A MUSEUM OF HISTORY AND TECHNOLOGY FOR THE SMITHSONIAN INSTITUTION

by

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Signature of Author:.....
Department of Architecture, December 21, 1956

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Thesis Supervisor

Accepted by:.....
Chairman, Departmental Committee
on Graduate Students

ABSTRACT

A MUSEUM OF HISTORY AND TECHNOLOGY
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Submitted for the degree of Master in Architecture in the Department of Architecture, December 21, 1956

Public Law 106 of the Eighty-Fourth Congress (1955) provides for the construction of a new Museum of History and Technology as a unit of the Smithsonian Institution. The new building is to be built in Washington, on the Mall, to replace the present crowded Arts and Industries Building. In terms of public exhibition space it will be the largest museum in the country. Because of its site, purpose, and size, it presents a unique problem in design. The three basic problems are considered to lie in the development of: a) an exterior character related to the overall scheme of the Mall; b) An interior character related to the nature and scale of the objects to be displayed; c) the organization of the great exhibition spaces in such a way that they may be understood as a whole. These problems are discussed in terms of desired qualities, and are referred to the solutions presented in other comparable buildings. The conclusions are summarized in a proposed design for the Museum.

Thesis Supervisor: Departmental Committee on Graduate Theses, Professor Herbert L. Beckwith, Chairman

Cambridge, Massachusetts
December 20, 1956

Pietro Belluschi, Dean
School of Architecture and Planning
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Dean Belluschi:

I have the honor to submit herewith my thesis entitled:

"A Museum of History and Technology for the Smithsonian Institution."

Very truly yours,

John F. Hayes

ACKNOWLEDGEMENT:

I would like to acknowledge the assistance given me by the following people in the preparation of this thesis:

Mr. Leonard Charmichael, Secretary of the Smithsonian Institution.

Mr. Frank A. Taylor, Assistant Director of the United States National Museum.

Pietro Belluschi, Dean of the School of Architecture and Planning, M.I.T.

Professor Lawrence B. Anderson, Head of the Department of Architecture, M.I.T.

Professor Herbert L. Beckwith, Chairman of the Thesis Committee, M.I.T.

Professor William H. Brown, Department of Architecture, M.I.T.

John A. Hayes and Mary J. Hayes, my parents, whose support and encouragement have made the completion of this thesis possible.

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INTRODUCTION

In 1829, an Englishman named James Smithson provided for the establishment at Washington of an "establishment for the increase and diffusion of knowledge among men".[1] Seventeen years later, in accepting this gift, Congress ordered that "/the Board of Regents/... shall cause to be erected a suitable building of plain and durable materials and structure, without unnecessary ornament, and of sufficient size, and with suitable rooms or halls, for the reception and arrangement of a liberal scale of objects of natural history, including a geological and mineralogical cabinet..." and that "... all objects of foreign or curious research... shall be arranged in such order, and so classed, as to best facilitate the examination and study of them in the building...."[2]

While the Smithsonian Institution has been active in many fields of scientific research since that time[3], it is as a museum that it is best known to the public. Its buildings occupy most of the land on both sides of the Mall. The original building of 1846 has been supplemented by the Arts and Industries Building of 1879, the New National Museum of 1904, the Freer Gallery of 1916, and the National Gallery of Art of 1937.[4]

Public Law 106 of the eighty-fourth Congress (1955) provides for the appropriation of $36,000,000 for the construction of a new Nuseum of History and Technology as a unit of the Smithsonian Institution.[5]

The new building will replace the present Arts and Industries Building, the crowded exhibition structure which many people believe to be "the Smithsonian Institution". The displays in this building cover many fields: airplanes, automobiles and power machinery, exhibits in physics and chemistry on one hand; displays of the personal possessions of important figures in American history, the household arts of the different periods, and of military history on the other. With the exception of the airplanes, which will go to another new building, these are the types of materials which will be exhibited in the new building.[6]

The program for the new Museum asks for almost a half-million square feet of exhibition space. It will be the largest museum in the country: fifty percent larger than the Metropolitan Museum of Art in New York, twenty-five percent larger than the American Museum of Natural History (also in New York), and about three times the size of the present Arts and Industries Building.[7] In addition, about 300,000 square feet of space must be provided for administration, research, and the storage of other materials.

The site is on the Mall. The new building will thus be part of the composition of formal landscape and monumental buildings which connects the Capitol on its hill at the East, and the Washington Monument on a slight rise at the West. It will form one end of the line which is begun by the National Gallery of Art, and be opposite

the Agriculture Building. On the side away from the Mall it will face the half-mile long facade of the Federal Triangle group of buildings.

These conditions indicate three desirable attributes which the solution should possess.

1. The organization of the great exhibition spaces in such a way that they may be understood as a whole so that a sense of spatial orientation may be preserved.
2. An exterior expression considered in relation to the development of the Mall as a whole.
3. An interior expression related to the nature and scale of the objects to be displayed.

While Part I of this paper is concerned primarily with an objective statement of the conditions of the problem, Part II will treat these specific problems at some length. Much of the argument is advanced through illustrations of the existing buildings which are judged to be more or less successful in these aspects. The object is to indicate the reasoning which led to the proposed design for the Museum which is presented in Part III.

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PART ONE - PROGRAM

CHAPTER ONE: SITE

The purpose of this section is to present the necessary factual material relating to the location and physical character of the site. The broader implications of the site will be considered later, in Chapter 4.

Location:

The new museum is to be built in Washington on the Mall which joins the Capitol and the Washington Monument. The exact site (shown in yellow on Illustration S-1) is fixed by act of Congress to be the block bounded by Twelfth Street, Constitution Avenue, Fourteenth Street and Madison Drive (the Northern roadway of the Mall).[8] It will be the last building on the Mall before the beginning of the Washington Monument Grounds, and will be diagonally opposite the present Arts and Industries Building which it will replace.

Surroundings:

To the North, along Constitution Avenue, the site faces the Federal Triangle group of buildings (those characterized by the strong pattern of shadows in Illustration S-2). The units nearest the site house: the Department of Commerce; the Department of Labor; the Government Auditorium; the Interstate Commerce Commission; and the Department of Internal Revenue. The whole group is of uniform design and materials; the facades are of granite, five stories high, and have a total extent of about 3,700 feet.

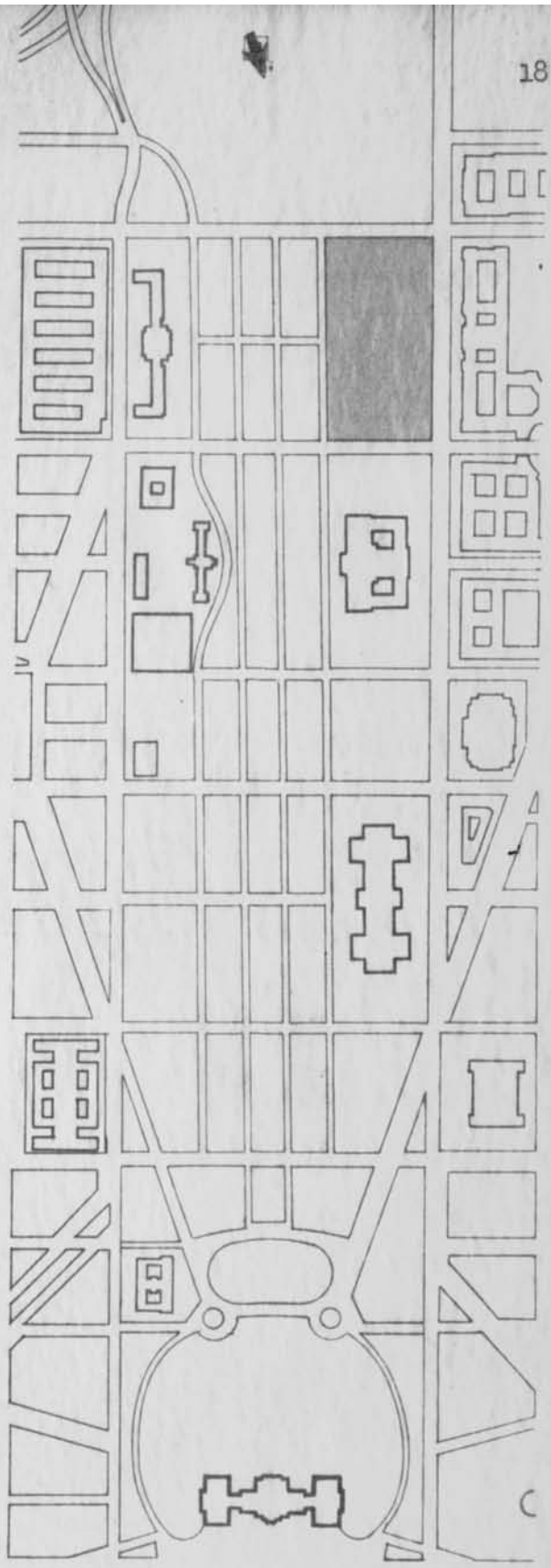

ILLUSTRATION: S-1: Air View of Washington

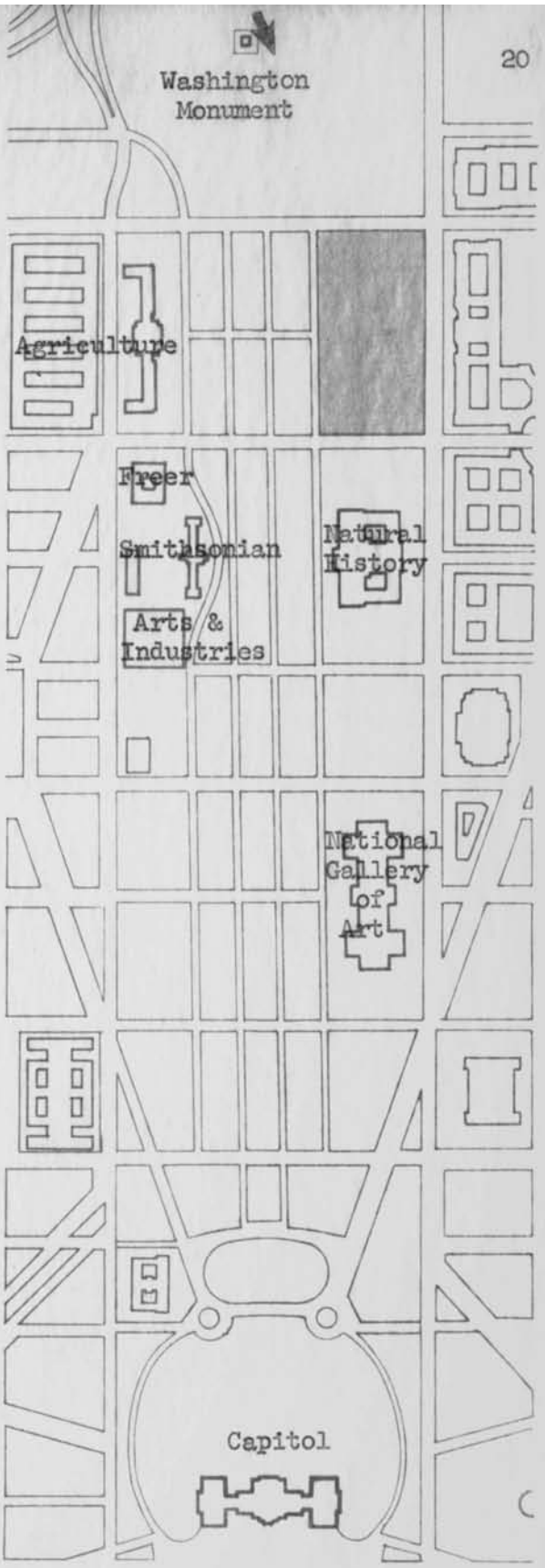

ILLUSTRATION: S-2: Air View of the Mall

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To the South, and on axis with the site, is the Department of Agriculture Building. To the West is the Washington Monument.

To the East, on Twelfth Street, is the adjacent site of the New National Museum, the Natural History Building, a unit of the Smithsonian Institution (Illustration S-3).

It is a conspicuous site. Seen from the Monument (Illustration S-4), the Museum will be the first of the free-standing buildings along the Mall. Proceeding from the Capitol, it will follow the considerable masses of the National Gallery of Art and the Natural History Building.

The site adjoins two of the most-travelled streets in the city: Constitution Avenue which carries much of the East-West traffic within the city, and Fourteenth Street which brings in traffic from the Airport and from the South. It is about three blocks South of the downtown Washington business and shopping area.

Physical Description:

The site is approximately 1050 feet long on Constitution Avenue.[9] Because the Mall roadways are skew to the general North-South, East-West street pattern, the width varies from 550 feet at Twelfth Street to 600 feet at Fourteenth Street. The area is about 600,000 square feet (about 14 acres). The main axis runs almost due East-West.

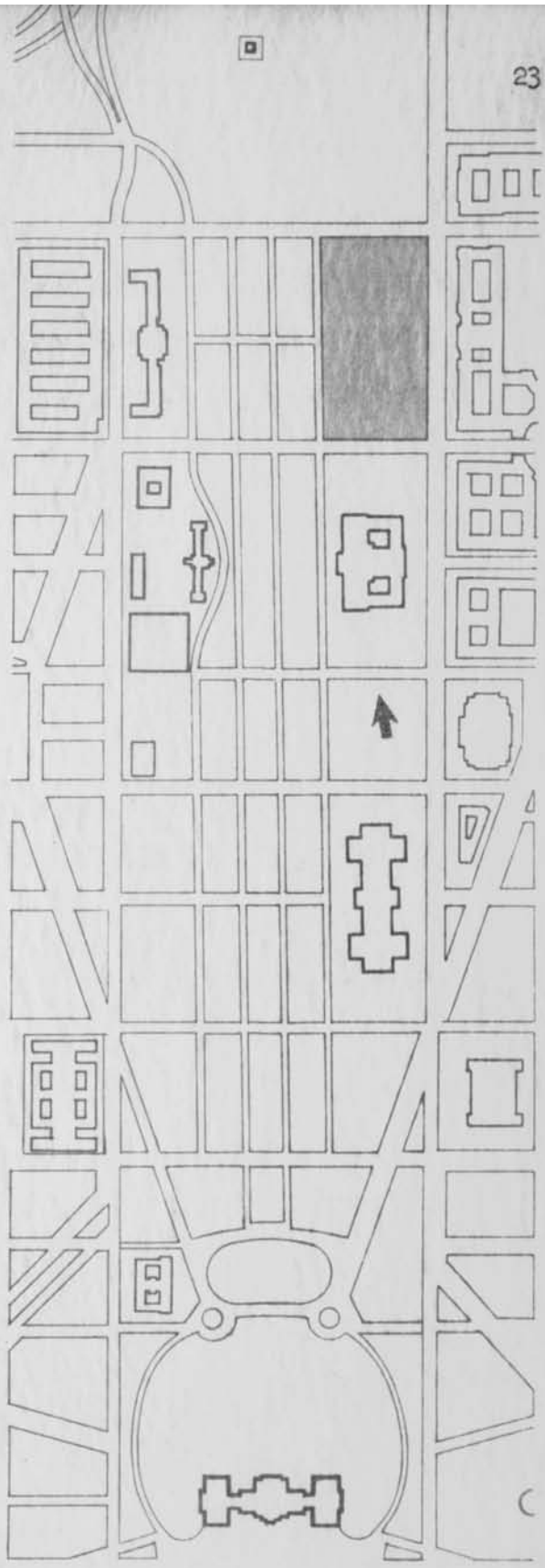

ILLUSTRATION: S-3: Air View of Site - from East

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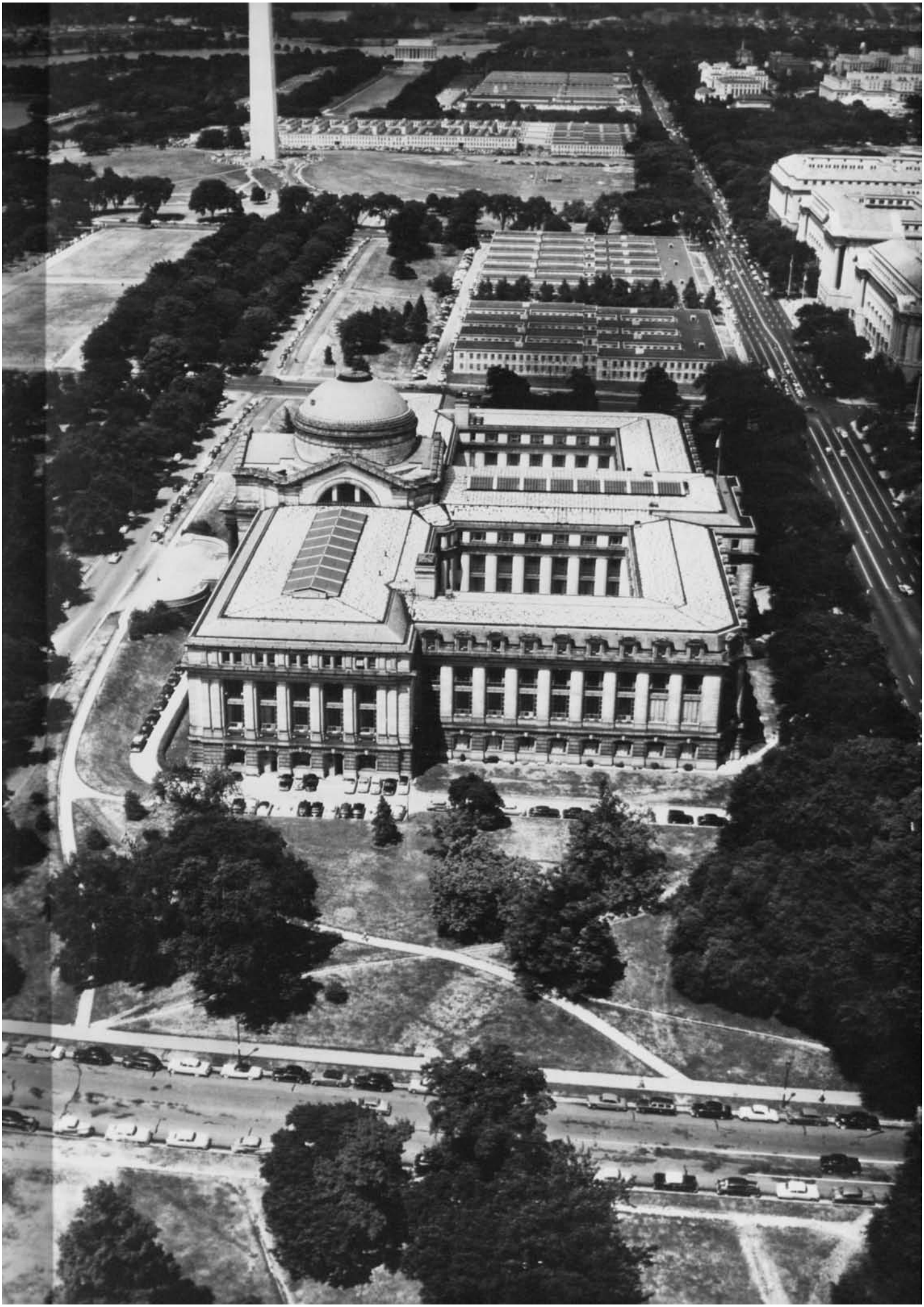

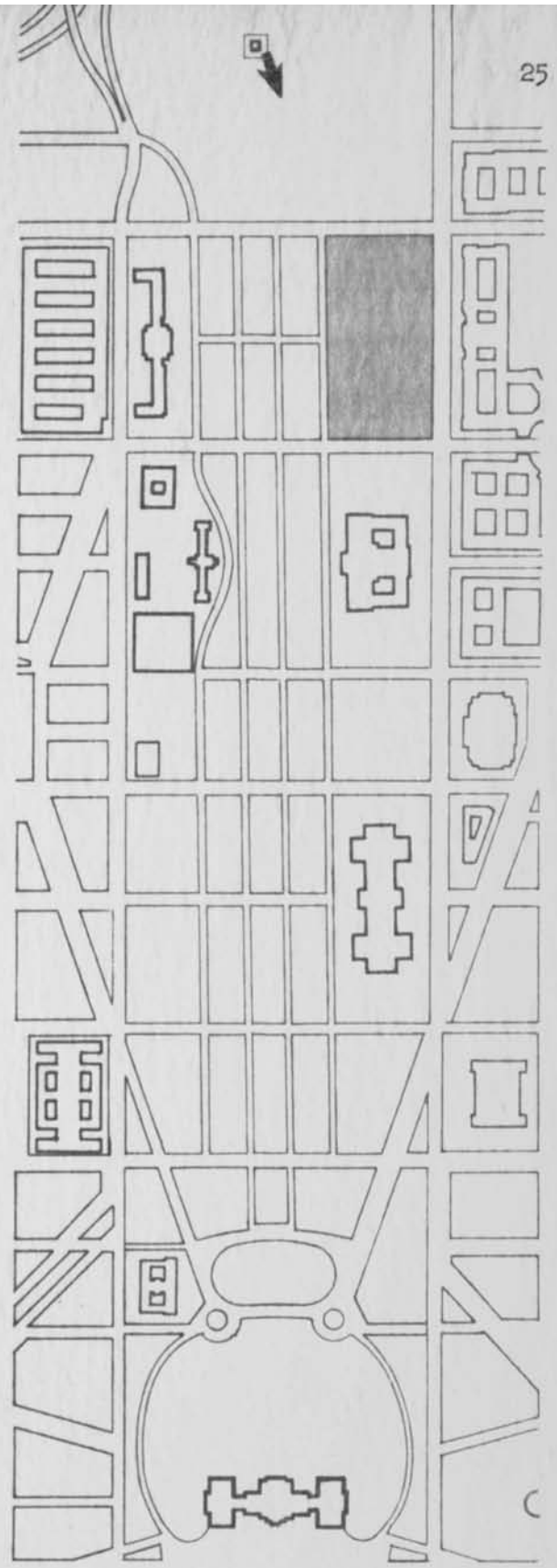

ILLUSTRATION: S-4: Site and Mall from Washington Monument

At present, Twelfth and Fourteenth Streets cross Madison Drive at levels which are depressed below the general elevation of the Mall (Illustration S-5). The present plan for the development of the Mall indicates that these streets will be further lowered to pass under the Mall which will be bridged over them.[10] Whether or not this particular scheme is carried out, it seems likely that the profile along the Madison Drive will be made level at Elevation 30 (above mean sea level).

