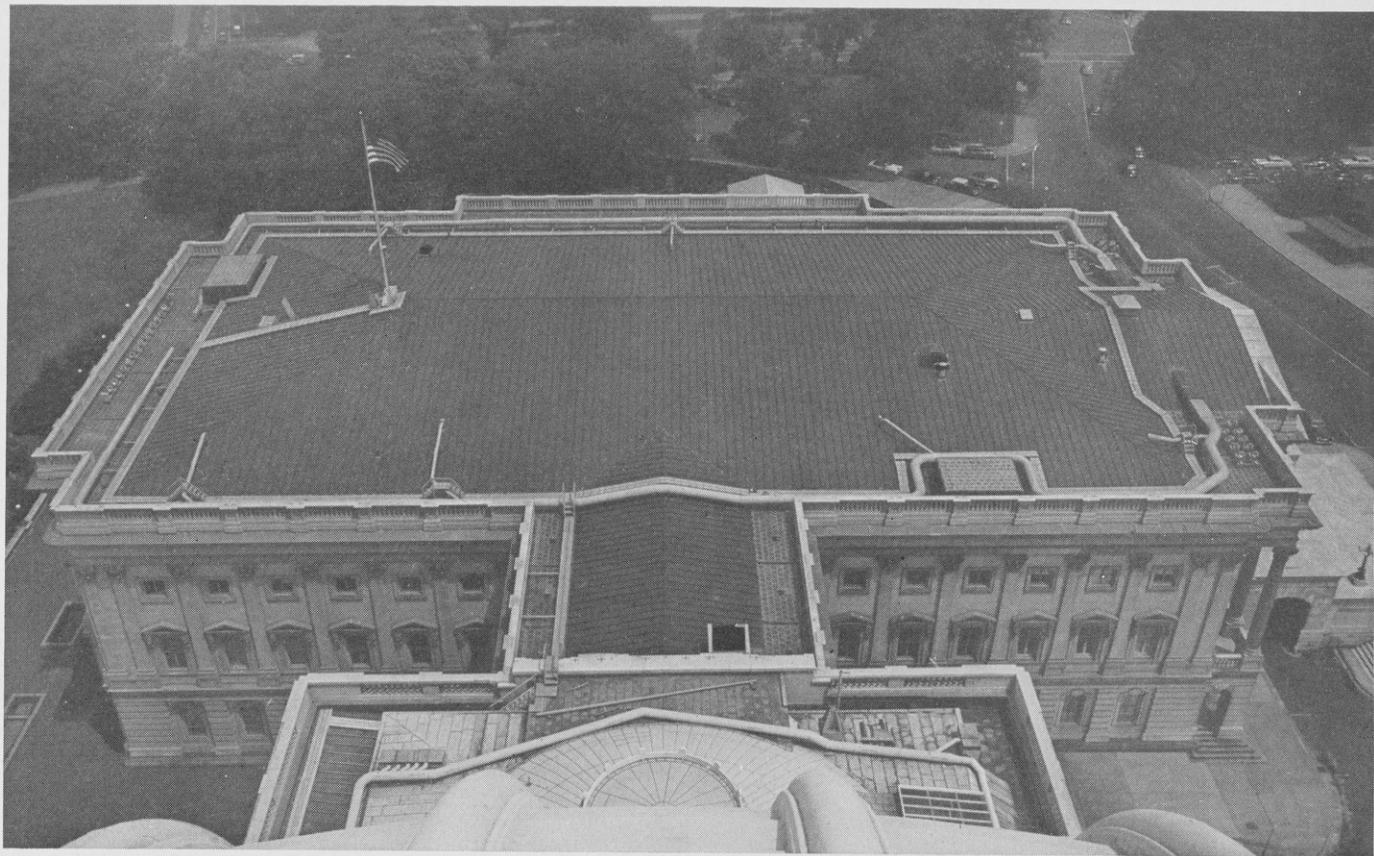
Charles S. Leopold of Philadelphia, Pa., was retained by Marshall & Gongwer to design the air conditioning changes required under their contract, and Leo H. Cleary of Washington, D. C., was retained by Francis P. Sullivan and Marshall & Gongwer for design of the lighting and other electrical improvements required under their respective contracts.

ARCHITECTURAL TREATMENT OF SENATE CHAMBER WITH RELATIONSHIP TO OTHER PARTS OF THE CAPITOL

The design for the remodeling of the Senate Chamber, carried into effect during the past year, was studied with motives from the same sources of early Federal architecture used by Thornton and Latrobe in the Supreme Court and Statuary Hall portions of the Capitol, and from other buildings of the early Republic; this design being fitted to thoroughly modern means of lighting, air conditioning, and acoustic treatment.

In general, the details of treatment are very much like those of the old Supreme Court Chamber, and provide a meeting room for the Senate in keeping with the importance of the deliberations of the legislative branch of the Government.

The plans represent long hours of study and deliberation on the part of the Architect of the Capitol and the architectural, engineering, air-conditioning, lighting, and acoustical consultants engaged by him for the project. The plans were reviewed by the Commission of Fine Arts and received their full endorsement. The plans also repre-



View showing completed new roof, January 1950.

sent many hours of consideration on the part of the special Senate Roof and Chamber Committee appointed under Public Law 155, Seventy-ninth Congress, and were approved by the committee before being carried into effect.

RECONSTRUCTION AND IMPROVEMENTS, SENATE CHAMBER CEILING

During the first construction stage, the old cast-iron and glass ceiling of the Senate Chamber and the temporary steel supports installed in 1940 were removed, and a new ceiling constructed of stainless steel and plaster was installed in replacement of the old ceiling. The stainless steel section is elliptical in shape and forms the central portion of the new ceiling. It is perforated with small holes which convey conditioned air into the Chamber and cause even distribution of the air, and also provide improved acoustics for the Chamber. Above the stainless steel portion of the ceiling, a plenum chamber lined with acoustical material has been installed, the stainless steel actually forming the bottom of the plenum chamber. In the center of the stainless steel portion of the ceiling, there is an oculus, the field of which is of carved glass and bronze outlining the figure of an eagle, illuminated from above.

The stainless steel section of the ceiling is surrounded by a plaster cove containing indirect lighting for the Chamber. The plaster portion of the ceiling continues from this point to the plaster cornice at the junction of the ceiling and gallery walls. The section of the ceiling over the galleries contains a series of decorative coffers and flush-type ceiling fixtures for lighting the galleries.

The stainless steel portion of the ceiling has been mottled a brownish gray, and the plaster work has been painted in colors selected to harmonize with the rest of the Chamber. The glass in the oculus has been tinted to make the outlines of the eagle more effective, and the steelwork in back of the oculus has been painted with a luminol paint of high reflecting quality.

Conditioned air for the galleries is introduced through semicircular outlets located in the ceiling border nearest the wall.

All work in connection with the new ceiling was completed during the first construction stage, with the exception of the painting of the ceiling and minor work in connection with the oculus, completed in the second construction stage.

IMPROVEMENTS IN GALLERY SECTION OF SENATE CHAMBER

During the first construction stage, the old plaster was removed from the gallery walls, and a marble wainscot, approximately 4 feet high, was installed. The wall above the wainscot was faced with acoustical material and covered with gold-colored fabric. The wainscot is constructed of Hauteville cream marble and the fabric is a silk damask.

The plaster niches in the gallery walls were lined with Hauteville cream marble, and the 20 marble busts of Vice Presidents, formerly located in the plaster niches, were placed in the marble-lined niches on new pedestals of red Levanto marble.

The old maple trim, ornamented with bronze, forming the framework of the old gallery doors within the Chamber, was replaced with

Hauteville cream marble trim, and the 16 pairs of old maple gallery doors, ornamented with bronze, within the Chamber, as well as the 8 pairs of outer maple doors at the gallery entrances, were replaced with new mahogany doors containing glass panels.