From the Mall, the site has a gradual downward slope, falling about 20 feet to Constitution Avenue. Along Constitution Avenue (Illustration S-6) the land is effectively level at Elevation 10.[11]

While tests of the bearing capacity of the soil are not available, experience at the Natural History Building on the adjacent site indicates that the soil will provide adequate resistance in direct bearing for any building of comparable mass to be erected upon this site.[12] The low elevation of the land above the level of the Potomac suggests that any construction below the grade of Constitution Avenue will probably be subject to hydrostatic pressure.

The buildings which occupy the site at present (Illustration S-7) are temporary wooden structures; their removal should not involve any serious physical problems.

The dimensions of the site are shown on the Site Plan, Illustration S-8.

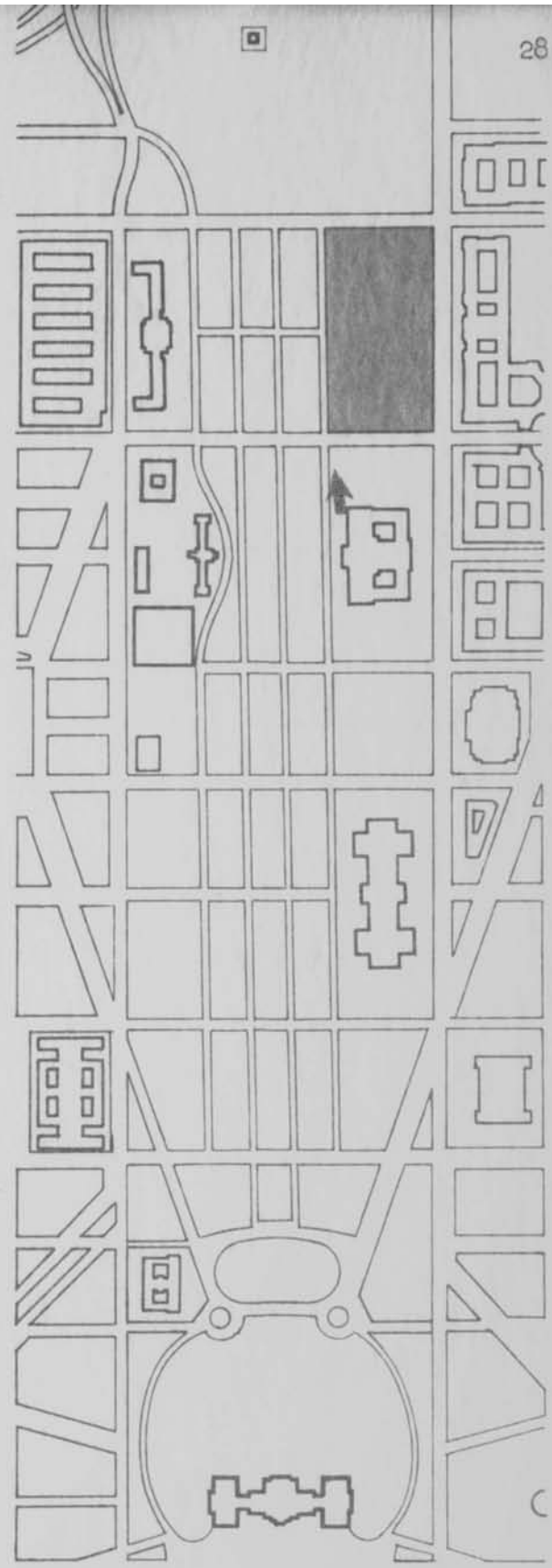

ILLUSTRATION: S-5: Site from Mall

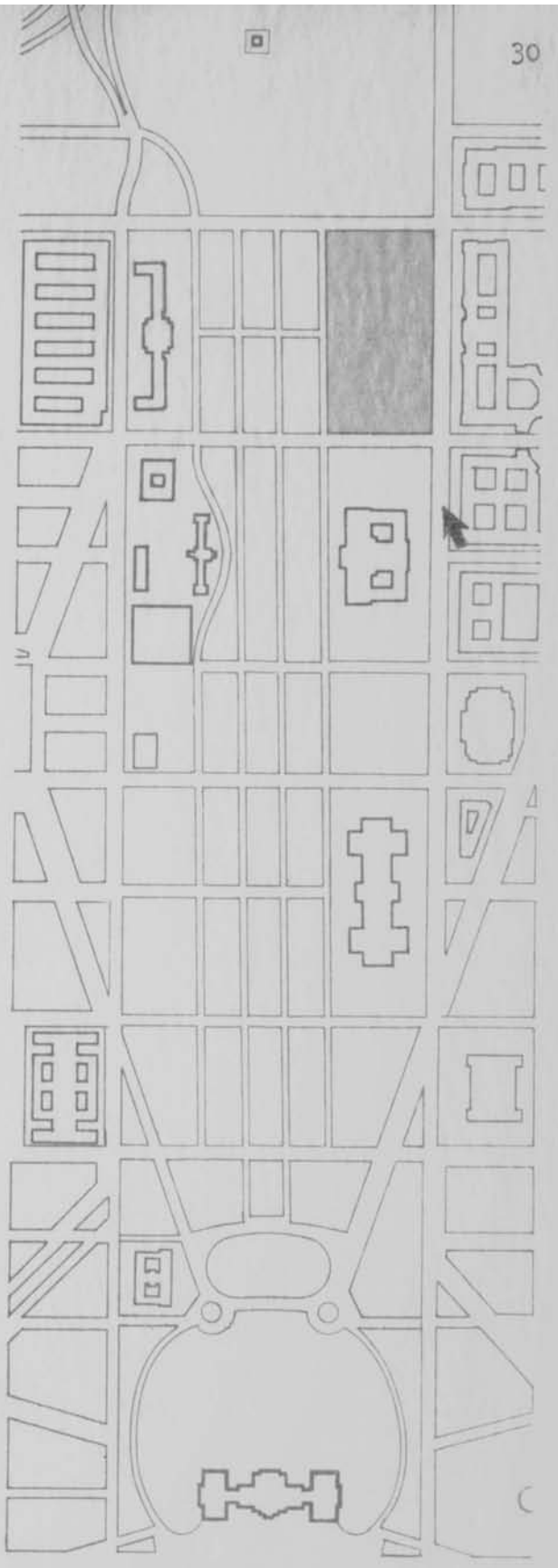

ILLUSTRATION: S-6: Site from Constitution Avenue

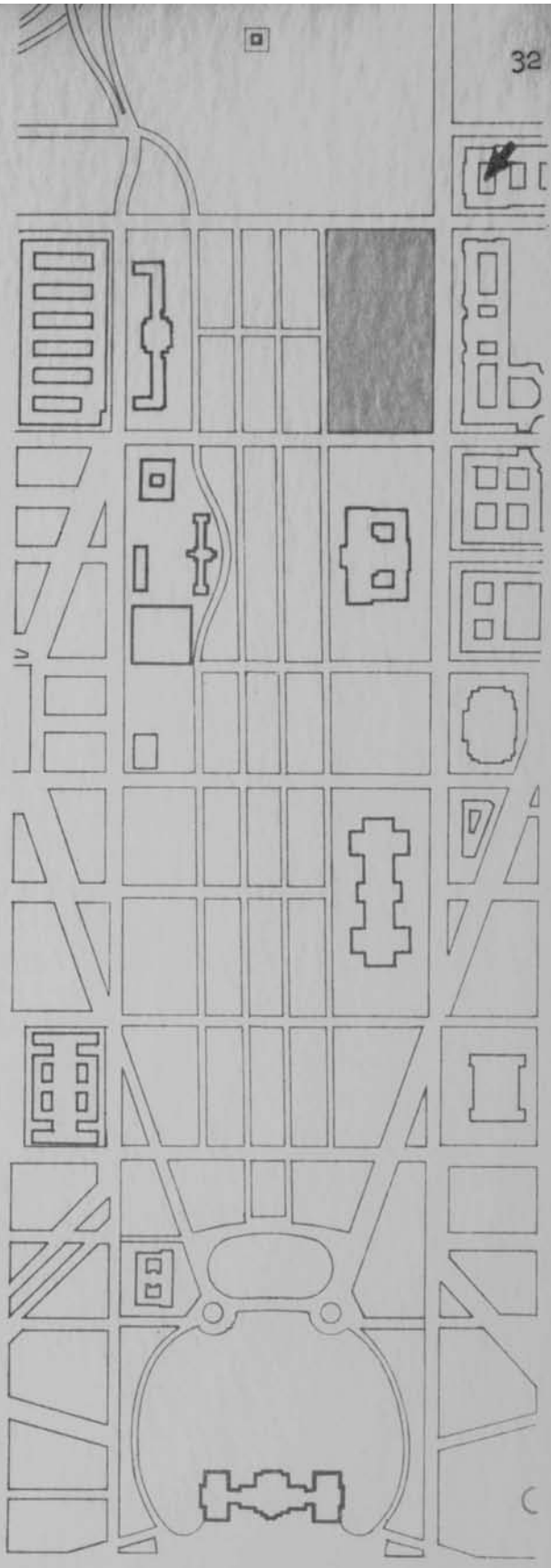

ILLUSTRATION: S-7: Air View of Site - from Northwest

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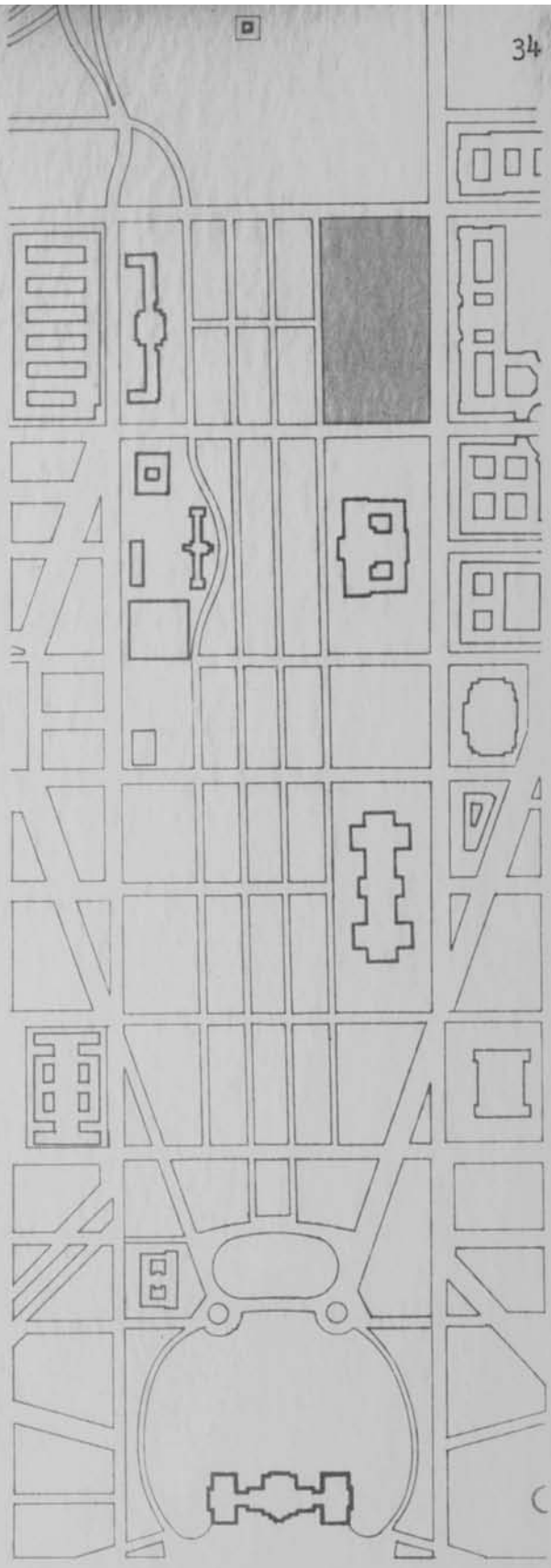

ILLUSTRATION: S-8: Site Plan

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CHAPTER TWO: REQUIREMENTS

INTRODUCTION

The purpose of museums is usually given under three categories: preservation, study, and exhibition. As a national museum, the new Museum of History and Technology must provide special facilities in all these areas. It will have primary responsibility for the preservation of original objects relating to the historical and technological development of the United States. It must administer a large program of related study and research both by its own staff and by visiting scholars. It must exhibit objects from its collections in such a way as to convey to the general public the meaning of our national development.

Spaces Required

The following types of space will be required to provide for these activities:[13]

1. Exhibition Spaces: 450,000 square feet of exhibition space is required. This will be divided as follows:
    a. Survey Collections - 2 at 50,000 s.f. each. One in History which should be seen first, one in Technology, these are all that would be seen by onetime visitors to the museum.
    b. Subject-Matter Collections - 260,000 s.f. assigned, 60,000 s.f. unassigned.

c. Special Exhibition Spaces - 30,000 s.f.

2. Public Spaces - adequate lobby and circulation spaces, lounges, and also:

   a. Auditorium for 1000 people

   b. Cafeteria

3. Reference Collections Spaces: 150,000 s.f. of which 50,000 s.f. to be readily accessible from offices, and 30,000 s.f. available for occasional use for special exhibitions. The rest for use principally by researchers.

4. Administrative and Curatorial Space: 60,000 s.f. for offices and library

5. Operating Spaces: 70,000 s.f. for shops, laboratories, and personnel spaces.

The total net space required is therefore about 770,000 s.f.

Circulation

The people for whom the building must be designed fall into several categories: The largest in numbers is probably the onetime visitor who comes to the museum as one part of a visit to Washington. It is estimated that these people will spend about two hours in the building. They must be directed to the special exhibits designed for this group; Repeat visitors are those who live near Washington, and who return several times to become acquainted with the collections as a whole; the subject-matter collections should be readily accessible to them; Visitors with special interests will want to see parts of the subject matter collections, and also to consult the curators for access to the special reference collections. School children and others coming in groups need access to all the collections, and also to classrooms, special lunch rooms etc.

Researchers require access to curators offices, all reference collections, and to offices for their use. Some visitors will require access to the offices of the administrative staff. All visitors should have access to the auditorium, cafeteria, and special exhibition galleries. For the staff, the administrative group requires access between offices; curators need access within the curatorial group, to the shops and laboratories, to reference collections, to the library, and to the exhibition spaces.

About 250,000 visitors a month come to the present building during the Spring.[14] The largest single day's attendance was 34,983 on May 8, 1954. It is anticipated that for the new building the peak month will bring about 750,000 visitors, with a maximum of 60,000 people in any one day. This indicates that there may be 5000-10,000 visitors in the building at one time on a few occasions, while an average of 2000 people could be expected to be in the building at once during the peak month of the Spring. Adequate circulation for these large numbers of people requires consideration in the design.

Note: This section is based on the official program included in the Appendix, considerably shortened, and reorganized in a more general form. Much of the wording is taken directly from the original, but because of the number of interpolations and summarizations, it appears less confusing to omit the usual punctuation. This should not be considered an official statement of the Smithsonian Institution.

PROGRAM FOR THE DESIGN OF THE MUSEUM OF HISTORY AND TECHNOLOGY

I PUBLIC SPACES

Lobbies

Well-designed lobbies are required to receive visitors, put them at ease and orient them to the contents of the building. Lobbies control traffic to exhibits, to meeting rooms and auditorium, to the curators' offices.

Typical entrance facilities include: A heated vestibule for early visitors waiting for doors to open. This might connect to a lounge with rest rooms used to accommodate overflow waiting crowds and doubling as an orientation room where visitors can rest and see graphic directions for visiting the museum. This and a large check room for garments and parcels require locations between guard post and door (security).

Provide one or two quiet, safe, areas where bus driver or tour escort can assemble 40-60 persons standing around him for instructions.

Lobby will have Information desk, publications and reproduction salesroom or island, writing desks, mailbox, drinking fountains, space for wheelchairs, directory and directing devices, guard post. Provide for telephones, guide-a-phone rentals, and first-aid rooms.

Special Exhibits Space

One space (10,000s.f.) for changing exhibits should be located close to the auditorium, accessible from auditorium entrances and lounges for evening openings. The lighting of this space should be very flexible. A storage and preparation space (3000 s.f.) is required adjacent to this space.

An additional 20,000 s.f. of special exhibits space should be provided, either separately, or as part of the general exhibition area.

Auditorium

First floor location for the auditorium is preferred. Capacity, 1,000 seats. This should be convertible to small meeting rooms and if possible to use for special exhibits. Locate for separation from rest of buildings with separate entrance, but also for entrance from the lobby. Lounges with rest rooms, a pantry, and a reception room are required nearby. The reception room (1,200 s.f.) should be equipped to convert to a meeting room. A "backstage" lounge with rest rooms and dressing rooms should be provided. A backstage room for preparing demonstrations would be useful. Box office.

Auditorium stage and equipment should include adequate lighting (with footlights or outlets for similar lighting), public address, two-way television circuits, projection TV (broadcast reception), best possible acoustics, sound motion picture projection, slide projectors.

Separate Special Entrance

A special entrance is desirable for school classes brought to the museum by appointment. Two classrooms, with projectors, seating fifty children each and designed to be opened into one large room, should be located near this entrance.

It is also desirable to have a separate entrance for receiving visiting dignitaries, including the President. A small reception hall directly connected by special elevator to similar halls on the exhibition floors, and also to a lounge adjoining the auditorium stage could be useful.

A handicapped visitors entrance and a stretcher exit are also desirable. A first aid room should be provided near this exit.

All three of these functions might be combined in one entrance.

II EXHIBITION SPACES

Organization of Exhibits

The exhibits planned for the museum consist of three principle blocks or types: the "Growth of America" series; the "Science and Technology in Industries" series; and the many galleries devoted to subject-matter exhibits, such as the history of transportation, ceramics, firearms, water-craft, engineering etc.

The "Growth of America" series (50,000 s.f.) should be centrally located and serve as the introduction to the museum for the first-time or one-time visitor. It will outline the development of the United States in ten units. Each unit will be based on a significant period in the Country's history. The character and contribution of each period will be illustrated with selected original objects of the period, such as machines, weapons, documents, costumes, models, vehicles, and personalia. These objects will be selected and exhibited for their value in graphically communicating the meaning of the period.

It would be appropriate, though not essential, that exhibits of the history collections (80,000 to 100,000 s.f.) be located near these. Most of these are of moderate sized objects which can be displayed under ceilings 12 to 14 feet high. However, the First Ladies Hall, objects such as the Book House, and possibly some items of military history, will require ceiling heights up to 23 feet. Therefore about 1/6th of the total space should have 23-foot ceiling height.

The "Science and Technology in Industries" series (50,000 s.f.) is a block of ten units of modern industrial or business exhibits. The subjects of these occasionally will be important industries such as communications, iron and steel, petroleum, and chemical manufactures; or they will be current industrial features such as automation, atomic energy, and industrial design; or again they might exhibit the functions of crafts, trades, or professional occupations. Each of these exhibits would start with a large symbolic machine or model of the latest design and develop backward with devices illustrating the technological and scientific developments which are of outstanding importance to the industry. They will be centrally located and the total area devoted to them will be large enough to create an impression that the museum exhibits in technology are up to date and progressive. These exhibits will change with appropriate rapidity.

The second group of technology exhibits will be the collections relating to the history of science and technology (125,000 s.f. to 150,000 s.f.). For both groups, most of the material will be accommodated in space with 12 to 14-foot ceilings. However, at least 1/5th of the space (both groups) should have 23-foot ceilings. Most of the technology items are also of moderate weight (machine tools, automobiles, and smaller). A few in number -- but bulky in size -- as locomotives, large engines, and

turbines are very heavy. It appears that these very heavy objects should be exhibited on the ground floor, possibly in a large machinery hall. There is some reason to keep all of the technology exhibits in proximity to each other, but no particular arrangement of exhibition space is required.

Another group of exhibits (40,000 to 75,000 s.f.) will be devoted to collections in the decorative arts, (ceramics, glass, silver, prints, photographs, textiles, and furniture). All of these will be accommodated in space with 14-foot ceilings or less. They all appropriately could be located near the historical collections, though many -- if not all -- have some technological interest.

In addition to the above assigned exhibition spaces, 60,000 s.f. of unassigned exhibition area should be provided as reserve.

Allocation of Space to Specific Exhibits

The allocation of the exhibition space among the various exhibits is as shown in Table I, below. The groupings indicated are provisional, and subject to design considerations.

TABLE I - ALLOCATION OF EXHIBITION SPACE BY SUBJECTS

Growth of America Series - 10 units	50,000 s.f.
Science and Technology in Industry - 10 units	50,000 s.f.
Subject Matter Collections:	
Presidents	5,000 s.f.
First Ladies	10,000 s.f.
Famous Americans	5,000 s.f.
Costumes	5,000 s.f.
Philately and Postal History	10,000 s.f.
Numismatics	10,000 s.f.
* History of Defense	30,000 s.f.
* Colonial Furnishings	5,000 s.f.
* XIX Century Furnishings	5,000 s.f.
Musical Instruments	5,000 s.f.
Ceramics	10,000 s.f.
Glass	5,000 s.f.
Textiles	5,000 s.f.
Heating and Lighting	5,000 s.f.
Graphic Arts	10,000 s.f.
Photography	10,000 s.f.

* Physics and Metrology	7,500 s.f
Electricity	10,000 s.f.
Tools	5,000 s.f.
Light Machinery	5,000 s.f.
* Power Machinery	10,000 s.f.
Automobiles and Coaches	15,000 s.f.
* Railroad Equipment	10,000 s.f.
Watercraft	10,000 s.f.
* Agriculture and Food Technology	10,000 s.f.
* Forestry and Woods	10,000 s.f.
Textile Machinery	10,000 s.f.
Chemistry	7,500 s.f.
Health	5,000 s.f.
Medical History	5,000 s.f.
Pharmaceutical and Dental History	5,000 s.f.
Reserve	60,000 s.f.
Special Exhibits (included in PUBLIC SPACES, p.40)	30,000 s.f.
Total for Exhibition Spaces	450,000 s.f.

* Part or all requires high ceiling

Requirements of Exhibition Spaces

Passageways and vertical transportation must be adequate to handle the large crowds of visitors who come to see the exhibits from the beginning and who move along in groups to the starting point. The individual visitor who comes to see a special exhibit should be able to by-pass these crowds and proceed directly to his destination. Circulation areas should be usable for special exhibitions during quiet seasons.

Galleries will provide a minimum of 5,000 s.f., unobstructed floor space. 50' x 100' is a workable gallery size. The large machinery and transportation hall, if used, should have a clear width of 75'. The starting area, entrance hall, and auditorium are other exceptions.

The greatest flexibility consistent with appropriate appearance and justifiable cost is wanted in the exhibition galleries. Walls should be removable between columns to permit two or more halls to be thrown

together. Walls should provide the maximum of convenience for changing service outlets. Air conditioning and heating outlets should be in the ceiling. If required to be in the walls they should be at least 10 feet above the floor.

Ceilings will provide for attachment of movable partitions in the exhibition halls. The ceiling design should permit the pattern of room lighting to be changed to fit exhibits arrangements and the installation should permit the greatest flexibility in mixing incandescent and fluorescent lighting and for the placing of accent and directional lighting elements. Suggested lighting standards are 10 foot-candles for room lighting; 20-50 foot-candles for objects.

Floors should provide the greatest economy of maintenance, resistance to heavy foot traffic, resistance to pitting under heavy concentrated loads as casters, ease of moving heavy objects over them, fine appearance, and maximum comfort. Variety of floor coverings reduces fatigue. Floors should provide flexibility in changing service outlets. This includes special exhibition areas, and auditorium floor.

Special requirements for the technology exhibits are service channels to operable exhibits at all locations including electricity, compressed air, water, and gas as required; built-in rails and platforms for railroad equipment; special outside doors, ramps and elevators for moving large objects in and out; and built-in cranes and hoists. The large machinery hall will require special floor design to permit recessing for flywheel and other pits, with channels for special requirements as water, compressed air, steam, etc., under floor.

The possibility of exposing the operating mechanisms of elevators, escalators, cranes etc. as working exhibits, should be considered.

Subsidiary Spaces

The following spaces should be distributed throughout the exhibition spaces:

1. Smoking lounges with associated rest rooms.
2. Six classrooms, with projectors, for 40 children each.
3. Six exhibits preparation and temporary storage rooms (2500 s.f.)

All floors must have the full complement of service and maintenance facilities including: Mop sinks, storage closets for cleaning supplies and equipment, outlets for scrubbing, vacuum cleaning and waxing. (Outlets should be located for occasional daytime cleaning with minimum interference with visitors.) Storage space for handling equipment, ladders, scaffolds, lamps, etc.

III REFERENCE COLLECTIONS SPACES

The reference collections spaces provide for the storage of material which is either not currently on display, or which is primarily useful for study purposes. These spaces fall into two groups, differing in the immediacy of access which is required. The Reference Collections Storage Spaces are intended primarily for the use of members of the staff and for serious scholars or researchers. The Reference Collections Spaces must provide in addition, for frequent access by members of the general public having special interests. Access to both groups must be controlled.

Reference Collections Storage Spaces

Natural Light is not required in the Reference Collections Storage Spaces.

The storage (100,000 s.f.) spaces should consist of a few large spaces enclosed by perimeter wall, which can be subdivided by demountable partitions into units of roughly 5000 s.f. Provision should be made for one work room and one laboratory (15 x 20') in each of these units.

A suitable ceiling would be of exposed beams, painted, with lighting by fluorescent strips between the beams. Provide 15 foot-candles illumination at the floor. Floors should be concrete, painted, containing service channels for maximum flexibility in partitioning space.

All doors open to ceiling or to have removable overhead. All doors and corridors between freight elevators and storage areas will have full beam clearance. Corridors from elevators to storage area will have the same width (15' ?) as the smaller dimension of the freight elevator, plus space at doors or entrances to storage areas, in which to turn large objects.

About 30,000 s.f. of this storage space at the center, adjacent to the public elevators, should be equipped for occasional special use as exposition space. Same specifications apply to this as to Special Exhibits space, except that finish will be rougher.

The distribution of this space among the various collections is as shown in Table II, below

TABLE II - STORAGE SPACE REQUIRED FOR COLLECTIONS

Physics and Chemistry	5,000 s.f.
Mech. and Civil Engineering	10,000 s.f.
Transportation	10,000 s.f.
Electricity	10,000 s.f.
Agriculture and Forestry	10,000 s.f.
Medical Science	5,000 s.f.
Military and Naval History	20,000 s.f.
Civil History and Costumes	15,000 s.f.
Reserve	15,000 s.f.
Total Reference Storage Space required	100,000 s.f.

Reference Collections Space

This will house the "show" collections, that is, the memorial or named study collections which are those of greatest interest to the non-scholar. It should have convenient access from the curators' offices. Normal office ceiling height will be adequate. 50,000 s.f. are required, assigned as shown in Table III, below.

TABLE III - AREAS FOR REFERENCE COLLECTIONS SPACES

Numismatics	5,000 s.f.
Philately	5,000 s.f.
Textiles	10,000 s.f.
Furnishings, Silver and Folklore	10,000 s.f.
Ceramics and Glass	5,000 s.f.
Prints, Graphic Arts and Photography	10,000 s.f.
Musical Instruments	5,000 s.f.
Total Reference Collections Spaces required	50,000 s.f.

Two meeting rooms should be provided for scientific and historical panel groups, requiring proximity to the reference collections. Two at 750 s.f. 1,500 s.f.

A storage vault bomb-proof and water-tight for quick "evacuation" of selected objects should be provided 3,600 s.f.

IV ADMINISTRATIVE AND CURATORIAL SPACES

General

There are three basic units in this category: the Public Services section, which consists of the library, reference department, and docent service etc.; the administrative offices for the Director and his assistants; and the curator's offices for the 20 curatorial divisions.

Public Services Spaces

Space for the Public Services activities should be located for easy access from the lobbies and from the curatorial offices. This should be easily shut off from the rest of the building for possible use on Saturdays and Sundays.

Administrative Offices

The Director's Suite should be planned appropriately in expectation that a future Secretary of the Smithsonian Institution or Director of the United States National Museum, might use it.

Curator's Offices

Curator's offices should be as close to the library as practicable, close to storage areas, and with quick access to shops, laboratories, and exhibits areas. They should be grouped so that one stenographer may serve as receptionist and stenographer for three curators. Provide maximum privacy for curators.

Offices for visiting historians should be provided, spaced between curator groups as reserve offices for curators or additional clerks.

A professional visitors lounge and two staff lounges should be provided.

Allotment of Spaces

The spaces required for all three units are as shown in Table IV.

TABLE IV - ADMINISTRATIVE AND CURATORIAL SPACES REQUIRED

Public Services:		
Public Inquiries Office	500	
Combined Working Libraries	5,000	
	6,500	12,000 s.f.
Administrative Spaces:		
Director's Office	400	
Study or laboratory	300	
Reception room (business) 2, total	600	
Reception room (ceremonial)	1,600	
Conference room	600	
Pantry	100	
Lavatory		
Administrative assistant	200	
Stenographers (2), total	300	
Messenger and supplies	100	
File clerk and files	300	4,500 s.f.
Administrator	350	
Administrative assistant	200	
Stenographer	150	
Clerks (2)	200	
Messenger	100	1,000 s.f.
Director of Research (Historian):		
Office	400	
Conference room	300	
Administrative assistant	150	
Stenographer	150	1,000 s.f.
Director of Public Services (Education):		
Office	400	
Study	150	
Administrative assistant	200	
Stenographer	150	
Messenger	100	1,000 s.f.
Exhibits Director:		
Office	350	
Administrative assistant	200	
Architectural assistant	150	
Chief designer	150	
Stenographer	150	1,000 s.f.
Assistant Superintendent of Buildings:		
Offices, 2 at 250, 1 at 200		700 s.f.

Curators' offices (20 groups as follows):		
Curator.....	200	
Associate curator.....	200	
Associate curator.....	200	
Stenographer-receptionist.....	200	
Museum aid - workroom.....	200	
Museum aid - workroom.....	200	
Museum aid.....	200	
Office collections - library, with lavatory.....	400	36,000 s.f.
Visiting Historians Studies 10 at 150 s.s.....		1,500 s.f.
Professional Visitor's Lounge.....		900 s.f.
Staff Lounges 2 at 600 s.f.		1,200 s.f.
Total For Administrative and Curatorial Spaces		60,800 s.f.

V OPERATING SPACES

Operating Spaces for the Museum consist of three main groups: Laboratories and Shops for the care of collections and the construction of exhibits; Personnel spaces for the maintenance staff; and Materials Handling Spaces for shipping and receiving, temporary storage, and the transfer of materials within the building.

Laboratories and Shops:

The Photographic Laboratory will be a central facility for all units of the Smithsonian Institution. In addition to the usual photographic operations it will do color processing, photo-setting and silk-screen processes, X-ray and micro-photography, and photographic cataloging of specimens. Natural light requires consideration.

The Print Shop will be central for all Smithsonian activities. It will include the present equipment of linotype machine, proof and printing presses, paper cutter, stapling machines, and duplicating equipment.

The Exhibits Laboratory will be the principal such unit for the Smithsonian Institution. It will include office space, design rooms, mock-up stages, spray booth, silk-screen laboratory, light and heavy mechanical shops. The space estimate includes necessary storage areas for supplies and for finished work.

The Preservation Laboratories are intended for the preservation of the collections and for the restoration of objects for display. They should be grouped together with direct access to and from the curatorial offices.

The Television Laboratory should have a studio-type camera room to produce television sequences to supplement scenes produced in the exhibition spaces. It will include offices for the staff, a small art work room, dressing rooms, and camera stages.

Spaces Required for Laboratories and Shops

The spaces required for Laboratories and Shops are as shown in Table V below.

TABLE V - SPACES REQUIRED FOR LABORATORIES AND SHOPS

Photographic Laboratory		6,000 s.f.
Print Shop		2,000 s.f.
Exhibits Laboratory		24,000 s.f.
Preservation Laboratories:		
Textiles	750	
Metals and Woods	1,000	
Mechanical Models	500	
Glass and Ceramics	500	
Ship Models	500	
Document Repair	400	
Furniture Restoration	750	4,400 s.f.

Television Laboratory.....		6,000 s.f.
Personnel Space:		
Lunch rooms.....	800	
Locker room for lab. personnel.....	600	
Showers and lavatory.....	800	2,200 s.f.
Total for Laboratories and Shops		44,600 s.f.

Maintenance Personnel Spaces

The spaces required for maintenance personnel are shown in Table VI, below:

TABLE VI - SPACES REQUIRED FOR MAINTENANCE PERSONNEL

Guard Office (Central reporting)		
Lieutenant.....	200 s.f.	
Squad room.....	600 s.f.	
Locker room.....	500 s.f.	
Pantry, vented.....	150 s.f.	
Showers, lavatory.....	600 s.f.	2,050 s.f.
Labor Force		
Foreman.....	200 s.f.	
Locker room.....	500 s.f.	
Pantry, vented.....	150 s.f.	
Showers, Lavatory.....	500 s.f.	
Storage of supplies.....	200 s.f.	
Equipment room.....	1,000 s.f.	2,550 s.f.
Char Force		
Forewoman.....	150 s.f.	
Locker room.....	500 s.f.	
Pantry, vented.....	150 s.f.	
Showers, Lavatory.....	500 s.f.	
Supplies.....	200 s.f.	
Equipment room.....	300 s.f.	1,800 s.f.
Telephone Room (S.I. Central).....		600 s.f.
Total for Maintenance Personnel Space		7,000 s.f.

Materials Handling Spaces

The required materials handling spaces are the Central Shipping Facility and the International Exchange Service.

The Central Shipping Facility will accommodate all Smithsonian shipping, including the International Exchange Service (below), Natural History Museum, mail, library, express, and supplies. These will come in vehicles of all sizes up to largest trailer vans. Occasionally a large heavy machine will be unloaded, assembled, from a low bed trailer. Recommended size of platofrm: 30'x 50'. Consider layout to accommodate 6-8 vans at one time unloading at night for the installation of a special exhibit.

A shipping clerk's office, packing room, temporary shipment storage space, and a separate and secure mail room should be adjacent to the platform. A supplies storage space, a fumigation room, and additional temporary storage space should be nearby.

One large freight elevator serving all floors should be located as near as practicable to the loading platform. It should have a 15' x 20' platform, 20 ton capacity. Two other elevators should be located to provide the least movement of heavy objects over the exhibition floors.

The International Exchange Service receives publications from Government Printing Office, Departments, private institutions, and foreign offices of the Exchange. Unpacks and packs parcels and shipping boxes. Parcels and boxes move in and out by express, mail, and freight trucks. Empty packing boxes are delivered by truck (high) and stored. Large storage area for filled boxes is required. Design for greatest facility in handling shipments and for moving trucks in and out. Requires total

of 10,000 s.f. for business office, sorting and packing rooms, box storage and temporary storage of shipments, all in one unit, adjacent to shipping platform. Consult the Chief, IES, for detailed requirements for platform scales, hoists, etc. Investigatee necessity to locate the offices and packing rooms near shipping platform.

The spaces required for materials handling are as listed in Table VII, below.

TABLE VII - SPACES REQUIRED FOR MATERIALS HANDLING

Central Shipping Facility		
Shipping Platform	1,500	
Adjacent Spaces	3,000	
Supplies Storage	1,500	
Fumigation Room	800	
Temporary Storage	1,500	8,300 s.f.
International Exchange Service		10,000 s.f.
Total Space required for Materials Handling		18,300 s.f.

VI ADDITIONAL SPACES

Cafeteria

Cafeteria will operate as GSI cafeteria principally for lunch for visitors. It will be arranged to serve mornings and afternoons as a snack bar separated from tables, and to serve milk, ice cream, etc., to children's lunch rooms. It also will serve one Secretary's dining room and one employees' dining room.

Two lunch rooms for children bringing lunches, seating 60 each, to adjoin cafeteria for milk bar service.

Shelter Areas

Shelter areas to be used in case of air raid should be considered.

VII EXTERIOR SPACES

The following uses for exterior space should be considered: outdoor exhibits; sculpture; fountains; garden patios shaded in summer, enclosed in winter; sheltered spaces for groups to assemble for instructions from tour leaders; areas for school classes to eat lunch outdoors, in spring and fall; benches for waiting; use of roof for terraces.

Parking areas with line of sight to nearest entrances. Areas on south side screened and shaded by trees. Off-street lanes for parking double rows of busses, Constitution Avenue and Madison Drive (two-levels), 12th to 14th Streets. Season control of these lanes by traffic signs.