During the second construction stage the old gallery floor, consisting of iron and wood construction, was removed and replaced with a new floor constructed of steel and precast concrete slabs, arranged in steps as heretofore. The risers of these steps have been faced with Hauteville cream and French gray marble. The new gallery floor has been covered with marbleized rubber tile. New steel return air conditioning grilles have been installed in the gallery risers. The old wood rails separating the different sections of the gallery have been replaced with new bronze rails. All old and unused piping and duct work under the gallery areas were removed and new copper water lines were installed as necessary.

The old wood parapet was removed from the gallery and replaced with a new parapet, construct of Hauteville cream marble on the side facing the Chamber and the Alabama Madre cream marble on the side facing the galleries. The old desks were removed from the Press Gallery and replaced with new mahogany desks. The old stools were also removed from the Press Gallery and replaced with 115 new stools. Kick plates have been put on the new gallery doors installed during the first construction stage.

The old gallery seats were removed and replaced with new seats of noiseless construction, covered with red and old gold-colored fabric having a fretwork design containing alternate rows of five-point and six-point stars. The number of new seats installed is 621.

The Vice Presidents' names have been carved on the new marble pedestals of the 20 busts in the gallery niches.

New wall bracket fixtures for the galleries are provided for under the plans.

IMPROVEMENTS IN LOWER SECTION OF SENATE CHAMBER

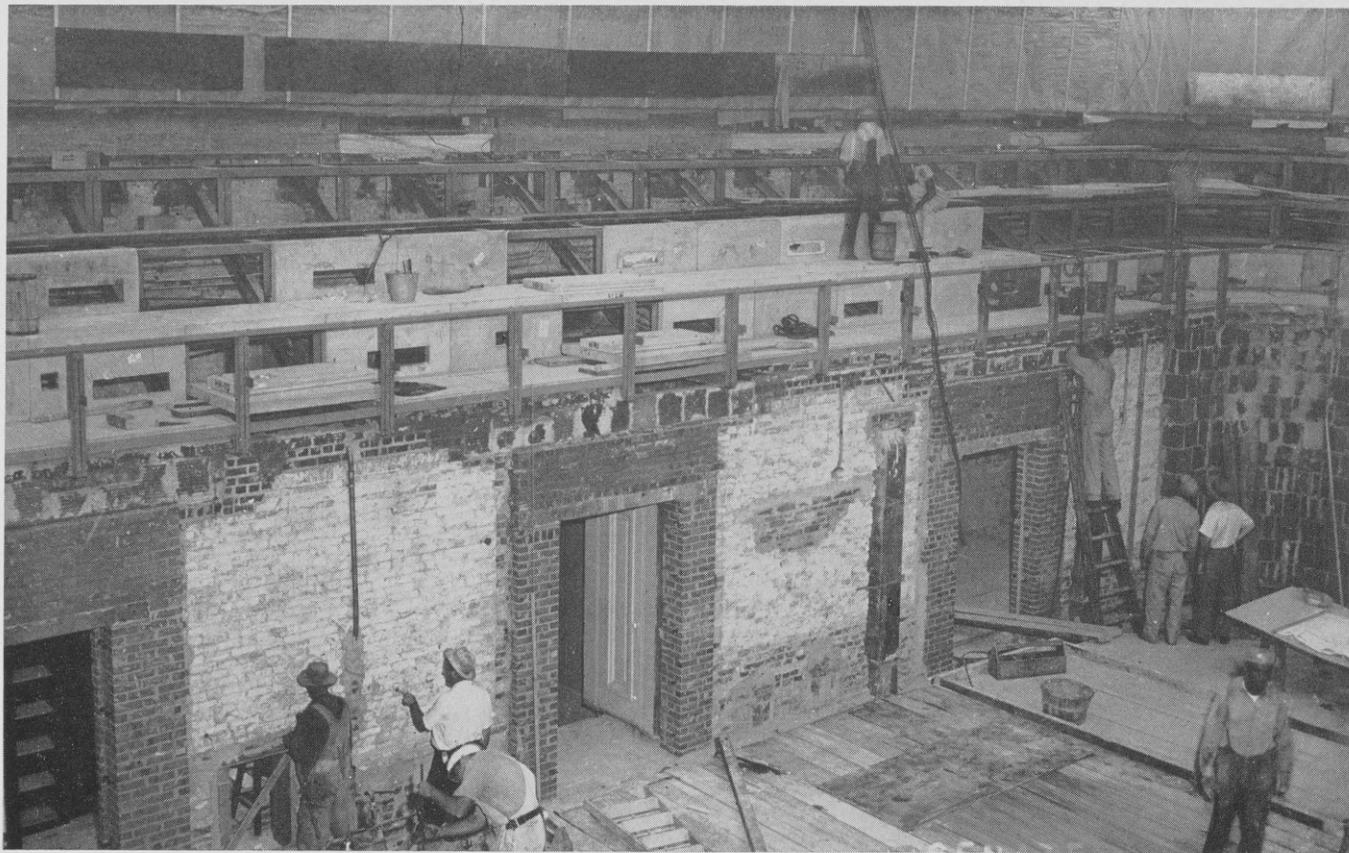
All improvements effected in the lower section of the Chamber were made during the second construction stage.

The old lower walls of the Chamber, extending from the floor to the gallery, consisting of cast-iron wainscot, cast-iron pilasters and plaster panels, were removed from the existing brick structural walls and replaced by wood paneling, separated by pilasters of red Levanto marble, with Hauteville cream marble caps and base, and with Hauteville cream marble panels at the four corners of the Chamber. The old cast-iron cornice at the junction of the lower wall of the Chamber and the gallery was also removed and replaced with a new cornice constructed of Hauteville cream marble. The new wood panels have been painted to harmoize with the color scheme of the remainder of the Chamber walls.

The panel behind the Vice President's rostrum is constructed of Hauteville cream marble, flanked by red Levanto marble columns and pilasters. At the top of this panel, the motto "E Pluribus Unum" (one out of many) has been carved. The plans provide for a new bronze clock to be installed above the rostrum on the ledge of the cornice. In the center of the panel, between the two pilasters a dark blue velvet drape, embellished with gold embroidered design, has



View showing old construction partly removed from Chamber walls, August 18, 1950.



Detail of gallery and side-wall construction, September 22, 1950.

been hung. On each side of this panel a French gray marble bookcase with mahogany doors has been constructed.

The old wooden rostrum and mahogany desks on the rostrum were removed and replaced with a new wooden rostrum and new mahogany desks. The front of the rostrum is constructed of red Levanto marble, decorated with two bronze wreaths. The wooden steps and platform of the rostrum have been covered with carpet.

The section of the Chamber floor on which the new rostrum is installed was reconstructed and strengthened to accommodate the new desks and the marble panels and columns at the back of the rostrum.

The four doors leading from the Chamber to the cloakrooms and lobby have been replaced with new mahogany doors, containing glass panels and bronze grilles. New mahogany jambs have been installed, and over each of these four doorways is a wood panel on which is carved a group of flags. The fretwork on the new mahogany doors and door molding has been decorated in gold leaf.

The vestibules of the east, west, and south entrances to the Chamber have been reconstructed, and the inner, or Chamber, doors at these entrances have been replaced with new mahogany doors, containing glass panels and bronze grilles. In the Chamber, each of these entrances is flanked with red Levanto marble columns, and the following mottoes have been carved in marble over these three doorways: Over the east entrance doorway "Annuit Coeptis" (God has favored our undertakings); over the west entrance doorway "Novus Ordo Seclorum" (A new order of the ages is born); over the south entrance doorway "In God we trust." Over these three entrances, beneath the inscribed mottoes, Hauteville cream marble panels have been installed and sculptured with designs representing the following: Over the east entrance "Patriotism"; over the west entrance "Courage"; over the south entrance "Wisdom."