CHAPTER THREE:-MATERIAL TO BE EXHIBITED

INTRODUCTION

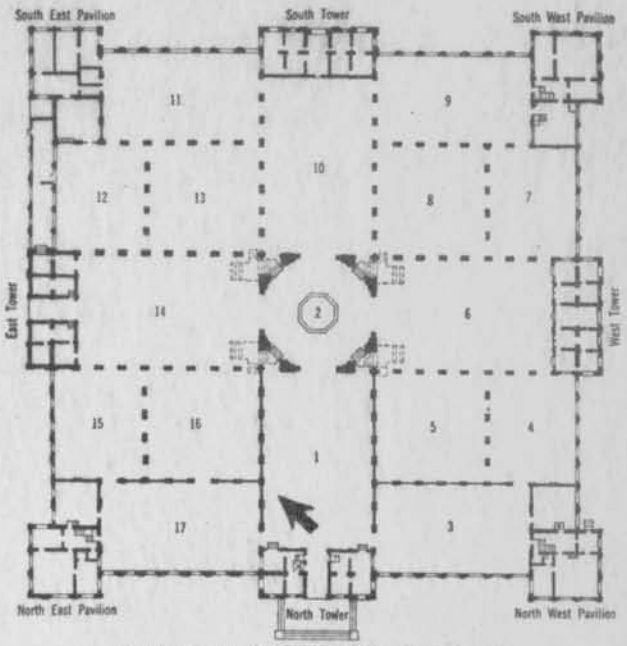
The general arrangement of the exhibits has been outlined in the program given in Chapter II. In summary, it may be said that the exhibits fall into two main groups: the two series of survey exhibits ("Growth of America" and "Science and Technology in Industry") which are intended for the one-time visitor; and the subject-matter collections which will be visited by those with more time or by those who have special interests.

The survey exhibits (with the exception of the one unit illustrated) do not exist at present. The material for them will be taken from the subject-matter collections and from reserves not now on display. The material in this chapter is, therefore concerned primarily with the content of the subject-matter collections, but by extension, should indicate the nature of the other exhibits.

The subject-matter exhibits are divided into thirty-one groups which fall into the three general categories of: American History; Domestic Arts; and Science and Technology. The illustrations which follow are grouped in this way.

The illustrations (E-1 to E-28) are intended to show the types of materials which will be displayed, the scale of objects involved, the way in which they are presently displayed, the space required, and, by indication in the captions, the area allotted to each in the new Museum.

The photographs were made by the author in the Spring of 1956, in the Arts and Industries building which at present, houses most of the collections to be transferred to the new building. In a few cases, exhibits were undergoing reconstruction, and photographs were not made. In general, where the present displays do not correspond exactly in content with the divisions given in the program, it has been necessary to select arbitrarily certain objects as typical of the new units. Thus the enumerations of objects in the captions are occasionally compilations of material presently in several different displays.



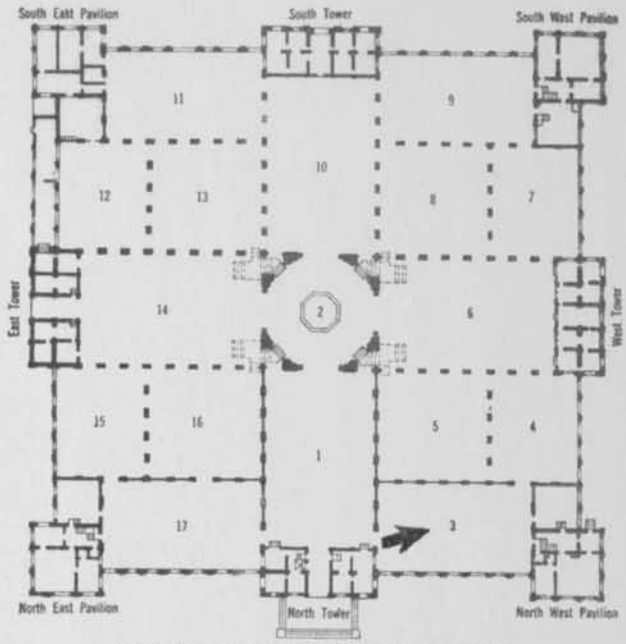
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-1: HALL OF PRESIDENTS

Personal possessions of the presidents:
Washington, Jefferson, etc.

Present Area: scattered
Proposed Area: 5,000 s.f.


SWORD

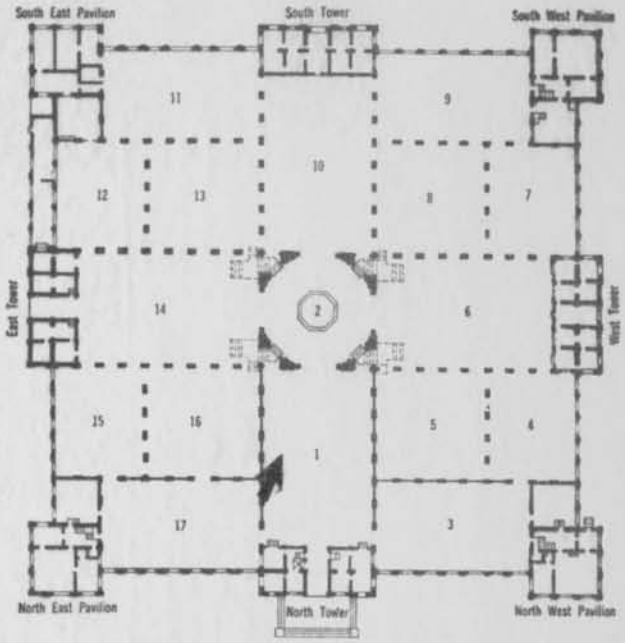


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-2: FIRST LADIES HALL

Eight rooms (largest about 14' x 24') reconstructions of rooms of the White House as they appeared during various periods, as settings for mannequins wearing dresses of president's wives and other noted women of the period.

Present Area: 5,000 s.f.
Proposed Area: 10,000 s.f.

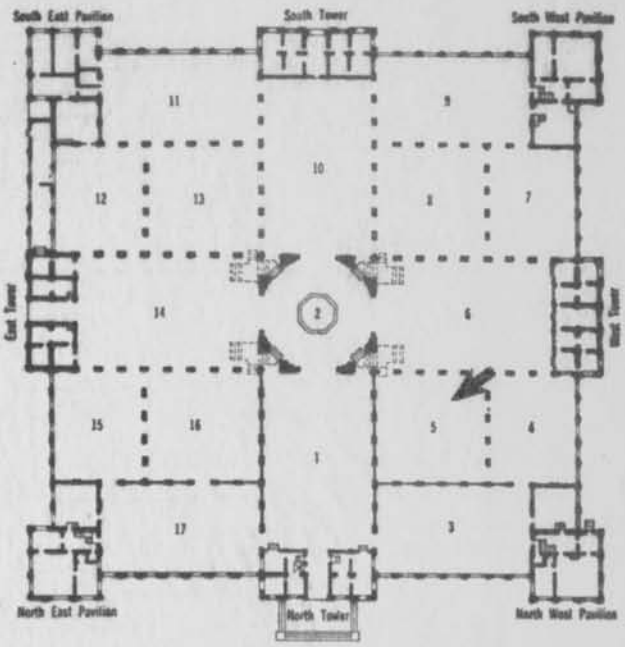


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-3: FAMOUS AMERICANS

Uniforms, swords, insignia, trophies, medals etc.-possessions and momentos, principally of military men: Grant, Sherman, Pershing etc.; but also of others e.g. Samuel F.B. Morse.

Present Area: 7,500 s.f.
Proposed Area: 5,000 s.f.

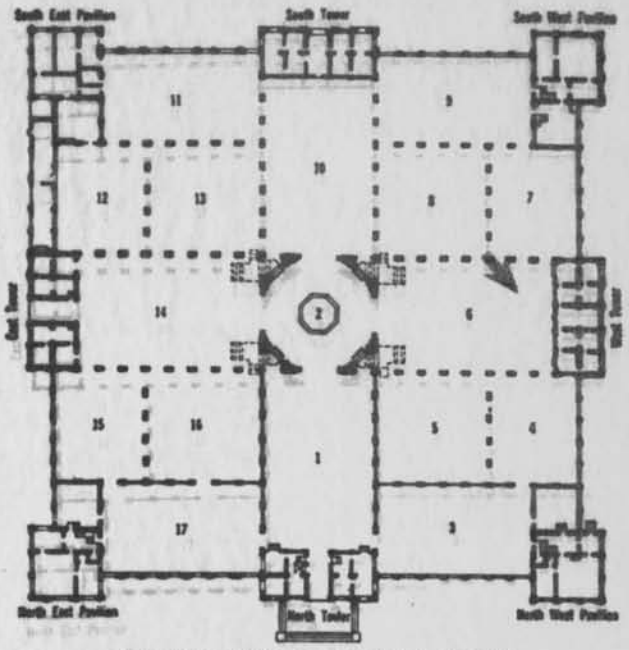


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-4: HISTORY OF DEFENSE

Uniforms of the Army, Navy, and Marines from Colonial period to the present. Weapons: about 2,000 firearms-from muskets to machine guns; swords. Development of specific military weapons: rifle, torpedos, etc. Models of Naval vessels, some 10'-12' long, many smaller ones. Memorablia of historic incidents.

Present Area: 15,000 s.f.
Proposed Area: 30,000 s.f.

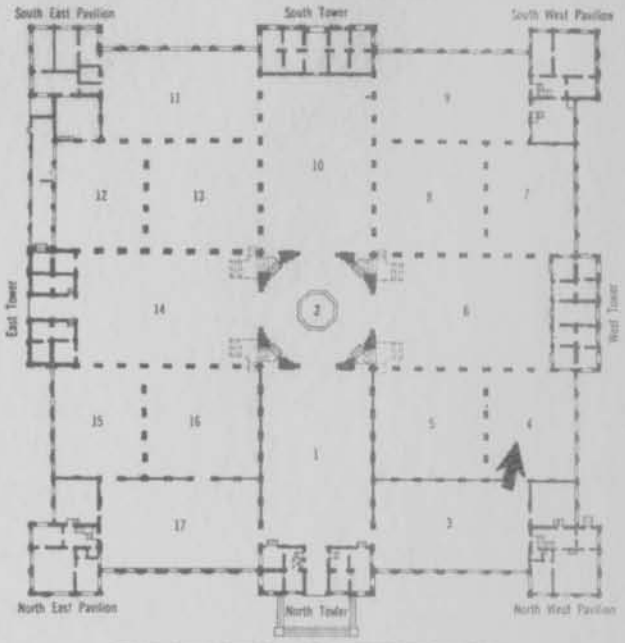


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-5: PHILATELY AND POSTAL HISTORY

A large collection of stamps.
Historical material relating to stamps and postal service.

Present Area: 2,750 s.f.
Proposed Area: 10,000 s.f.



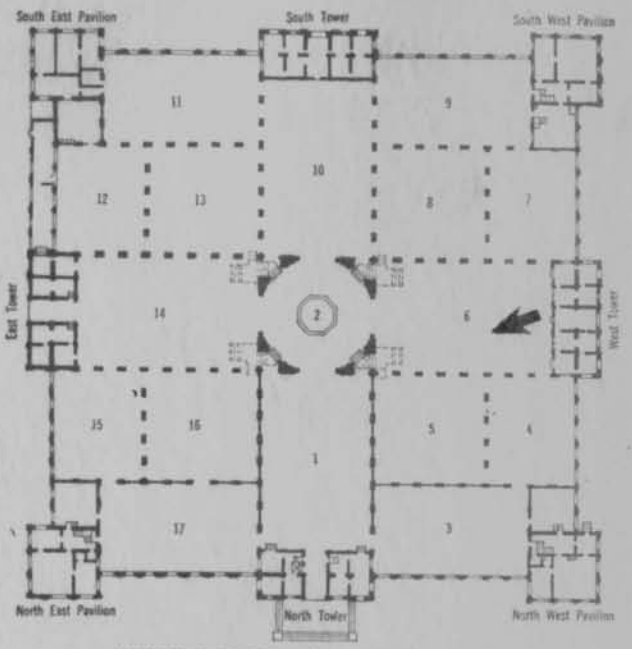
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-6: NUMISMATICS

Several thousand coins displayed in special cases; paper money; military and diplomatic medals; commemorative medals. Coin striking equipment.

Present Area: 3,750 s.f.
Proposed Area: 10,000 s.f.


NR105W



FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

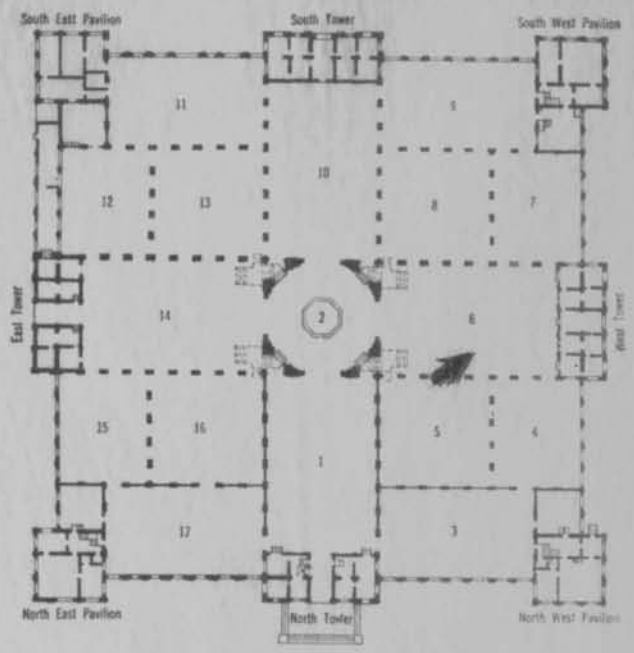
ILLUSTRATION: E-7: COLONIAL FURNISHINGS AND FOLKLORE

A complete period room. China, silver, owned by Jefferson, Washington etc.; laces and jewelry owned by the Adams Family; furniture from Mt. Vernon; Adams' furniture.

Present Area: 3,500 s.f. including space in the Natural History Building.

Proposed Area: 5,000 s.f.


CURTISS AIRPLANE

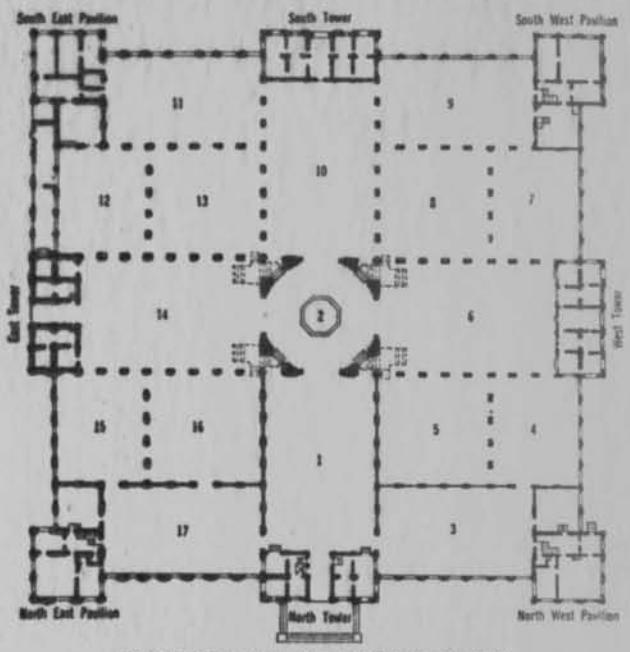


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-8: XIX CENTURY FURNISHINGS AND FOLKLORE

Furniture-courches, chairs, tables; some china and silver, canes and walking sticks; furniture from Appotomax. Doll's House-model of about twenty rooms of XIX century furnishings.

Present Area: 2,500 s.f.
Proposed Area: 5,000 s.f.



FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

IN THE NATURAL HISTORY BUILDING

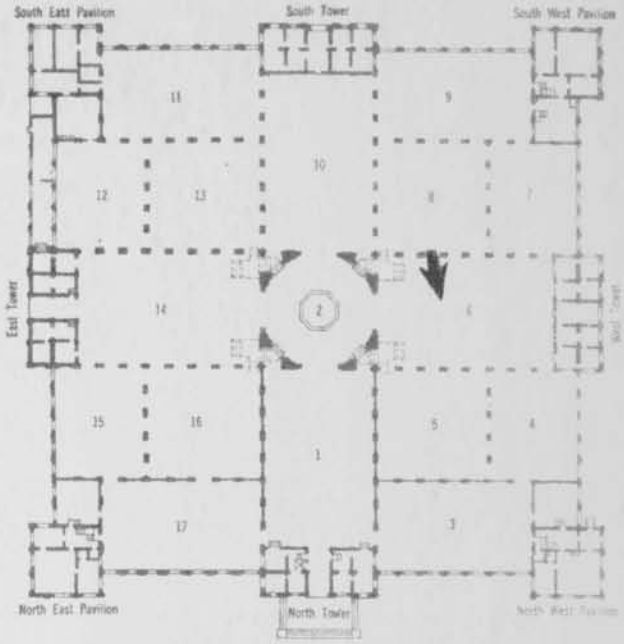
ILLUSTRATION: MUSICAL INSTRUMENTS

Pianos illustrating the development of that instrument: grand pianos, box and spinet pianos, upright pianos. A small organ. Violins; wind instruments; noisemakers and percussion instruments.

Present Area: 10,000 s.f.
Proposed Area: 5,000 s.f.

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

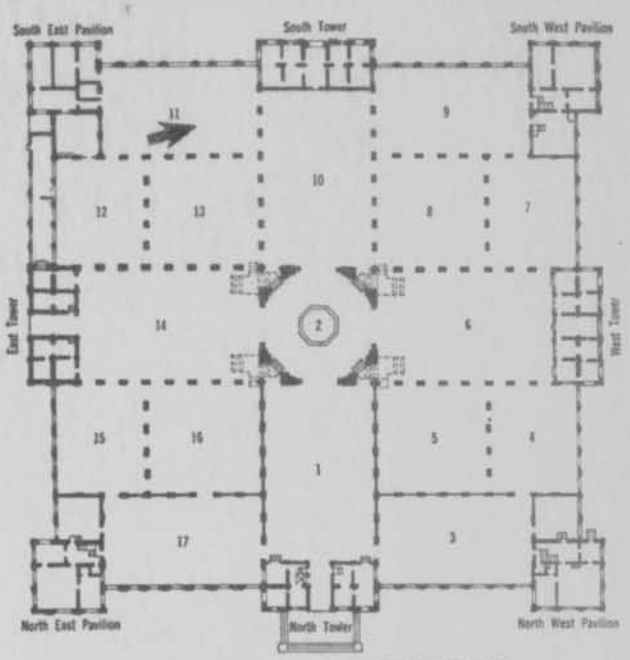


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-9: COSTUMES AND ACCESSORIES

Dresses from the eighteenth and nineteenth centuries displayed on mannequins.

Present Area: 500 s.f.
Proposed Area: 5,000 s.f.