Lee Lawrie, Easton, Md., was the sculptor for these three panels. The east door panel was carved by Louis Milione, Philadelphia, Pa.; the west door panel by Bruno Mankowski, New York City; and the south door panel by Edward H. Ratti, Bronx, N. Y.

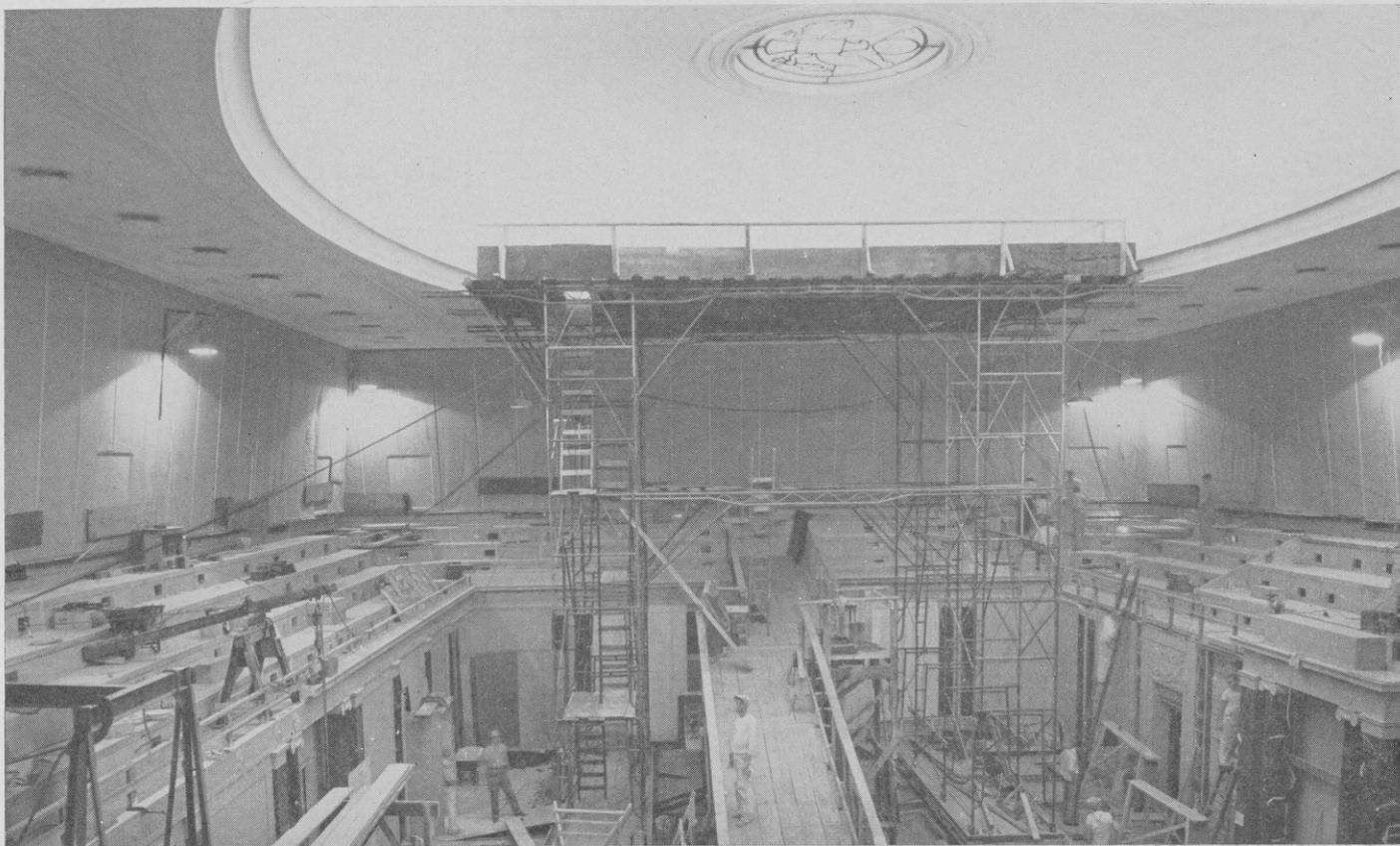
A bronze clock has been installed on the parapet at the south entrance.

The outer doors of the south and west vestibules have been replaced with new mahogany doors; but the old outer maple doors of the east vestibule have been retained.

Repairs were made to the Chamber floor where necessary. The old iron return air-conditioning grilles were removed, cleaned, and re-installed on the risers of the Chamber floor.

In the plenum chamber beneath the floor there have been installed the necessary conduits to permit of the future installation of a public address system, in the event that the Senate ever decides that it wishes such a system; also, to permit of the future installation of broadcasting facilities, if desired. The outlets for the public address system have been installed and capped at the floor level. Outlets have been provided for Senators' desks, the Vice President's desk, the clerks' desks, and in the well.

The old carpet was removed from the Senate Chamber floor and replaced with a new loop pile, dark red and gray, carpet.



View showing progress of construction work, October 5, 1950.

The old desks and chairs of Senators on the Chamber floor were retained, and after reconditioning were put back in the Chamber in time for the convening of the Eighty-second Congress in January.

The Vice President's chair and the reporters' tables and chairs have also been retained. Ten new chairs have been ordered for use at the rostrum, and new davenports and chairs provided for use in the rear corners of the Chamber, in replacement of existing benches and chairs.

The air-conditioning system serving the Senate Chamber and adjacent areas has been improved by the installation of new equipment, and plumbing, electrical, and other mechanical equipment has been relocated and replaced as necessary.

The lighting and other electrical systems serving the Senate Chamber and adjacent areas have been converted from 25-cycle alternating current and direct current to 60-cycle alternating current, and energy for these systems is being supplied by the local utility company.

IMPROVEMENTS IN CLOAKROOMS, LOBBY, AND OTHER ADJACENT AREAS

The old plaster was removed from the walls of each cloakroom and was replaced with new plaster applied on metal lath. It was necessary to install new metal lath, as the old plaster, originally bonded to the brick walls, had become loose. The old cast-iron ceiling of each cloakroom was treated with acoustical tile; the newly plastered walls were painted; and changes and improvements were made to the air-conditioning system. The old marble mantles were retained, cleaned, and polished; the existing crystal lighting fixtures were also retained; and the old marble floors were covered with carpet.

The old telephone booths and other existing equipment were removed from each cloakroom; and, in replacement, new telephone booths, constructed of mahogany, were installed in the section of each cloakroom, formerly occupied by the old wooden lockers. A new walnut message desk for the handling of telephone calls, a new lavatory, water cooler and shelf, coat and hat rack and metal locker compartments were also installed in this space.

The old furniture was removed from each cloakroom and replaced with new furniture, which was placed in the section of each cloakroom formerly occupied by telephone booths as well as in the section formerly occupied by furniture.

No changes were made in the lobby, with the exception of the installation of three additional writing desks and the relocation of four bookcases from their existing locations in the lobby to the entrance to the marble room. The existing furniture in the lobby was reconditioned and has been continued in use. A new carpet has been installed in the lobby.

The Senate document room was converted into a two-story room by construction of a concrete and steel floor between the floor of the document room and the section of the new roof constructed over the Senate connection. The old mezzanine deck was eliminated to allow for the new floor construction. Both the existing floor and the floor of the additional story were covered with rubber tile, and both the lower and upper rooms were provided with fluorescent lighting and acoustical tile ceilings, and air conditioned.

The press and radio rooms have been provided with fluorescent lighting. The press rooms were also acoustically treated and provided with improved air conditioning.

TEMPORARY STRUCTURES

Preparatory to the start of the first-stage construction work, temporary structures for workmen and materials, enclosed by plywood fences, were erected on the west Senate and House lawns during the period April to June 1949. These structures and fences remained in place until termination of the second-stage construction work and have now been removed. The lawns will be properly restored to their original condition in the spring.