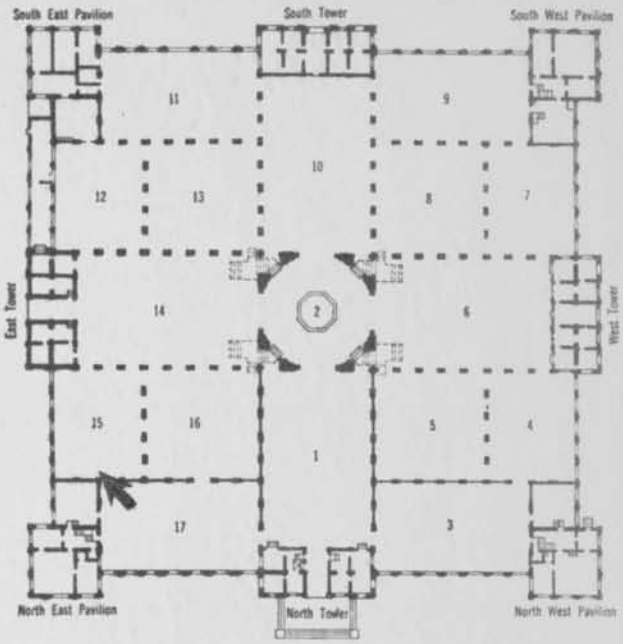


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-10: TEXTILES

Types of textiles-properties and construction; American hand and machine made fabrics from different periods. (bedspreads, needlepoint, rug weaving etc.)

Present Area: 7,000 s.f.
Proposed Area: 5,000 s.f.

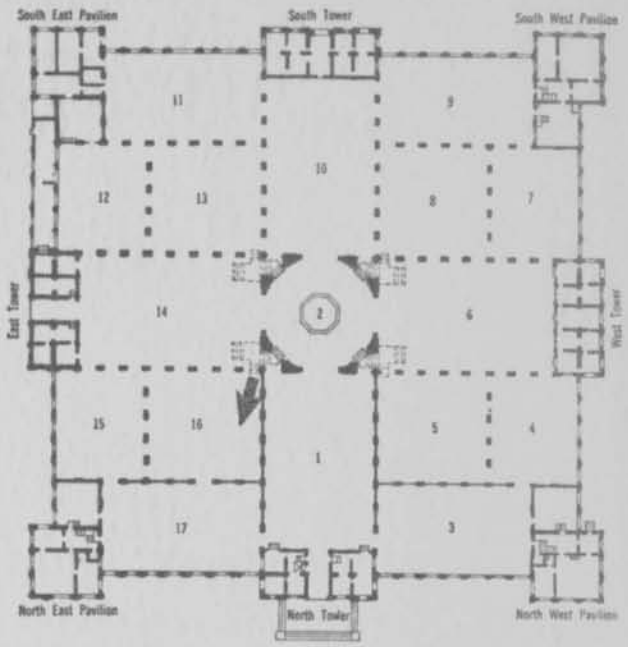


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-11: CERAMICS

Examples of Chinese, Asiatic, Moorish, Spanish, French, German pottery and china. Development of English china Early, Delft, Wedgewood etc). XVIII and XIX century English products; American ceramics.

Present Area: 2,700 s.f.
Proposed Area: 10,000 s.f.



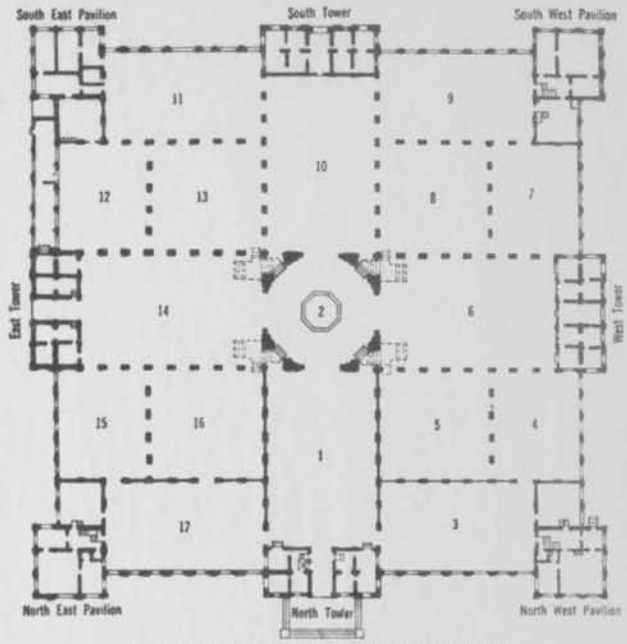
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-12: GLASS

Venetian glass; Bohemian; Tiffany; Victorian art glass; historical flasks; sandwich glass; pressed glass; hinge-molded glass; cut glass and blown-molded glass.

Present Area: 900 s.f.
Proposed Area: 5,000 s.f.


THE CERAMIC ART



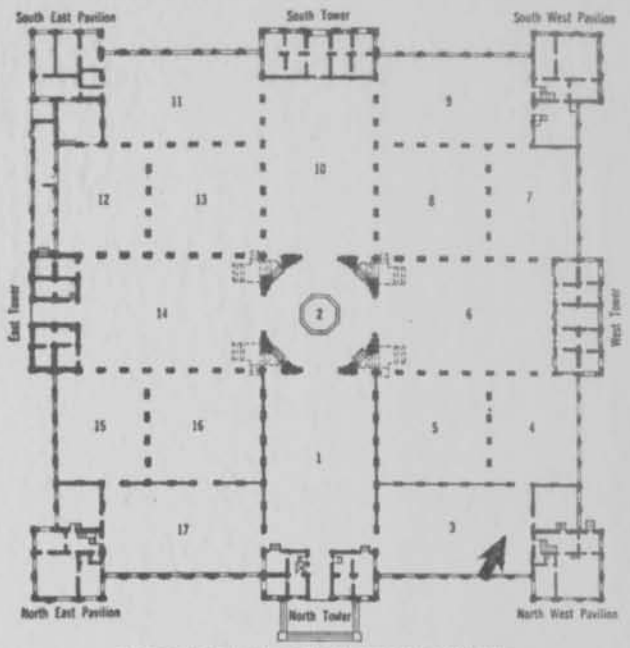
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-13: GRAPHIC ARTS

Display of reproduction processes (relief, gravure, offset, collotype, etc.-black and white and color) - typical examples and step by step demonstration; flat-bed presses. (engraving and printing processes, mezzotint, line, intaglio, soft-ground etc.) Examples of work in various media: Gutenburg bible page.

Present Area: 4,500 s.f.
Proposed Area: 10,000 s.f.


RELIEF PRINTING
COLLOTYPE
COLLOTYPE
BEGINNINGS



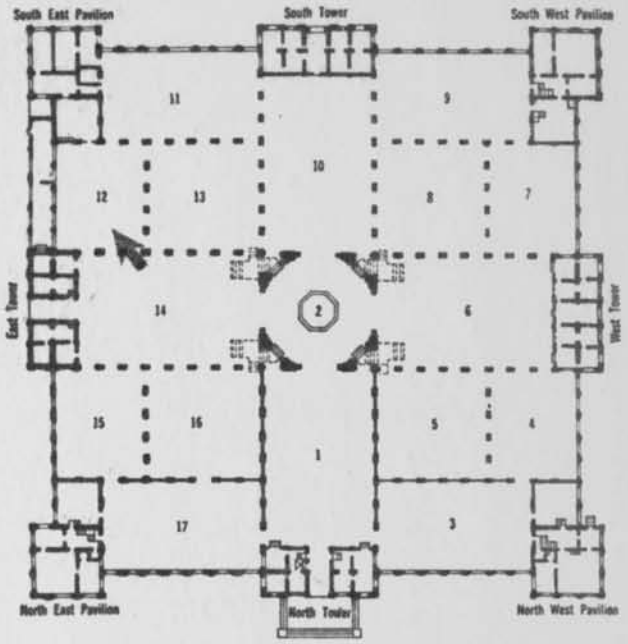
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-14: PHOTOGRAPHY

Development of photographic equipment and processes (cameras etc.); motion picture development; sound film development; X-rays, spark photos, radio-photo, wire-photo; some pieces of large equipment theatre projectors etc.

Present Area: 3,500 s.f.
Proposed Area: 10,000 s.f.


THE EDISON KINETOSCOPE

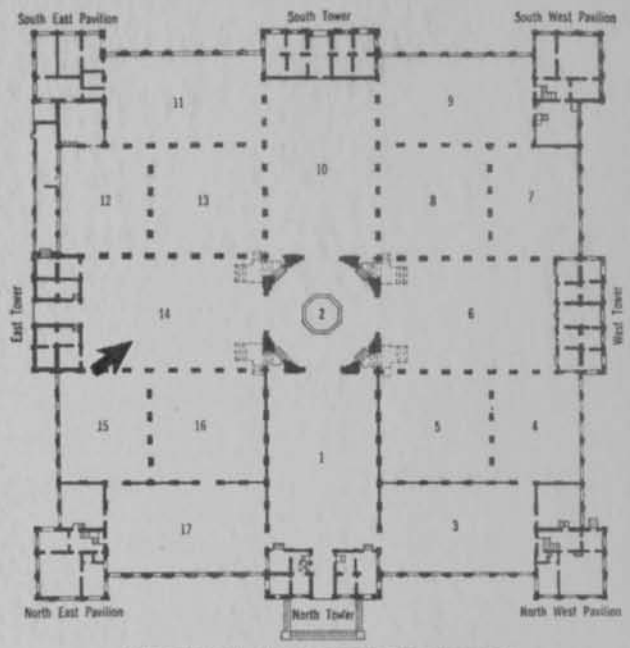


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-15: AUTOMOBILES AND COACHES

Automobiles from 1894 Haynes to 1914 Rauch and Lang Electric (some restored, others not); motor cycles; 1/4-size models of cars and trucks; operable gasoline engines; steam engines; auto accessories, trophies; tire manufacturing; hand-drawn fire engines; coaches; bicycles, harness, lamps; 1 ox-cart; 3 sedan chairs.

Present Area: 7,500 s.f.
Proposed Area: 15,000 s.f.

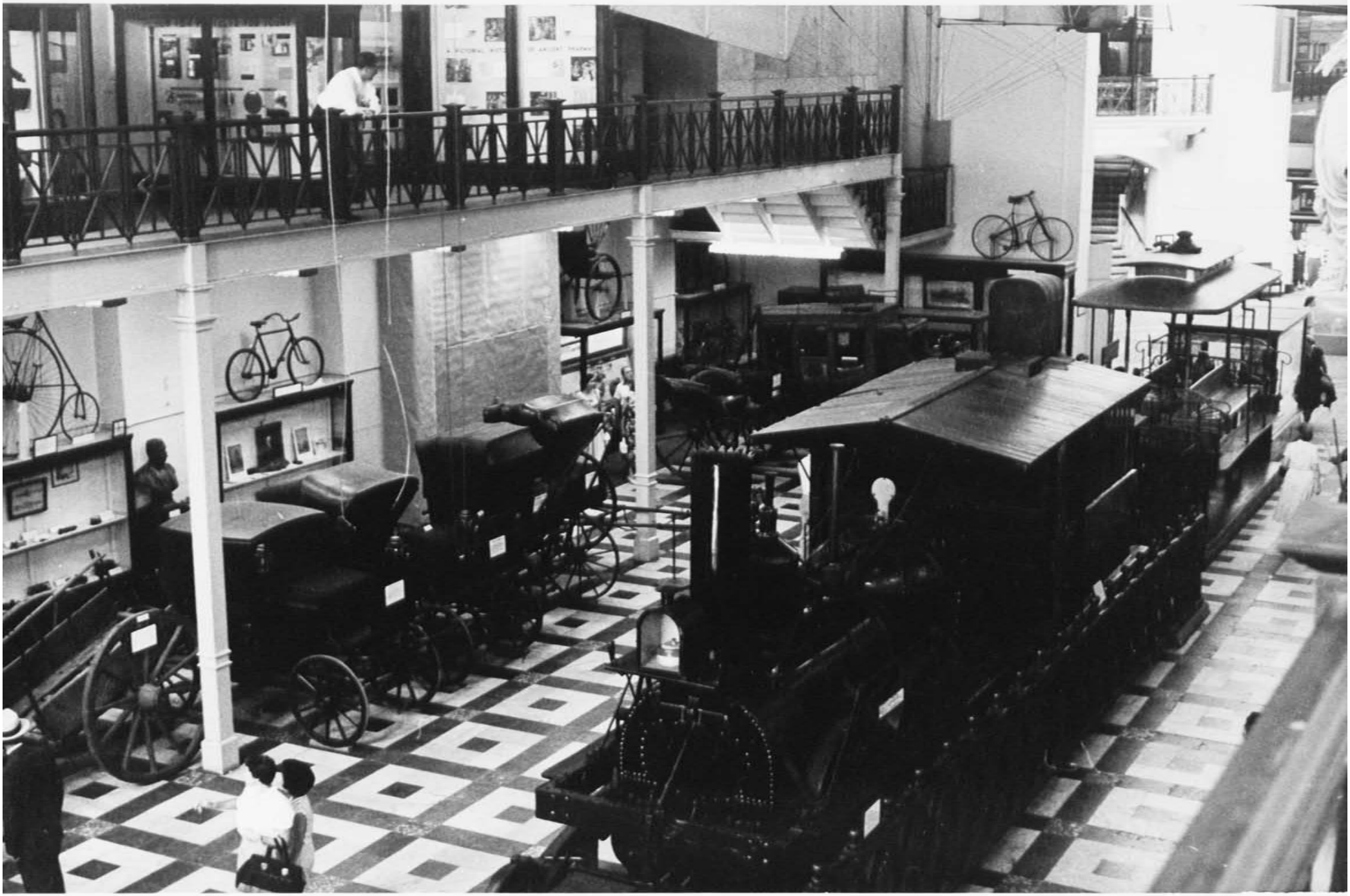


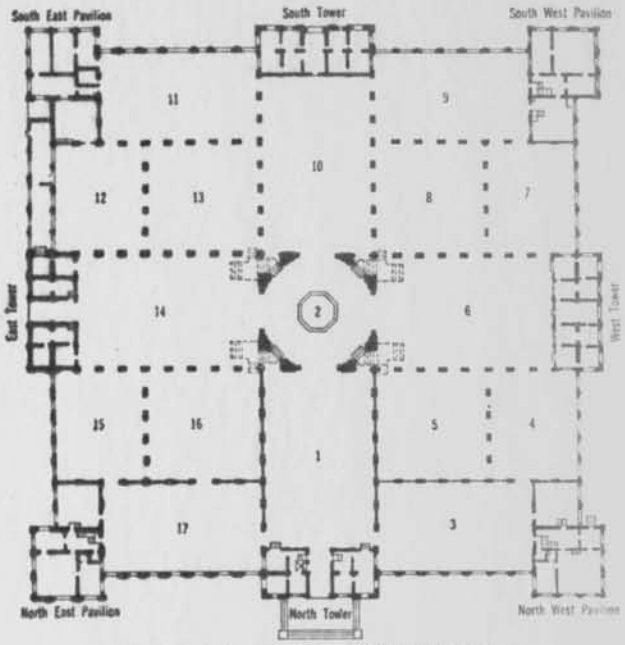
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-16: RAILROAD EQUIPMENT

"John Bull" - locomotive - 50' long; railroad bridge girder-35'; first locomotive built in U.S. (1828-9); model of engine cylinder; model of air brake system operation; medium size train models.

Present Area: 3,000 s.f.
Proposed Area: 10,000 s.f.





FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

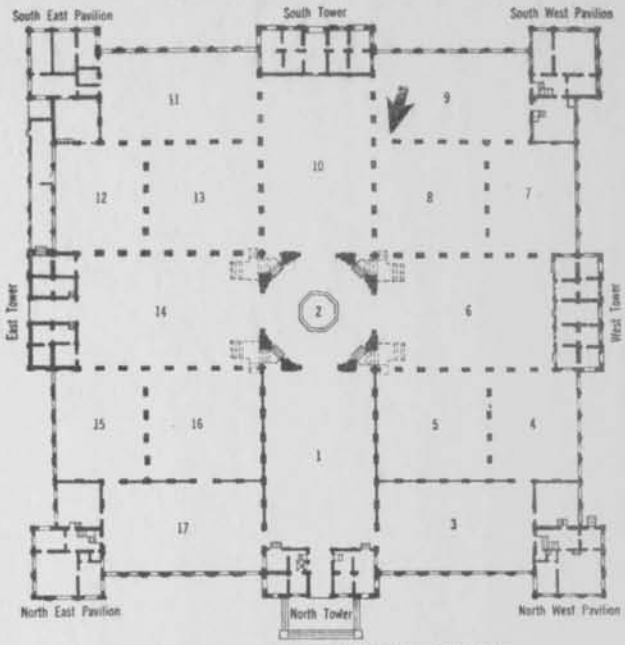
ILLUSTRATION: POWER MACHINERY

Closed

Present Area: 1,800 s.f.
Proposed Area: 10,000 s.f.

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

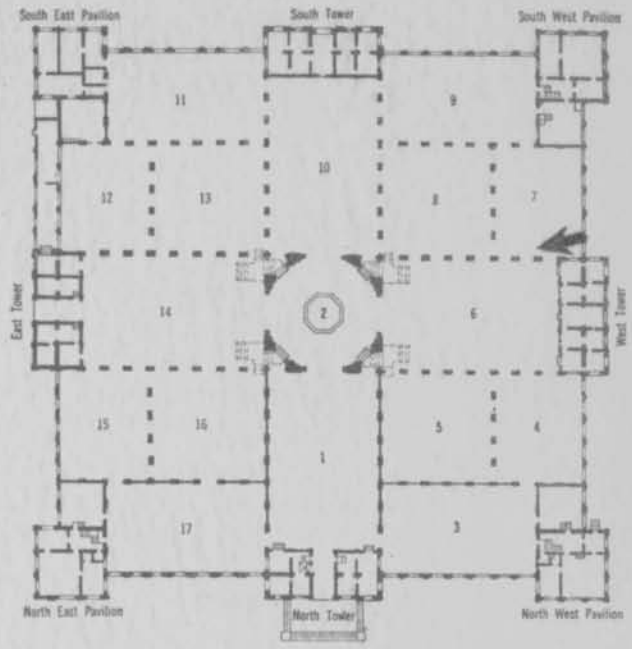


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-17: TOOLS

Woodworking machine; screw-making and pin-making machines; (all very old); hand tools; gauges, lathes, and wire brushes.

Present Area: 900 s.f.
Proposed Area: 5,000 s.f.



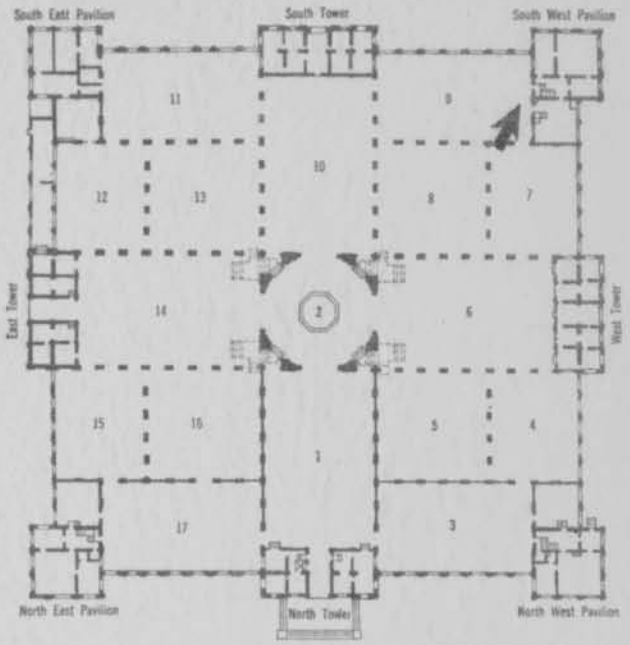
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-18: LIGHT MACHINERY

Development of typewriters and calculating machines, sewing machine development etc.

Present Area: 900 s.f.
Proposed Area: 5,000 s.f.