COMMENTS ON PERFORMANCE

As indicated in a previous section of this report, in order that the Senate roof and chamber improvements might be accomplished, it was necessary for the Senate to vacate its Chamber and meet in the Old Senate Chamber, or Supreme Court Room, on three different occasions—once, in 1940 when the temporary supports were installed under the old ceiling of the Senate Chamber; again, in 1949 when the first-stage construction work was performed; and the third time in 1950, when the second or final-stage construction work was performed.

The work of reconstructing the roof over the Senate wing of the Capitol and remodeling the Senate Chamber was an exceptionally difficult alteration job, and innumerable construction problems and unforeseen field conditions were encountered, which had to be met, solved, and expedited. These conditions were further aggravated by the fact that no detailed drawings of the old building construction were available; also, by the fact that the work had to be done within two very limited time periods, and it was finally necessary to reduce the period for the second-stage construction work from 6 to 4½ months, due to the Senate requiring occupancy of its Chamber until August 11, 1950, instead of July 1, 1950, as originally scheduled.

As a result of these conditions, it was necessary to work overtime and extra shifts during certain periods of the construction work. All of these factors, combined, resulted in additional costs, making it necessary for the Senate Roof and Chamber Committee to increase the limit of cost of the project from \$2,267,000 to \$2,367,000.

At the time of performance of both the first and second-stage construction work, the membership of the special Senate Roof and Chamber Committee was as follows: Senator Chavez, New Mexico, chairman; Senator Byrd, Virginia; Senator Green, Rhode Island; Senator Taft, Ohio; and Senator Kem, Missouri, members.

AUTHORIZATIONS, APPROPRIATIONS, EXPENDITURES

The total limit of cost for the Senate roof and chamber project, as fixed by the Senate Roof and Chamber Committee under authority of the Second Deficiency Appropriation Act, 1948, is \$2,367,000.

Of this amount, \$2,267,000 has been appropriated to date, leaving a balance of \$100,000 to be appropriated in the next supplemental appropriation bill, to complete the liquidation of contract obligations.

As of March 5, 1951, a total of \$2,149,740 has been paid out of the \$2,267,000 appropriated, and the balance of this appropriation, to-

gether with the \$100,000 unappropriated balance of the authorization, is expected to be required to liquidate final contract obligations not yet billed or paid.

The Comptroller General of the United States has cooperated with the Senate committee and the Architect of the Capitol by having representatives of his office make site audits of the monthly cost-plus-a-fixed-fee payments made under this appropriation during the course of both the first- and second-stage construction work, and all accounts audited to date have been cleared without exceptions or disallowances.

DISPOSITION OF HISTORIC MATERIALS

Under the provisions of Senate Resolution 357, Eighty-first Congress, which was introduced by Senator Chavez (for himself and the entire membership of the Senate) and agreed to by the Senate, September 22, 1950, the Architect of the Capitol, at the direction of the committee, presented to Vice President Alben W. Barkley, of Kentucky, as a gift from the Senate, the desk in the Senate Chamber occupied by him as President of the Senate and Vice President since January 3, 1949, and which was first occupied by Vice President John C. Breckenridge, of Kentucky. Authority for the committee to so act was granted by section 3 of Public Law 731, Eighty-first Congress, approved August 25, 1950.

Under section 3 of Public Law 731, the Architect of the Capitol is also authorized to dispose of any other historic materials removed and preserved from the Senate Chamber, in such manner as may be directed and approved by the Senate Roof and Chamber Committee.

Senate Resolution 357 reads as follows:

[S. Res. 357, 81st Cong., 2d sess.]

Whereas the Special Committee on Reconstruction of Senate Roof and Skylights and Remodeling of Senate Chamber, acting under authority of section 3 of Public Law 731, Eighty-first Congress, has directed the Architect of the Capitol to present to Alben W. Barkley, of Kentucky, as a gift from the Senate in recognition of his service as Member of Congress, President of the Senate, and Vice President, the desk in the Senate Chamber occupied by him as President of the Senate and Vice President since January 3, 1949; and

Whereas this particular desk was first occupied by Vice President John C. Breckenridge, of Kentucky; and

Whereas Kentucky and its people have contributed to the building of the United States in every form and manner in all that is good for a government of the people; and

Whereas it is the desire of the Special Committee on Reconstruction of Senate Roof and Skylights and Remodeling of Senate Chamber, acting under Public Law 731, Eighty-first Congress, to honor not only Kentucky but Vice President Breckenridge and Vice President Barkley that the special committee has made this decision and presentation. In effect, the said gift be to Vice President Alben W. Barkley for his lifetime, and thereafter to the State of Kentucky: Therefore be it

Resolved, That the Senate take this occasion to extend to Vice President Alben W. Barkley an expression of high appreciation for his distinguished and judicial service as its Presiding Officer, and, even at this late date, to pay tribute to Vice President Breckenridge and to the State of Kentucky and its people.

Section 3 of Public Law 731 reads as follows:

SEC. 3. With respect to any other materials of historical interest, removed or to be removed from the Senate and House Chambers during their renovation and which are not to be reused, the Architect of the Capitol is authorized to dispose of the same in such manner as may be directed and approved by the special Senate and House Roof and Chamber Committees, appointed under Public Law 155, Seventy-ninth Congress, acting separately with regard to their respective Chambers.

APPENDIXES

The following supplemental data of interest are appended to this report:

1. Legislative history of project, 1939 to 1950.
2. Directives and resolution of Senate committee, dated June 18, 1948, July 11, 1950, and August 7, 1950, fixing the limit of cost for the Senate project and directing the Architect of the Capitol with respect to contract and other procedures.
3. List of contracts and subcontracts entered into for the Senate roof and chamber improvements.
4. Report of Thomas W. Marshall, consulting engineer, dated November 29, 1938, describing the defective condition of the old roofs over the House and Senate wings of the Capitol and recommending their replacement with new roofs.
5. Senate agreement of November 22, 1940, and Senate resolutions of June 29, 1949, and August 9, 1950, ordering the Senate to meet in the Old Senate Chamber, or Supreme Court room, while both the temporary and permanent construction work was done in connection with the Senate roof and chamber improvements.

RECONSTRUCTION OF ROOFS AND SKYLIGHTS OVER THE SENATE AND HOUSE WINGS OF THE CAPITOL AND ALTERATION AND IMPROVEMENT OF THE INTERIOR OF THE SENATE AND HOUSE CHAMBERS AND ADJACENT AREAS

LEGISLATIVE HISTORY OF PROJECT, 1939 TO 1950

Senate and House improvements

Hearings were held before the House Committee on Appropriations on the 1940 legislative establishment appropriation bill, February 1939, on estimate requesting an appropriation of \$585,000 for the reconstruction of the roofs and skylights over the Senate and House wings of the Capitol.

House Report 43, Seventy-sixth Congress, February 16, 1939, on the 1940 legislative establishment appropriation bill, recommended an appropriation of \$5,000 for further technical advice in lieu of the requested appropriation of \$585,000.

Hearings were held before the Senate Committee on Appropriations on the 1940 legislative establishment appropriation bill, February 1939, on estimate requesting the above-stated appropriation—the item having been disallowed by the House committee.

Senate Report 159, Seventy-sixth Congress, March 10, 1939, on the 1940 legislative establishment appropriation bill, recommended an appropriation of \$10,000 for a further survey of the roofs under direction of a special joint congressional committee, in lieu of the requested appropriation of \$585,000, and the \$5,000 provided by the House.

Conference report (H. Rept. 811, June 8, 1939, 76th Cong.) approved the Senate committee's recommendation.

Public Law 130, Seventy-sixth Congress, Legislative Branch Appropriation Act, 1940 (53 Stat. 832), approved June 16, 1939, provided \$10,000 for a further roof study.

Report of special congressional committee (S. Doc. 200, 76th Cong., May 27, 1940), submitted pursuant to Public Law 130, Seventy-sixth Congress, recommended an appropriation for the proposed roof project.