FIRST
RITER PATENTED



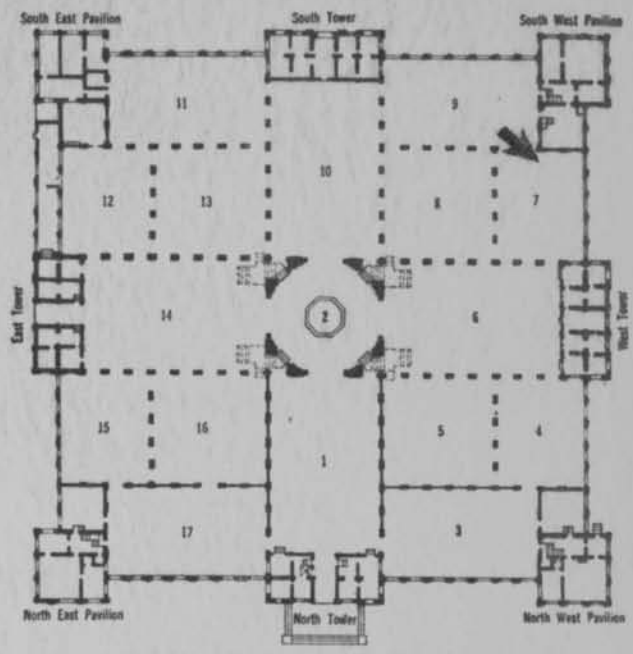
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-19: PHYSICS AND METROLOGY

Astrophysical and meterological instruments; surveying instruments and machines for their construction; watches, clocks and sundials.

Present Area: 2,000 s.f.
Proposed Area: 7,500 s.f.

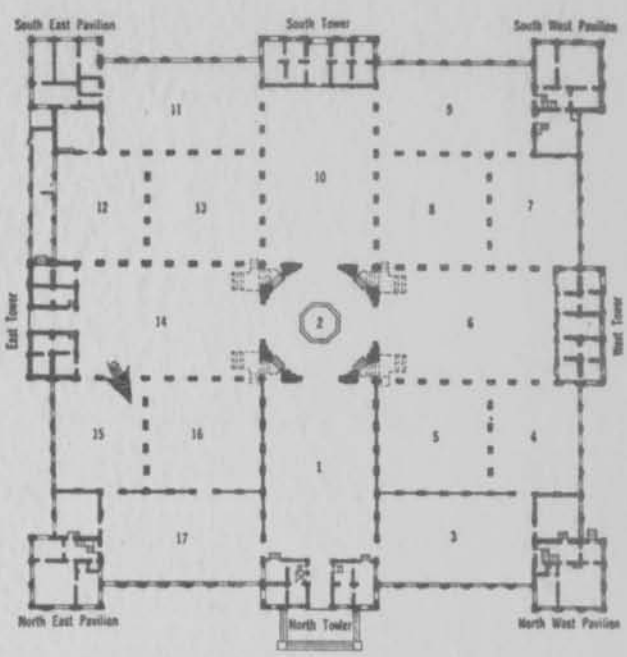

SCIENTIFIC
INSTRUMENTS



FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-20: ELECTRICITY

Development of the vacuum tube; early radio transmitters; early radio parts, radios, and television sets; microphones; radio navigation and meteorology; microwave relay; radar. Development of telephone. Development of phonograph.

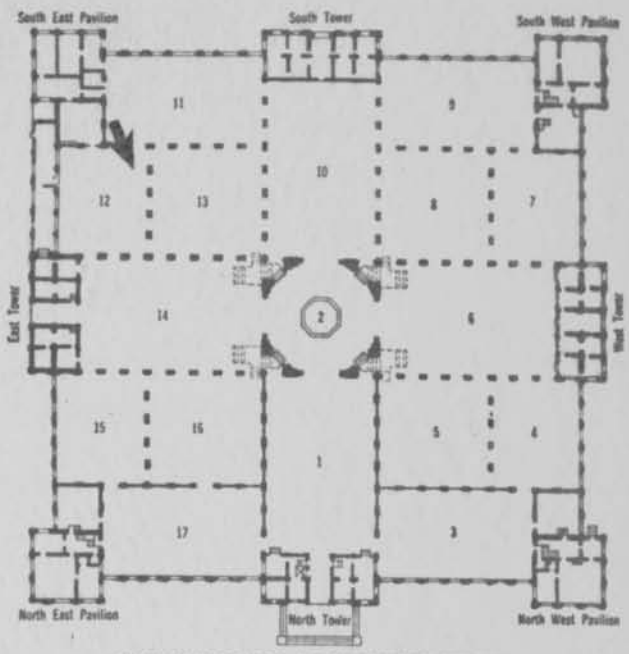


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-21: WATERCRAFT

Canoes, kayaks, etc, 15'-20' long; models 4' to 7' long of modern ships and of sailing vessels; 200-300 models 2' to 4' long of various ships, old and new-jammed in cases; about 200 1/2-hull models.

Present Area: 3,500 s.f.
Proposed Area: 10,000 s.f.

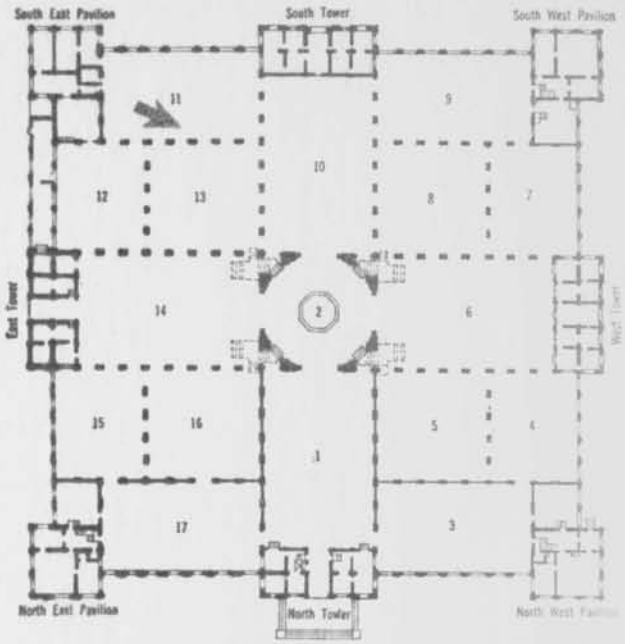


FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-22: HEATING AND LIGHTING

Firemaking devices-flints, tinder tubes, matches etc.; fuels; development of lighting devices-lamps, candles, torches; development of heating devices-hearth warmers, stoves etc.; Franklin stoves; box stove; candle snuffers; stone lamps.

Present Area: 2,000 s.f.
Proposed Area: 5,000 s.f.

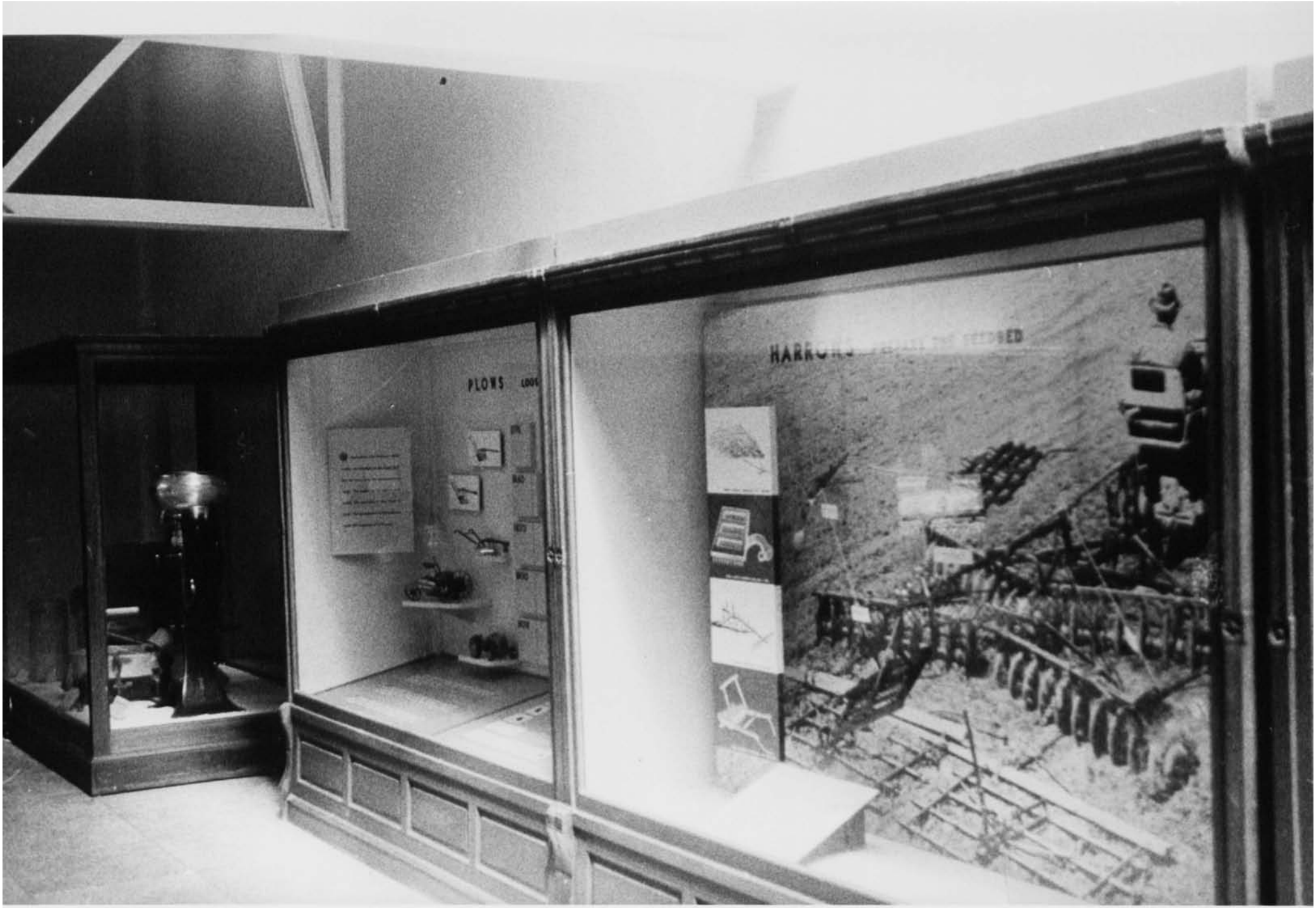


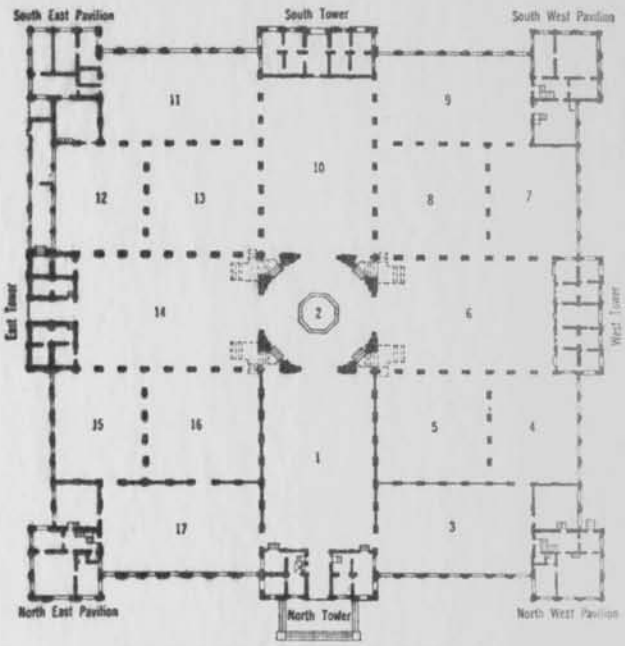
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-23: AGRICULTURE AND FOOD TECHNOLOGY

Dioramas and displays; model grist mill; operation of: plow, harrow, planter (models and photos); milk processing machines etc.; vacuum pan (4' sphere); large model of farm and condensed milk plant operation (25' long); observation beehive; development of plow; model plows (12") from different countries and periods.

Present Area: 2,500 s.f.
Proposed Area: 10,000 s.f.


PLOWS



FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

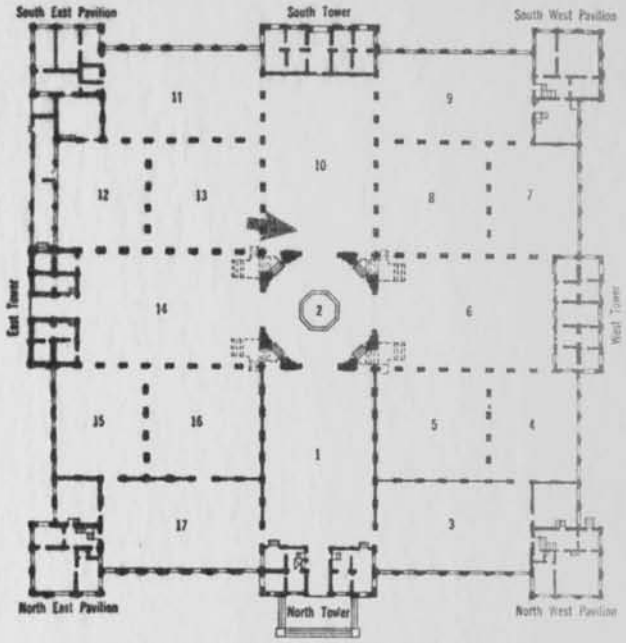
ILLUSTRATION: FORESTRY AND WOODS

Closed, but consists in part of many samples of different species of wood.

Present Area: 3,750 s.f.
Proposed Area: 10,000 s.f.

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

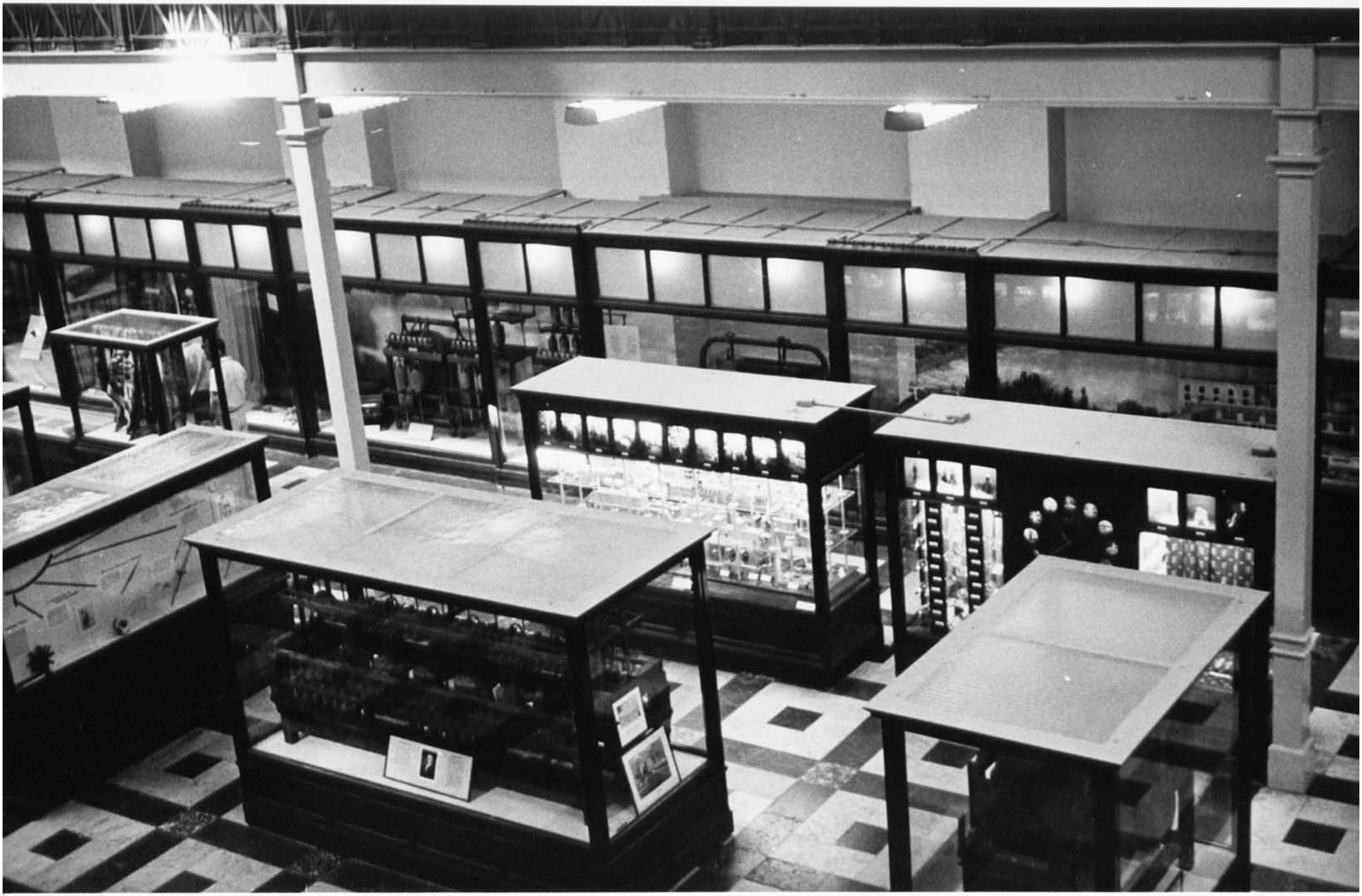


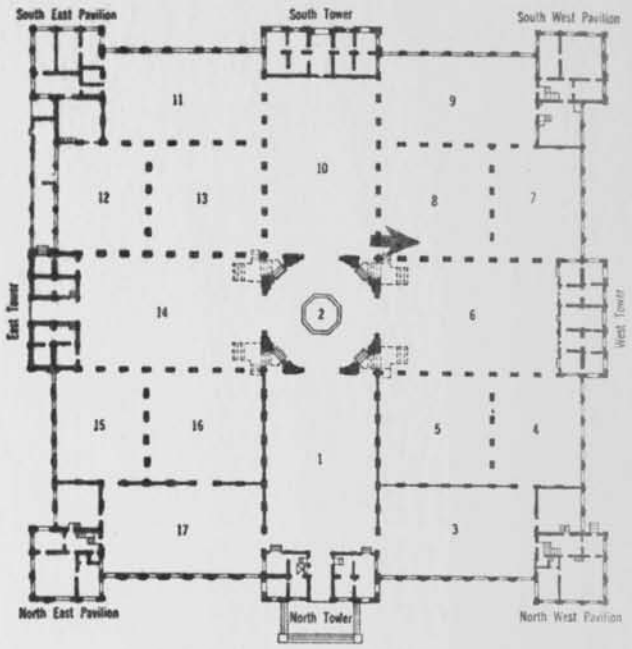
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-24: TEXTILE MACHINES

Large model of cotton ginning mill; machinery: looms, spinning frames, cards, braider, small machines; model of textile finishing plant; model of cotton plantation and mill (30' long); dev. of loom; spinning frame; dev. of synthetic fibers processing of raw cotton.

Present Area: 5,000 s.f.
Proposed Area: 10,000 s.f.