Hearings were held before House Committee on Appropriations on second deficiency appropriation bill for 1940, June 3, 1940, on estimate requesting an appropriation of \$585,000 for the roof project.

House Report 2597, Seventy-sixth Congress, June 18, 1940, recommended the requested appropriation of \$585,000.

Public Law 668, Seventy-sixth Congress, Second Deficiency Appropriation Act, 1940, approved June 27, 1940 (54 Stat. 629), provided an appropriation of \$585,000 for the reconstruction of the roofs and skylights.

Senate improvements

Senate Resolution 150, Seventy-seventh Congress, agreed to September 8, 1941, directed a subcommittee of the Senate Committee on Public Buildings and Grounds to make a study of (a) better lighting system for the Senate Chamber and the Senate Office Building; (b) plans for redecorating and providing better acoustics in the Senate Chamber; and (c) better system of lighting for the Senate library, Senators' reading rooms, and library stack rooms; and to submit to the Senate a report with recommendations regarding the same.

Hearings were held before a subcommittee of the Senate Committee on Public Buildings and Grounds, October 24 and 27, 1941, on Senate Resolution 150, Seventy-seventh Congress.

Senate Report 1043, Seventy-seventh Congress, February 5, 1942, submitted pursuant to Senate Resolution 150, Seventy-seventh Congress, recommended an appropriation of \$134,500 to provide for the replacement of the existing iron and glass roof over the Senate Chamber with a steel and concrete metal covered roof; the replacement of the iron and glass panel ceiling with a vaulted type of plaster ceiling acoustically treated and decorated and arranged with a series of oval coves, with incandescent lights installed in the coves; the installation of acoustical material on the gallery walls and replacement of existing gallery seats with new noiseless seats; also improvements in the air conditioning system serving the Senate Chamber. In its report, the committee also recommended an appropriation of \$8,140 for better lighting in the Senate Office Building, and an appropriation of \$7,500 for a better lighting system for the Senate library in the Capitol.

Senate and House improvements

Hearings were held before House Committee on Appropriations, February 20, 1942, on 1943 legislative branch appropriation bill, on request that the unexpended balance on June 30, 1942, of the appropriation of \$585,000 provided in the act of June 27, 1940, be continued available until expended.

House Report 1905, Seventy-seventh Congress, March 17, 1942, recommended the indefinite continuation of the unexpended balance of the \$585,000 appropriation.

Senate improvements

The legislative branch appropriation bill, 1943, was amended by the Senate to include an appropriation of \$134,500 to carry out the Senate Chamber improvements recommended in Senate Report 1043, but the amendment was stricken from the bill in conference (H. Rept. 2195, 77th Cong., June 2, 1942).

Senate and House improvements

Public Law 600, Seventy-seventh Congress, approved June 8, 1942 (56 Stat. 342), continued for an indefinite period the unexpended balance of the \$585,000 appropriation.

Senate improvements

Senate Joint Resolution 31, Seventy-ninth Congress, introduced in the Senate February 15, 1945, authorized an additional appropriation for the substitution of reinforced concrete roof slab for the skylight over the Senate Chamber; reconstruction of the Chamber ceiling; redecoration, acoustical treatment, improved lighting, and other alterations, changes, and improvements in such Chamber, to be carried forward under plans to be approved by a committee of five Senators.

Informal hearings were held before the Senate Committee on Public Buildings and Grounds, May 1945, on Senate Joint Resolution 31, Seventy-ninth Congress.

Senate Report 322, Seventy-ninth Congress, June 1, 1945, recommended the enactment of Senate Joint Resolution 31, Seventy-ninth Congress.

Senate and House improvements

Hearings were held before the House Committee on Public Buildings and Grounds, July 6 and 10, 1945, on Senate Joint Resolution 31, Seventy-ninth Congress.

House Report 875, Seventy-ninth Congress, July 9, 1945, recommended the enactment of Senate Joint Resolution 31, amended to include similar improvements in the House Chamber to be carried forward under plans to be approved by a committee of five Representatives, as approved by the Senate for the Senate Chamber, and increased the limit of cost of the roof and chambers project from \$585,000, as fixed in the act of June 27, 1940, to \$1,446,000.

Public Law 155, Seventy-ninth Congress, approved July 17, 1945 (59 Stat. 472), authorized the alteration and improvement of the Senate and House Chambers, as recommended by the Senate and House committees.

Senate improvements

Senate Report 1389, Seventy-ninth Congress, May 23, 1946, was submitted to the Senate by the special committee of five Senators appointed under Public Law 155, approving the plans and report of the Architect of the Capitol for improving the Senate Chamber and reconstruction of the Senate wing roof.

House improvements

House Report 2321, Seventy-ninth Congress, June 24, 1946, was submitted to the House by the special committee of five Representatives appointed under Public Law 155, approving the plans and report of the Architect of the Capitol for improving the House Chamber and reconstruction of the House wing roof.

Senate improvements

Senate Document 184, Eightieth Congress, June 18, 1948, transmitted supplemental estimate of appropriation in amount of \$600,000, to be expended with the unexpended balance of the 1940 appropriation of \$585,000, to carry forward the Senate roof and chamber improvements authorized by the acts of June 27, 1940, and July 17, 1945, authorizing cost-plus-a-fixed-fee contracts and vesting the special Senate Roof and Chamber Committee with authority to fix the limit of cost for the Senate project.

Hearings were held June 17, 1948, before the Senate Committee on Appropriations on the second deficiency appropriation bill, 1948, on \$600,000 supplemental estimate for the Senate roof and chamber improvements.

Senate Report 1769, Eightieth Congress, June 18, 1948, on the second deficiency appropriation bill, 1948, recommended approval of the \$600,000 supplemental estimate, and the legislative provisions contained in the text of the estimate. The item was approved by the Senate.

Special Senate Roof and Chamber Committee, by directive of June 18, 1948, subject to enactment of the Second Deficiency Appropriation Act, 1948, fixed the limit of cost for the Senate project at \$2,267,000, and directed the Architect of the Capitol to enter into the necessary contracts, including cost-plus-a-fixed-fee contracts, and to incur such other obligations as necessary for the performance of the Senate roof and chamber improvements.

Conference report (H. Rept. 2442, 80th Cong.), June 19, 1948, approved the Senate Appropriations Committee's recommendation.

Public Law 785, Eightieth Congress, Second Deficiency Appropriation Act, 1948 (62 Stat. 1028), approved June 25, 1948, provided the requested supplemental appropriation of \$600,000 for the Senate roof and chamber improvements and the authority to enter into cost-plus-a-fixed-fee contracts for the Senate improvements, and vested the special Senate Roof and Chamber Committee with the authority to fix the limit of cost for the Senate project.

House improvements

House Document 54, Eighty-first Congress, February 3, 1949, transmitted supplemental estimate of appropriation in amount of \$2,274,500, to be expended with the unexpended balance of the 1940 appropriation of \$585,000, to carry forward the House roof and chamber improvements authorized by the acts of June 27, 1940, and July 17, 1945, authorizing cost-plus-a-fixed-fee contracts, and vesting the special House Roof and Chamber Committee with authority to fix the limit of cost for the House project.

Hearings were held, February 1, 1949, before the House Committee on Appropriations on the first deficiency appropriation bill, 1949, on the \$2,274,500 supplemental estimate for the House roof and chamber improvements.

House Report 111, Eighty-first Congress, February 14, 1949, on the first deficiency appropriation bill, 1949, recommended approval of the \$2,274,500 supplemental estimate, and the legislative provisions contained in the text of the estimate. The item was approved by both the House and Senate.

Special House Roof and Chamber Committee, by directive of February 18, 1949, subject to enactment of the First Deficiency Appropriation Act, 1949, fixed the

limit of cost for the House project at \$2,567,000, and directed the Architect of the Capitol to enter into the necessary contracts, including cost-plus-a-fixed-fee contracts, and to incur such other obligations as necessary for the House roof and chamber improvements.

House Joint Resolution 226, Eighty-first Congress, was introduced in the House April 14, 1949—a so-called continuing resolution—making temporary appropriations for the fiscal year 1949, pending enactment of the first deficiency appropriation bill, 1949, which was then in disagreement in conference. This joint resolution contained authority to proceed with the House roof and chamber improvements prior to enactment of the first deficiency appropriation bill, 1949.

House Report 453, Eighty-first Congress, April 14, 1949, recommended approval of the continuing resolution.

Public Law 62, Eighty-first Congress, approved May 12, 1949, enacted into law House Joint Resolution 226.

Public Law 71, Eighty-first Congress, First Deficiency Appropriation Act, 1949, approved May 24, 1949, provided the requested supplemental appropriation of \$2,274,500 for the House roof and chamber improvements and the authority to enter into cost-plus-a-fixed-fee contracts for the House improvements, and vested the special House Roof and Chamber Committee with the authority to fix the limit of cost for the House project; also ratified any obligations incurred prior to May 24, 1949, under authority of Public Law 62, Eighty-first Congress.

Senate improvements

Hearings were held, May 20, 1949, before the House Committee on Appropriations on the legislative branch appropriation bill, 1950, on an estimate of appropriation in the amount of \$1,374,500 for payment of obligations for the Senate roof and chamber improvements incurred under authority of the Second Deficiency Appropriation Act, 1948 (62 Stat. 1028), and the Senate committee's directive of June 18, 1948.

House Report 763, Eighty-first Congress, June 8, 1949, on the legislative branch appropriation bill, 1950, recommended approval of the \$1,374,500 estimate and the legislative provisions contained in the text of the estimate. The item was approved by both the House and the Senate.

Public Law 118, Eighty-first Congress, Legislative Branch Appropriation Act, 1950, approved June 22, 1950, provided the requested supplemental appropriation of \$1,374,500 for the Senate roof and chamber improvements.

House improvements

Special House Roof and Chamber Committee, by directive of June 28, 1950, increased the limit of cost for the House roof and chamber project from \$2,567,000 to \$2,667,000.

Senate improvements

Special Senate Roof and Chamber Committee, by directive of July 11, 1950, increased the limit of cost for the Senate roof and chamber project from \$2,267,000 to \$2,367,000.

House improvements

Special House Roof and Chamber Committee, by directive of December 14, 1950, further increased the limit of cost for the House roof and chamber project from \$2,667,000 to \$2,735,000.

JUNE 18, 1948.

Mr. DAVID LYNN,
Architect of the Capitol.

MY DEAR MR. LYNN: Subject to enactment of the necessary legislation and appropriation in the Second Deficiency Appropriation Act, 1948, you are hereby authorized and directed to enter into contracts and to incur such other obligations as may be necessary for the reconstruction of the roof over the Senate wing of the Capitol and improvement of the Senate Chamber, cloakrooms, and other adjacent areas included in the Senate project as approved by the Senate committee appointed under Public Law 155, Seventy-ninth Congress, in a total amount not to exceed \$2,267,000.

The contracts may be let on a cost-plus-a-fixed-fee basis to such extent and in such manner as in your judgment is to the best interest of the Government.

You are further authorized, in selecting the general contractor for the project, to limit your selection to the three firms who previously submitted bids or cost-plus-a-fixed-fee estimates when bids for the project were opened in December 1946, viz: The George A. Fuller Co. of New York City and Washington D. C.,

the Consolidated Engineering Co. of Baltimore, Md., and the McCloskey Co. of Philadelphia, Pa. In making a selection, new cost-plus-a-fixed-fee estimates should be secured from each of these firms and, if the proposals of two or more of the firms offer equal advantages to the Government, then the selection may be limited to such firms and the contract shall be awarded to the firm chosen by the Architect of the Capitol.

CHAPMAN REVERCOMB,
ROBERT A. TAFT,
C. WAYLAND BROOKS,
HARRY F. BYRD,
THEODORE FRANCIS GREEN,

Members of Senate Committee Appointed Under Public Law 155, Seventy-ninth Congress.

JULY 11, 1950.

MR. DAVID LYNN,
Architect of the Capitol.

MY DEAR MR. LYNN: The authorization which you were granted, June 18, 1948, by directive of the special Senate Roof and Chamber Committee appointed under Public Law 155, Seventy-ninth Congress, to enter into contracts and to incur such other obligations as necessary for the reconstruction of the roof over the Senate wing of the Capitol and improvement of the Senate Chamber, cloakrooms, and other adjacent areas included in the Senate project as approved by the Senate Roof and Chamber Committee, in a total amount not to exceed \$2,267,000, is hereby increased to a total amount not to exceed \$2,367,000.

This additional authorization is necessary in order to provide a contingency fund, for the second stage construction work, of \$35,000 for premium pay costs for overtime, double-shift, and holiday work, and \$40,000 for unforeseen construction and field changes and other miscellaneous items, based on experience of costs of such items in the first stage construction work; \$15,000 for remodeling the cloakrooms, not included in original budget estimate; \$10,000 to reimburse the appropriation for moneys received from the sale of salvaged materials which the Comptroller General advised could not be credited back to the appropriation but had to be turned into the Treasury as miscellaneous receipts.

DENNIS CHAVEZ,
THEODORE FRANCIS GREEN,
ROBERT A. TAFT,

Members of Senate Committee Appointed Under Public Law 155, Seventy-ninth Congress.

AUGUST 7, 1950.

EFFECTS OF DEFERMENT OF SENATE CHAMBER WORK

If the Senate Chamber improvements are not carried forward starting August 15, 1950, as presently scheduled, it is estimated that the work, if delayed for even 1 year, would cost at least an additional \$150,000—with the probability of increased cost if delayed for more than 1 year.

The additional cost, as estimated in report to the Architect of the Capitol from his superintendent of construction, after consultation with the general contractor, would result from—

- (1) Storage charges for storing principal construction materials and all items of furniture in warehouses off the site. (Cost would be further increased if necessity should arise for storing these materials on the site for all or part of deferment period, as additional storage structures would have to be erected on the site).
- (2) Insurance of materials whether stored on or off the site.
- (3) Cost of special treatment of millwork and correcting defects likely to develop in stored materials, including any replacements that might become necessary.
- (4) Cost of rehandling stored materials.
- (5) Losses due to deterioration of lumber stored on site.
- (6) Cost of maintaining around-the-clock security watches during the year that the work would be deferred; also labor cost for periodical inspections of all stored materials, particularly for checking effects of weather conditions.
- (7) Special storage protective measures, such as mothproofing for the gallery seats and other items of furniture.
- (8) Increased costs of cost-plus work, particularly from any wage increases occurring in the interim, and also due to extra labor costs necessary for

storing materials and removing same from storage when ready to be used in the construction work.

(9) Loss of experienced field personnel familiar with the construction problems peculiar to this particular job.

(10) Additional costs from claims expected to be filed by the general contractor and his subcontractors for additional costs incurred through disruption of the approved construction schedule which, under the terms of the contract, requires the general contractor and his subcontractors to provide and hold in readiness the necessary labor and materials for performing the second stage construction work during the period July-December 1950.

RESOLUTION OF COMMITTEE IN CHARGE OF SENATE ROOF AND CHAMBER PROJECT

The special Senate committee appointed under Public Law 155, Seventy-ninth Congress, approved July 17, 1945, in charge of the Senate roof and chamber project, having carefully considered the effects of further deferment of the Senate Chamber work scheduled to be performed during the period July-December 1950, as reported by the Architect of the Capitol to the committee, has concluded that the interests of the Government will be best served by permitting the contractor to proceed with the Senate Chamber work, starting August 15, 1950: Be it therefore

Resolved, That the special committee recommends to the Senate that the Senate Chamber be vacated and made available to the contractor, August 15, 1950, for performance of the Senate Chamber improvements remaining to be effected.