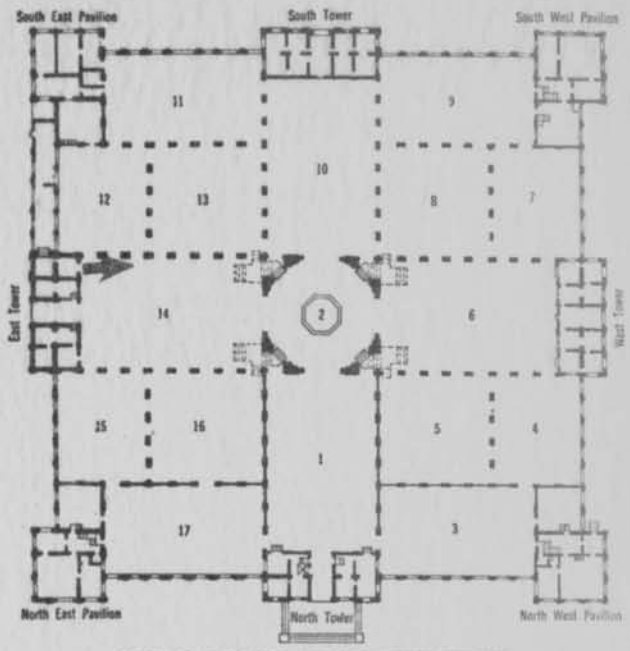
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-25: CHEMISTRY

Manufacturing processes-mostly plastics; plastic objects; explosives; sponges; preparation of leathers and furs color preservation; fats and oils.

Present Area: 3,000 s.f.
Proposed Area: 7,500 s.f.


MUCH BETTER COST-SERVICE RELATIONSH
GREATER RESISTANCE TO NATURAL ELE

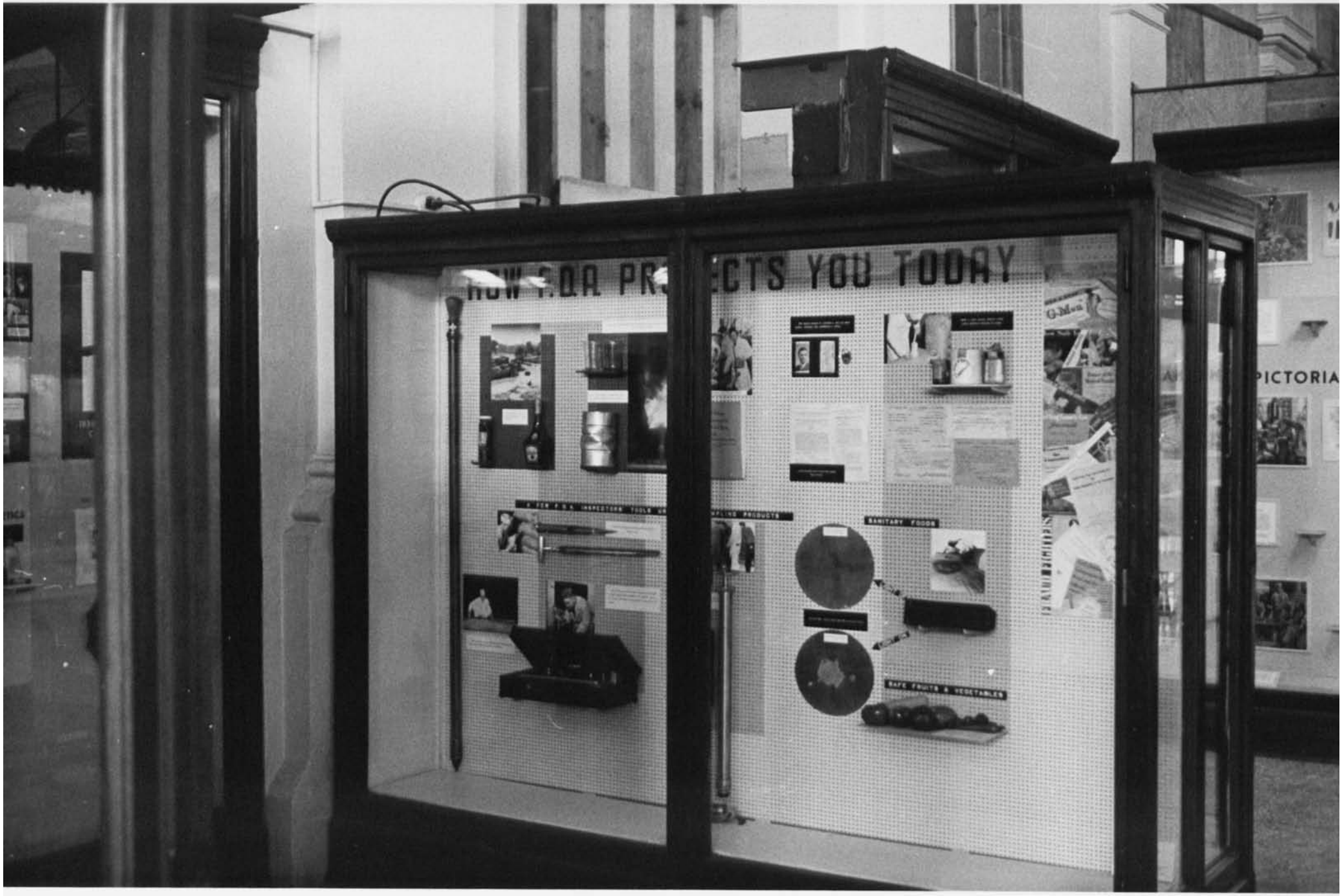


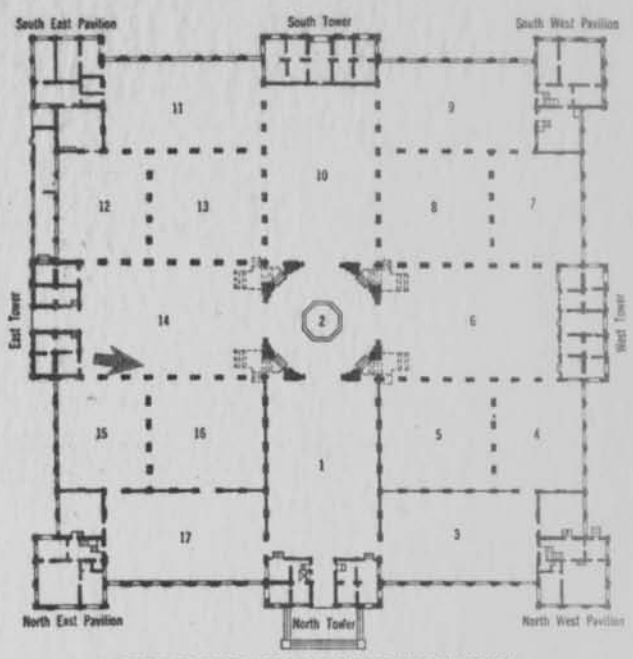
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-26: HEALTH

Federal food and drug control; hypodermic needle; diseases and medicines; animated display-allergy; proper weight (scales) cut-away model of human body.

Present Area: 1,500 s.f.
Proposed Area: 5,000 s.f.


ECTS YOU TODAY
SANITARY FOODS
SAFE FRUITS & VEGETABLES
PICTORIA



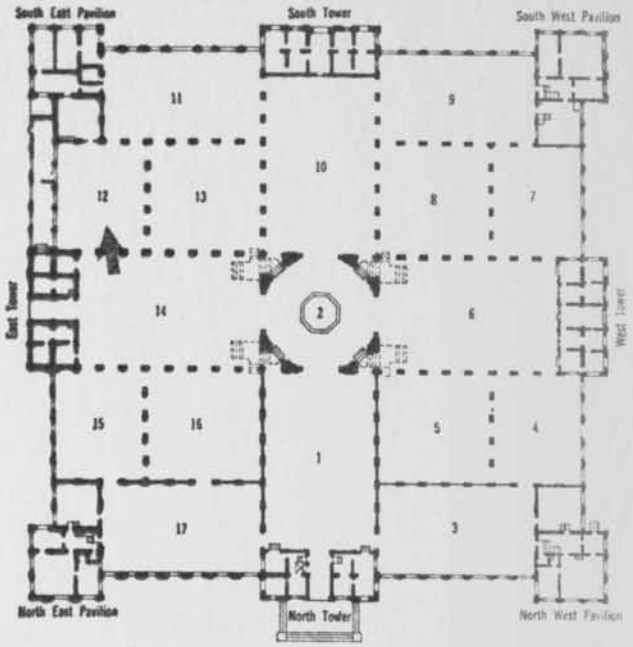
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-27: MEDICAL HISTORY

Development of medicine and medical instruments, iron lung, mechanical heart, electrocardiogram, X-ray, hearing aids, eyeglasses.

Present Area: 1,750 s.f.
Proposed Area: 5,000 s.f.


The Tools of the Surgeon
Surgical Instruments



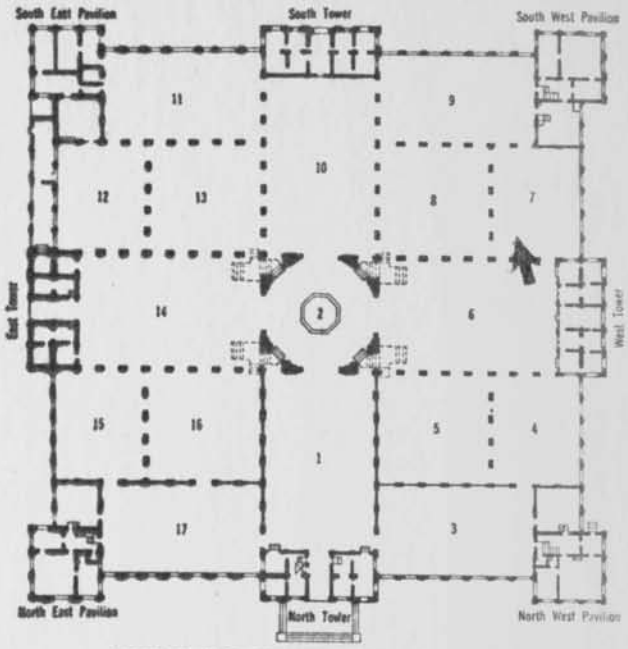
FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-28: PHARMACEUTICAL AND DENTAL HISTORY

Manufacture of medicine; pharmaceutical instruments and techniques; history of medicine and pharmacy; dentures; a reconstruction of a medieval Apothecaries shop.

Present Area: 3,000 s.f.
Proposed Area: 5,000 s.f.


Apotheke
EGYPTIAN
GREEK & ROMAN



FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

ILLUSTRATION: E-29: TYPICAL SURVEY EXHIBIT

This presentation of "Iron and Steel in America" gives some indication of the type of display which might be one unit of the "Science and Technology in Industry" series of Survey exhibits. At present, this is the only display of its type in the Smithsonian Institution.


IRON AND STEEL IN AMERICA

A MUSEUM OF HISTORY AND TECHNOLOGY FOR THE SMITHSONIAN INSTITUTION

PART TWO - DESIGN CONSIDERATIONS

CHAPTER FOUR: COMPLETION OF THE MALL SCHEME

While the Mall today possesses certain emotional qualities which cause us to associate it with the development of the Nation, it seems well to remember that it is in many respects a product of our own time. Although the idea of the Mall was contained in L'Enfants Plan of 1791, the actual execution of the work in its present form did not take place until 1933. So as not to be overwhelmed by the sanctions of the existing concept of the Mall, it seems well to point out briefly the way in which the present scheme developed.

L'Enfant's Plan - 1791:

In his proposed plan for the Federal City (Illustration M-1) L'Enfant indicated a "Grand Avenue, 400 feet in breadth, and about a mile in length, bordered with gardens, ending in a slope from the houses on each side. This Avenue leads to the Monument A /Washington Monument/, and connects the Congress Garden with the...President's Park." [15] It appears that this may have been the "Well improved field, being part of the walk from the President's house, of about 1800 feet in breadth and 3/4 of a mile in length. Every lot, colored deep red, with green plots, designates some of the situations which command the most agreeable prospects, and which are the best calculated for spacious houses and gardens, such as may accommodate foreign ministers &c." [16]

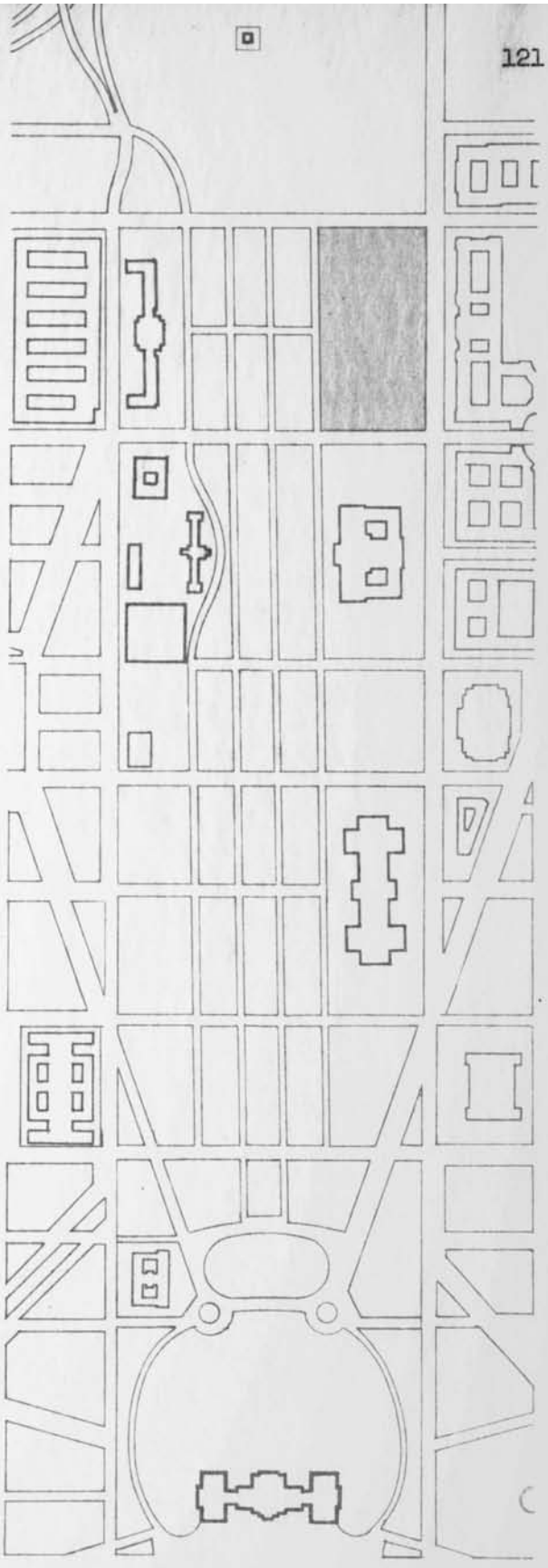
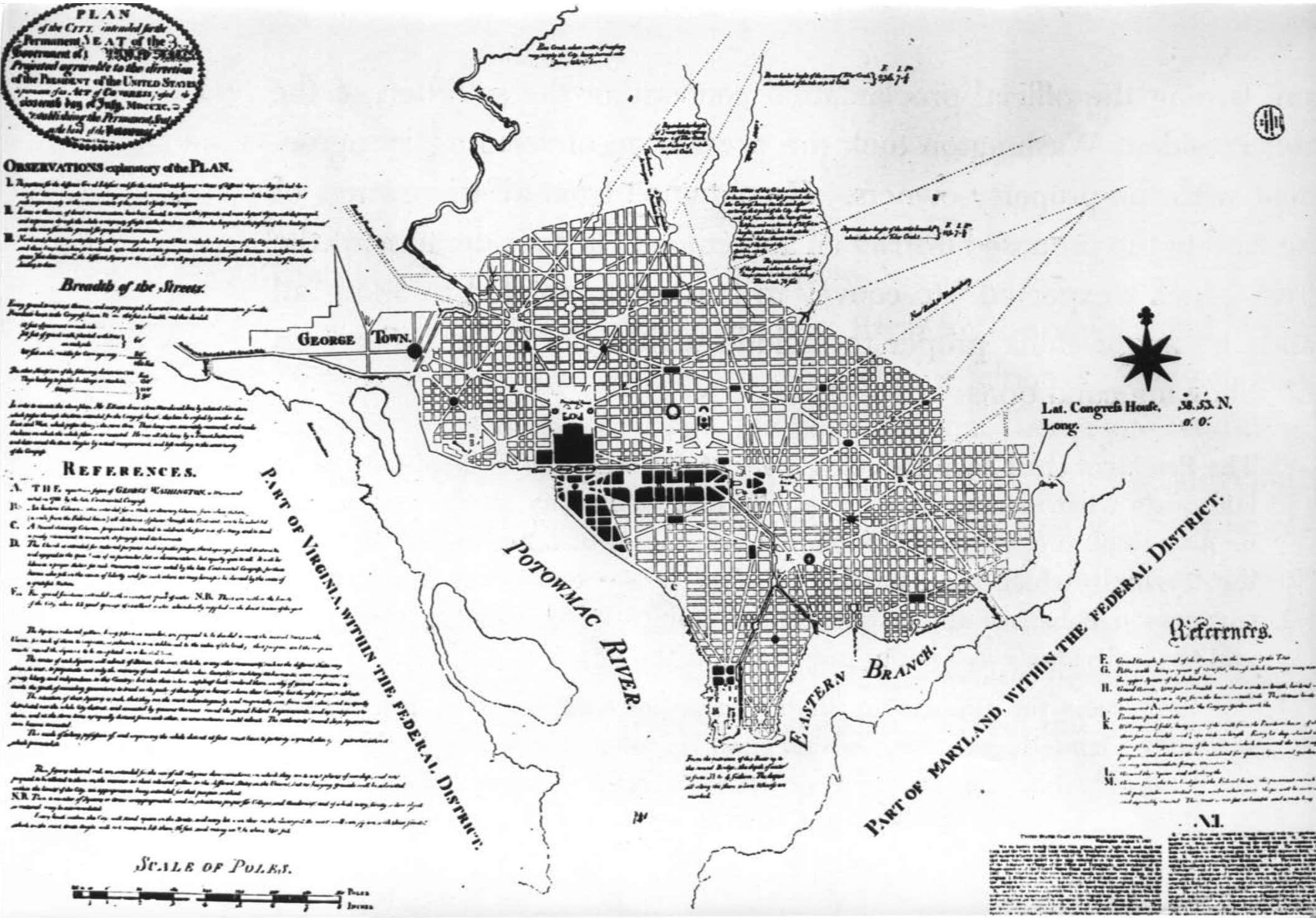


ILLUSTRATION: M-1: L'Enfant Plan 1791


PLAN
of the CITY, intended for the
Permanent SEAT of the
Government of the UNITED STATES
Projected agreeable to the direction
of the PRESIDENT of the UNITED STATES
pursuant to an ACT of CONGRESS, passed the
sixteenth day of July, MDCCXC,
establishing the Permanent Seat
on the bank of the Potowmac
OBSERVATIONS explanatory of the PLAN.
Breadth of the Streets.
REFERENCES.
GEORGE TOWN.
POTOWMAC RIVER.
EASTERN BRANCH.
PART OF VIRGINIA, WITHIN THE FEDERAL DISTRICT.
PART OF MARYLAND, WITHIN THE FEDERAL DISTRICT.
Lat. Congress House, 38. 53. N.
Long. 0. 0.
References.
SCALE OF POLES.

L'Enfant's conception of the Mall then was of a wide paved drive, somewhat wider than the present central grass plot and its adjoining roadways, which would be enclosed on either side by planted areas about 700 feet wide, extending on the South to Independence Avenue, and on the North to a Canal to be built to confine a river at the present location of Constitution Avenue. If these parks were the land to have been used for minister's houses etc., these would probably have been small enough in scale to scarcely change the feeling of undisturbed open space. Given a city of two or three story buildings, L'Enfant's Mall, if densely planted would have had importance as an interlude of green space while passing in the North-South direction, in addition to providing a clear vista from the Capitol to the Monument.

Nineteenth Century Development:

Whatever may have been L'Enfant's concept of the Mall, it was only in this last way, as a park, that the Mall existed during the Nineteenth century. While the general development of the City by 1860 (Illustration M-2) showed the completion of the street pattern in close adherence to the spirit of his design, the Mall was largely untended open space, one part of which was used for a railroad station, while much of the rest was used as a public dumping ground.[17] (Illustration M-3). The vista was blocked by the planting and by the many buildings. The only area which was purposefully developed was that assigned to the Smithsonian Institution.