DENNIS CHAVEZ, *Chairman*.
THEODORE FRANCIS GREEN.
HARRY F. BYRD.
ROBERT A. TAFT.
JAMES P. KEM.

CONTRACTS AND SUBCONTRACTS—SENATE ROOF AND CHAMBER PROJECT

General contractor for Senate roof and chamber project.—Consolidated Engineering Co., Inc., Baltimore, Md. Cost-plus-a-fixed-fee contract, entered into by Architect of the Capitol October 28, 1948.

In addition to the over-all management and coordination of all work under the contract, the general contractor performed all reinforced concrete work, masonry work, carpentry work, and demolition work with his own organization.

Subcontracts placed by Consolidated Engineering Co., Inc., with the approval of the Architect of the Capitol, for other branches of work

Subcontractor	Nature of subcontract	Date of subcontract
Reading Steel Products, Inc., Reading, Pa.	Structural steel	Dec. 6, 1948
Karl Koch Erecting Co., Inc., Bronx, N. Y.	Structural steel erection and demolition of old roof framing and trusses.	Dec. 20, 1948
Chesebro-Whitman Co., Long Island City, N. Y.	Steel scaffolding and chute	Mar. 22, 1949
Reading Steel Products, Inc., Reading, Pa.	Miscellaneous iron and steel	Jan. 12, 1949
Lloyd E. Mitchell, Inc., Baltimore, Md.	Roofing and sheet metal work, including insulation.	Dec. 13, 1948
Do	Stainless steel ceiling	Jan. 10, 1949
McNulty Bros. Co., Chicago, Ill.	Furring, lathing, plastering, and fireproofing trusses.	Feb. 2, 1949
Mehring & Hanson Co., Arlington, Va.	Air conditioning and other mechanical work.	Jan. 10, 1949
Harry Alexander, Inc., Washington, D. C.	Electrical work	Dec. 10, 1948
Harrison Carved Glass, New York, N. Y.	Carved glass for oculus.	June 20, 1949
Superb Bronze & Iron Co., Inc., Brooklyn, N. Y.	Ornamental and miscellaneous metal work	Jan. 10, 1949
Knipp & Co., Inc., Baltimore, Md.	Mill and cabinet work	Jan. 10, 1949
Rudolph & West Co., Washington, D. C.	Finishing hardware	Mar. 30, 1949
Vermont Marble Co., Proctor, Vt.	Marble work and antislip abrasive inlay	Dec. 10, 1948
Kuehne-Wilson of Maryland, Inc., Baltimore, Md.	Painting and finishing	May 16, 1949
The Hampshire Corp., Baltimore, Md.	Acoustical materials	Oct. 24, 1949
John Siedentop, Inc., New York, N. Y.	Installation of fabric covering on gallery walls.	Nov. 21, 1949
Arban & Carosi, Alexandria, Va.	Precast concrete slabs for gallery floors and steps.	Sept. 8, 1949
John H. Hampshire, Inc., Baltimore, Md.	Rubber tile	Oct. 24, 1949
The Venzie Corp., Philadelphia, Pa.	Architectural models	Feb. 23, 1949
Knipp & Co., Inc., Baltimore, Md.	New telephone booths for cloakrooms ¹	

¹ Addition to mill and cabinet work subcontract.

Other contracts let directly by Architect of the Capitol

Contractor	Nature of contract	Date of contract
American Seating Co., Grand Rapids, Mich.	New seats and new stools for galleries.....	June 30, 1950
F. Schumacher & Co., New York, N. Y.....	Furnished fabric to American Seating Co. for the new gallery seats.	July 20, 1950
E. P. Hinkel & Co., Washington, D. C.....	Carpet for Senate Chamber.....	Sept. 7, 1950
Edward F. Caldwell, Inc., New York, N. Y.	Lighting fixtures.....	Oct. 10, 1950
Rudolph Wendel, Inc., New York, N. Y.....	Reflectors for lighting fixtures.....	Oct. 10, 1950
F. Schumacher & Co., New York, N. Y.....	Fabric for gallery walls.....	July 22, 1949

Professional service contracts entered into have all been detailed in the body of this report, and the details of these contracts are not, therefore, repeated in the appendix, but only summarized as follows: Contracts with Francis P. Sullivan, Washington, D. C., and Harbeson, Hough, Livingston and Larson, Philadelphia, Pa., for architectural services; Thomas W. Marshall and James M. Gongwer, Washington, D. C., for engineering services; Paul E. Sabine, Geneva, Ill., for acoustical consultant services; Lee Lawrie, Easton, Md., for services as sculptor to make models for the marble panels over the east, south, and west doorways of the Senate Chamber; Louis Milione, Philadelphia, Pa., Edward H. Ratti, Bronx, N. Y., and Bruno Mankowski, New York, N. Y., for services as carvers of the marble panels over the east, south, and west doorways of the Senate Chamber.

This completes the list of the principal contracts and subcontracts let for the Senate roof and chamber project, with the exception of the contract let by the Architect of the Capitol to the Lehigh Structural Steel Co., August 19, 1940, for the installation of the temporary steel supports under the cast iron and glass ceiling of the Senate Chamber, which were removed when the permanent reconstruction work was begun in the summer of 1949. The new furniture for the cloakrooms was purchased, principally, from firms on the Federal Bureau of Supply Schedule.

REPORT OF THOMAS W. MARSHALL, CONSULTING ENGINEER, ON CONDITION OF
ROOFS OVER THE SENATE AND HOUSE WINGS OF THE CAPITOL

NOVEMBER 29, 1938.

MR. DAVID LYNN,
Architect of the Capitol, Washington, D. C.

DEAR MR. LYNN: Acting under my contract ACbr-119, dated July 14, 1938, I have had made a careful survey of the roof constructions over the Senate and House wings of the United States Capitol and wish to submit the following report of findings.

The roof over the Senate Chamber is supported by 12 trusses which have spans of about 83 feet. The roof over the House Chamber is supported by 14 trusses having spans of about 96 feet. The spacing of trusses, center to center, is about 9 feet 8 inches in each case. The approximate roof areas over the Chambers are Senate, 82 feet by 114 feet; House, 95 feet by 140 feet. In the Senate Chamber roof there is a skylight approximately 58 feet by 87 feet in size; the House Chamber roof has a similar skylight approximately 58 feet wide by 122 feet long. The Chamber roof areas outside those occupied by the skylights are covered with corrugated copper sheets laid on angle-iron purlins. Attached to the underside of the purlins are ceilings consisting of a thin plaster coat on wood laths. Copper roofing and plaster ceilings are connected to the purlins through wood nailing strips which are bolted to the angles. With the exception of a few minor skylights, the roofs over the corridors and lobbies which surround the two Chambers are of corrugated copper on angle-iron purlins, similar to those described above. Some portions have the plaster ceilings on wood laths as over the Chambers; in other portions the ceilings have been omitted. In these areas outside the Chambers the purlins are supported on low brick walls, built up from the ceiling arches. These walls are spaced about 9 feet apart, to suit the lengths of purlins, without reference to the location of walls in the story below.

The ceilings of the two Chambers are made up of cast-iron frameworks supporting ornamental glass ceiling lights. These ceilings are hung to the bottom chords of the roof trusses.

The Senate and House wings were erected during the period between 1851 and 1855—the cornerstone having been laid July 4, 1851. They are, therefore, now about 85 years old. When constructed the roof framing, and particularly the roof trusses, undoubtedly represented the highest development of engineering science and of the ironworkers skill. As measured by present-day standards they are entirely obsolete and fall far short of safety requirements now imposed. As evidence that this statement is not exaggerated or overdrawn, I quote from a recent article entitled "Three Centuries of Structural Analysis," written by Dean S. C. Hollister of Cornell University. After reviewing the work of early mathematicians and engineers, leading up to the presentation of the modern methods of truss design, which were published in 1863 and 1864, Dean Hollister writes: "It may fairly be said that the last 75 years constitute the modern period in structural development. During that time our modern data on materials have been developed. The range of available materials for structures has been vastly increased and improved. Also during that period the advanced theories of frameworks and of elasticity, and most of the modern analysis of statically indeterminate structures, have been brought forward."

The roof trusses over both wings are made up of rolled-iron deck beams as top chord members, cast-iron web struts and wrought-iron eyebar bottom chords and web ties, all pin connected, a type of truss long since superseded by the all steel truss with riveted connections. The cast-iron struts and wrought-iron eyebars are of satisfactory sizes and are not overstressed. The top chord deck beams and the connecting pins are definitely deficient in size and are greatly overstressed. The lateral bracing between trusses is light in weight, unsatisfactory in arrangement and detail, and generally deficient as compared with modern designs.

On the Senate side there are stresses in the top chord truss members which exceed those allowed in good practice by 100 percent. On the House side the excess is 65 percent. Therefore, the factor of safety of 4, which is demanded in all standard specifications and codes, is reduced to 2 for the Senate and $2\frac{1}{2}$ for the House. Furthermore, the ratio of length to radius of gyration for these members is as high as 175 on the Senate side and 135 on the House side, whereas the maximum ratio allowed in present-day practice is 120. Study of the design of these trusses and of other old structures, as well as the reading of old texts, indicate that engineers of the earlier days had only slight appreciation of the extent to which slenderness of section reduces the compressive strength of comparatively long members.

The sizes of connecting pins are satisfactory from the standpoint of shearing stresses, but are found to be grossly deficient when bending stresses are computed. These computations indicate bending stresses up to 77,000 pounds per square inch. It seems evident, however, that such stresses cannot actually exist or the pins would have broken long ago. It is probable that the pins have bent under the excessive stresses causing a redistribution of the applied forces in such a way as to greatly reduce the bending moment on the pin but with the effect of increasing the stresses in some of the eyebars. It is impossible to accurately determine the exact effect the bending of pins has had on the pin and eyebar stresses, but it is my opinion that many of the pins are overstressed by 100 percent and perhaps by 150 percent in some cases. That it was not the practice of early engineers to give consideration to the bending stresses in pins, but to proportion them for shearing stresses only, is shown by the following quotation from a paragraph titled "Eyebars and Pins" in the 1887 edition of Trautwine's Engineer's Pocket Book: "After deciding on the size of the body of the bars to bear safely the pull upon them, the proper proportioning of their heads or eyes and pins is an abstruse and difficult point upon which much has been written. It was formerly supposed that the diameter of the pin should be governed by its resistance to shearing, but experience has shown that this was entirely insufficient."

No serious deficiency is found in the strength of the angle-iron purlins which support the corrugated copper roofs. The wood nailing strips and wood laths present a fire hazard, however, which should be removed. Some of the plaster underneath the purlins has already fallen and other sections are likely to fall at any time.

In view of the conditions described above—first because of the serious deficiencies in the roof trusses and second because of the fire hazard attaching to the existing woodwork—I recommend that the present roof construction be removed and replaced by a new one of modern design and all fireproof materials. Over the two chambers new roof trusses should be installed with suitable intermediate

framing and bracing, and reinforced concrete slabs in the areas not occupied by skylights. Temporary stagings should be built in the Chambers to support the ceilings during the process of removal of the old construction and installation of the new. Over the lobbies and corridors around the Chambers, new roof structures should be constructed of steel beams and reinforced concrete slabs. These should be supported directly on the main walls of the building—not by the low walls, referred to above, which are built on the ceiling arches.

The total estimated cost of the reconstruction work as recommended above, including electric work, copper roofing and gutters, new skylights, necessary changes in duct work and other incidental work, is \$585,000.

Yours very truly,

THOS. W. MARSHALL.

[Extract from Congressional Record of November 22, 1940]

AGREEMENT UNDER WHICH THE SENATE VACATED THE SENATE CHAMBER, NOVEMBER 22, 1940, AND MET IN THE OLD SENATE CHAMBER, OR SUPREME COURT ROOM, COMMENCING NOVEMBER 25, 1940

ROOF REPAIR—PLACE OF MEETING OF HOUSES

Mr. BARKLEY. Mr. President, as has been stated time and again here on the floor and elsewhere, the roofs over the Senate Chamber and the House of Representatives have been declared to be unsafe. In view of the refusal of the other body to adjourn sine die, it has been thought advisable to seek to facilitate the immediate repair of the roofs over both the House and the Senate Chambers. I understand the other body is going to provide today for the meeting of its sessions in a large room in the House Office Building. It will take about 6 weeks to repair the roofs, and, unless we can arrange to hold the sessions of the Senate elsewhere between now and the 3d of January, it will be impossible for the Architect of the Capitol to begin the repair of the roof over the Senate Chamber. The money has already been appropriated for the purpose, plans have been made, the material, as I understand, ordered, and working force is waiting to go to work. Under these circumstances, it seems to me logical that the Senate meet elsewhere than in this Chamber during the remainder of this year.

The Architect of the Capitol has suggested that he can arrange the old Senate Chamber, more recently the Supreme Court Chamber, in the Capitol Building so that the Senate may hold its sessions there while the work on the roof is being done. So I ask unanimous consent, subject to the ability of the Architect of the Capitol to prepare the old Supreme Court room for our sessions, that the Senate, after today, or as soon as practicable, hold its sessions in the old chamber which was originally the Senate Chamber and has more recently been the chamber of the Supreme Court of the United States.

Mr. AUSTIN. Mr. President, on inquiry, I am advised that there is no rule of the Senate which requires the Senate to meet in any specified place. So far as I am concerned, I think it would be a distinction to sit in that Chamber where the Senate of the United States accomplished such great good in the building of the Republic, and where afterward the Supreme Court of the United States sat for so many years. I am rather pleased at the suggestion of the leader of the majority, and I concur in the request he has made.

Mr. BARKLEY. I am informed by the Architect of the Capitol that he can have that Chamber ready for us on next Monday, and while it is not necessary, for, as the Senator from Vermont says, under the rule we are not required to meet here, yet this is the meeting place of the Senate, and it seems to me that it ought to require unanimous consent to meet elsewhere. I ask that my request be submitted.

The PRESIDENT pro tempore. Is there objection to the request which has been submitted by the Senator from Kentucky? The Chair hears none, and it is so ordered.

May the Chair inquire of the Senator from Kentucky whether, when the Senate adjourns or recesses today, it will be with the understanding that it will meet in this Chamber and then proceed to the place designated?

Mr. BARKLEY. No; I do not think it is necessary to meet here; so when we adjourn or recess today, it will be with the understanding that we will assemble at 12 o'clock noon on Monday in the old Chamber of the Supreme Court in the Capitol Building. I see no need of coming here and then going there, because, it may be, that work will have begun on the roof of the Chamber on that day.

[S. Res. 130, 81st Cong., 1st sess.]

RESOLUTION

Resolved, That when the Senate recesses or adjourns on Friday, July 1, 1949, it be until Tuesday, July 5, 1949; and that on said day, and until otherwise ordered, it meet in the Old Supreme Court room in the Capitol.

Resolved, That all rules relating to the Senate Chamber shall be applicable to the Old Supreme Court room.

Resolved, That the Secretary communicate these resolutions to the President of the United States and to the House of Representatives.

Agreed to June 29, 1949.

[S. Res. 326, 81st Cong., 2d sess.]

RESOLUTION

Resolved, That when the Senate recesses or adjourns on Friday, August 11, 1950, it be until Monday, August 14, 1950, and that on said day, and until otherwise ordered, it meet in the old Supreme Court room in the Capitol.

Resolved, That all rules relating to the Senate Chamber shall be applicable to the old Supreme Court room.

Resolved, That the Secretary communicate these resolutions to the President of the United States and to the House of Representatives.

Agreed to August 9, 1950.

○