When the New National Museum was built around 1900, although the building was located in accordance with the McMillan Plan of 1901, the treatment of the grounds illustrated the existing character of the Mall (Illustration M-4). Orderly but winding paths, and irregular

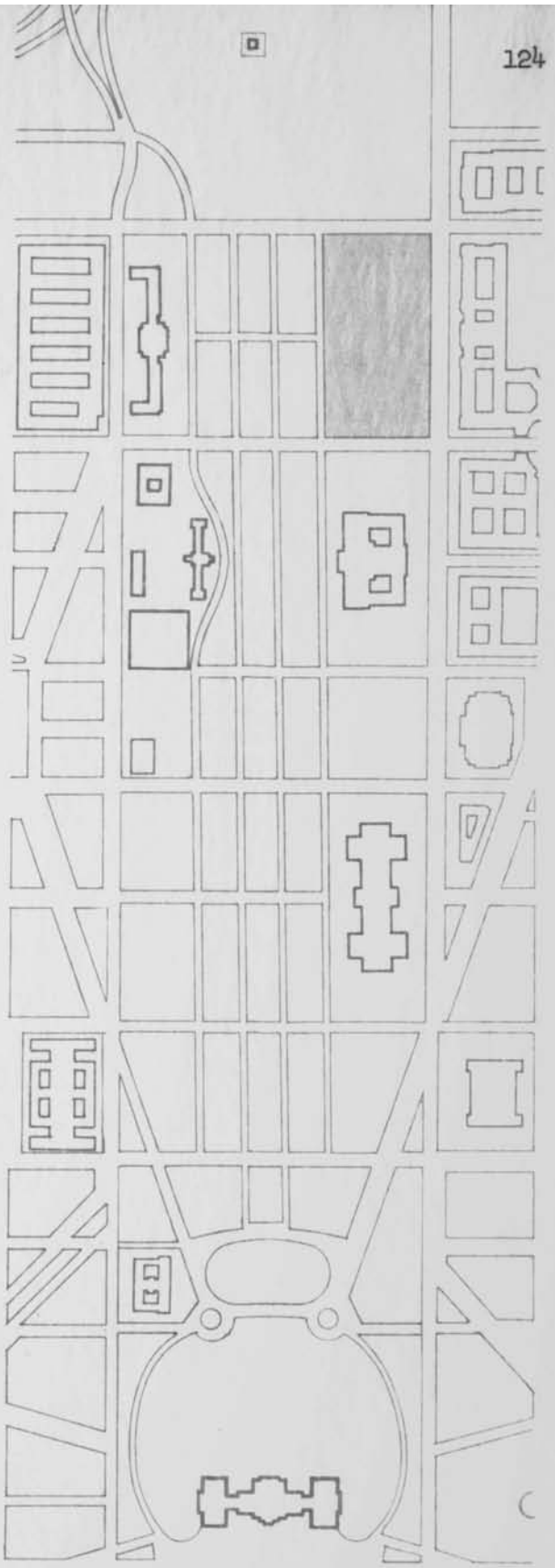
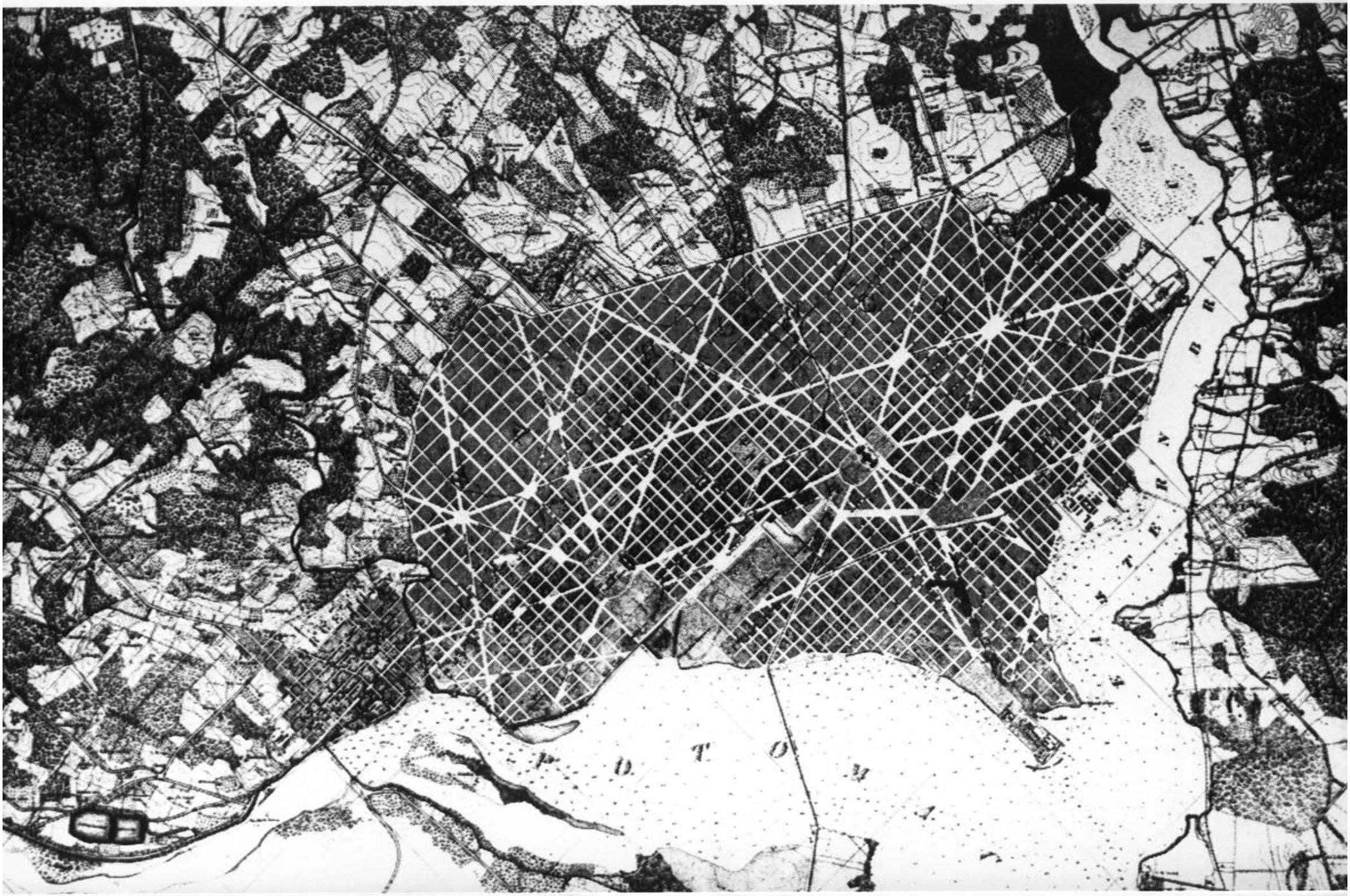


ILLUSTRATION: M-2: Plan of Washington - 1860


P O T O M A C

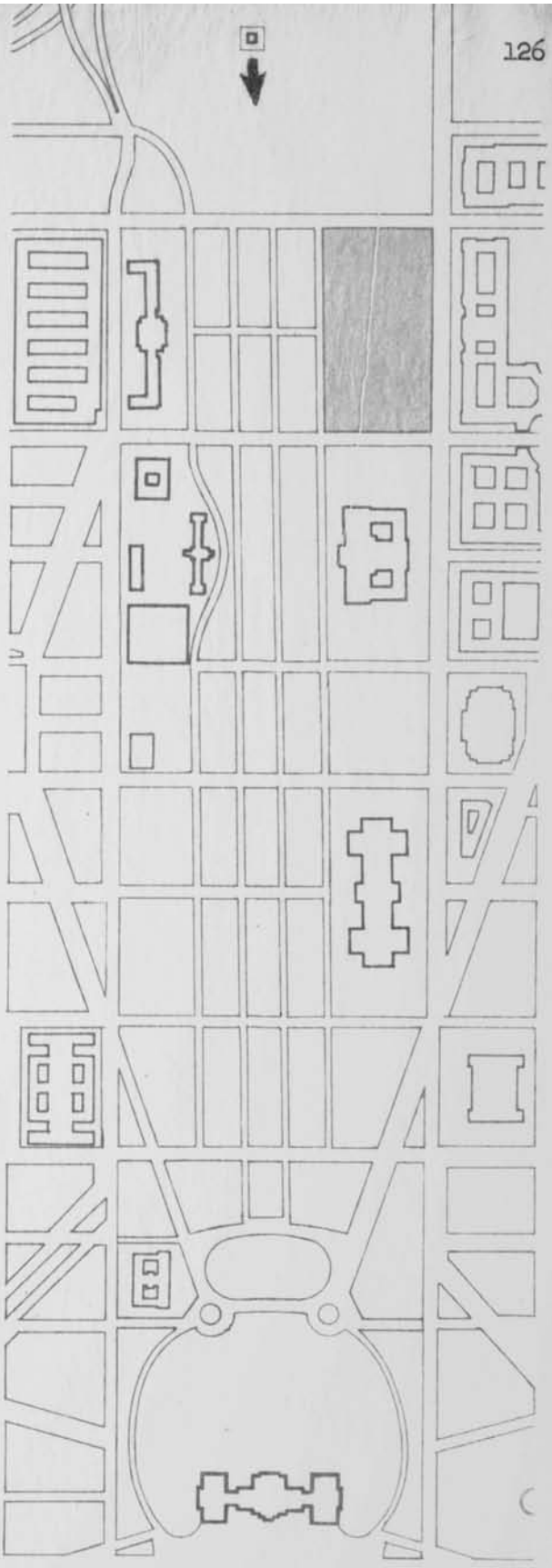


ILLUSTRATION: M-3: Photograph of the Mall - 1890

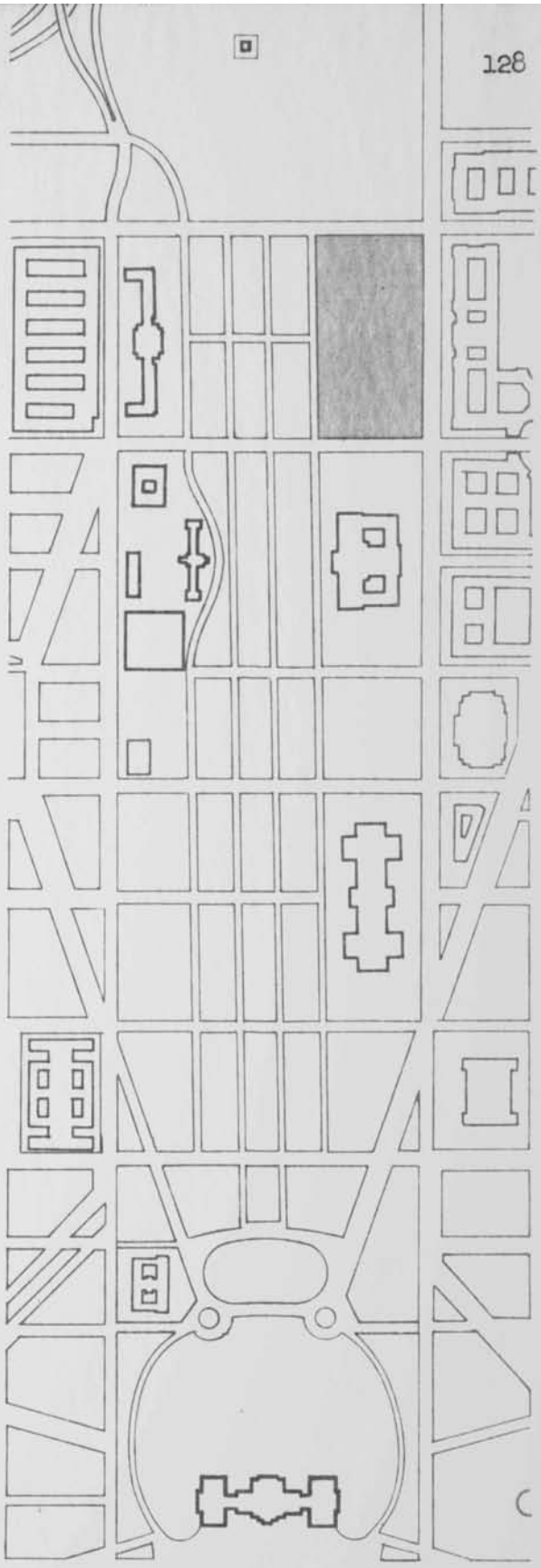
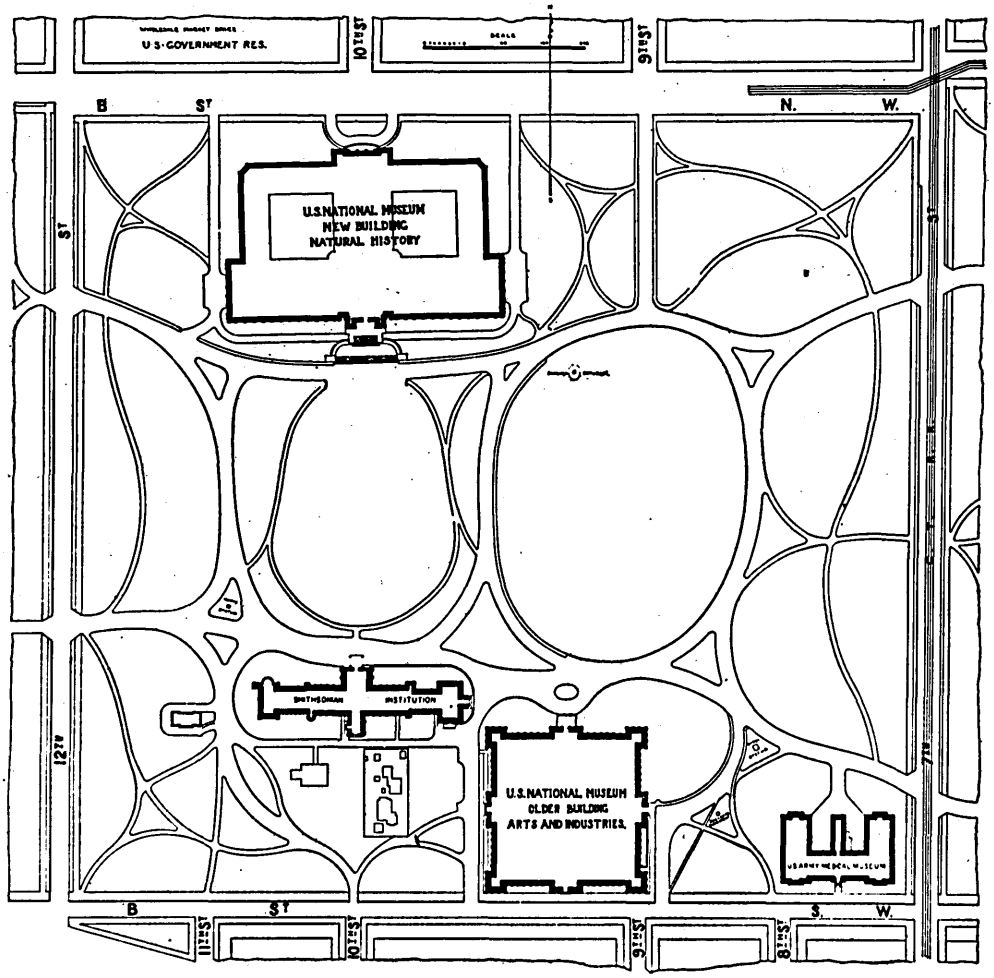


ILLUSTRATION: M-4: Site Plan of the New National Museum - 1912

SMITHSONIAN PARK



PLAN OF SMITHSONIAN PARK, SHOWING LOCATION OF ALL BUILDINGS.

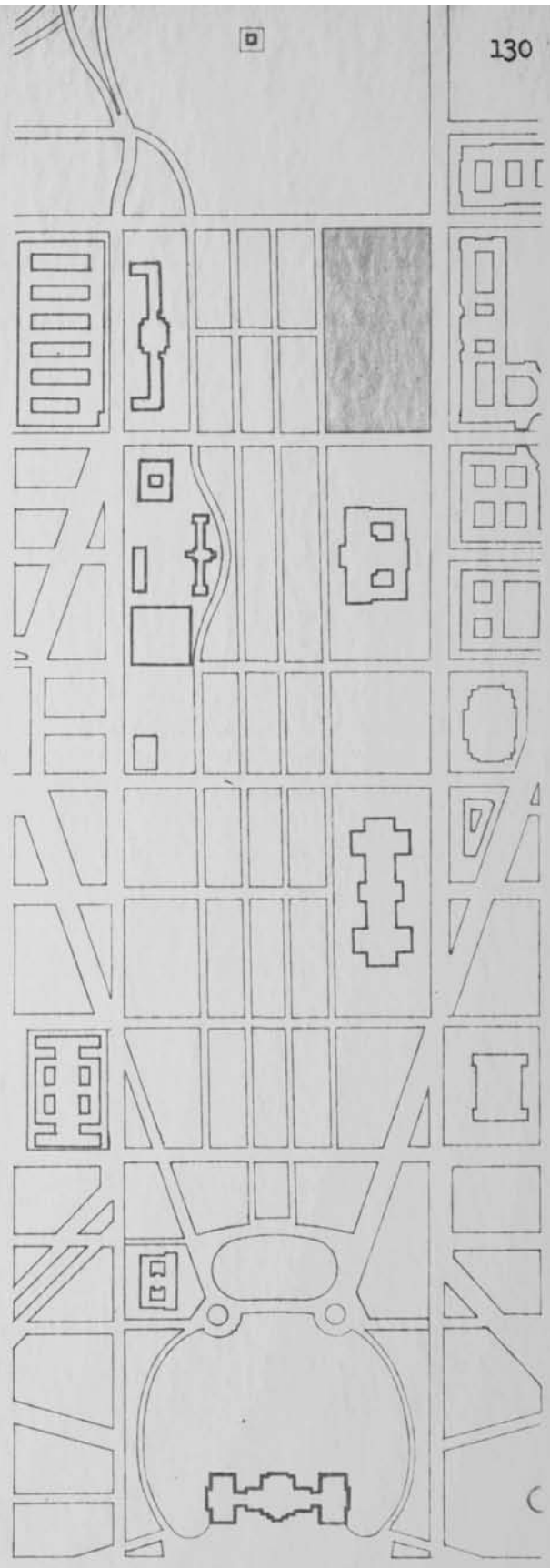


ILLUSTRATION: M-5: Photograph of the New National Museum - 1912

clumps of trees produced a feeling quite different from that of the present scheme. Seen from the cross streets (Illustration M-5) the buildings appeared in isolated settings, while the Capitol and Washington Monument were of much less importance from intermediate points than they are now.

Present Scheme of the Mall:

In 1901, Congress established a commission to study the park system of the Capitol. Burnham, McKim, Olmstead, and St. Gaudens were appointed, and prepared the McMillan Commission Plan (Illustration M-6).

The McMillan Plan restored the linear character of the Mall, which had been proposed by L'Enfant. Instead of his 400 foot wide avenue down the center of the Mall, it substituted a series of grass plots, separated by relatively narrow roadways; and recognizing that the Washington Monument was noticeably displaced from the center-line of the Mall (because no adequate bearing could be found at the original site), established the central roadways at an angle to the general street pattern of the city.

Spatially, the McMillan Plan was quite different from L'Enfant's scheme. Instead of a relatively uniform treatment of landscape which would extend from the roadway to the bounding streets of the Mall (Constitution and Independence Avenues), two narrow strips of trees were introduced, bounded by roadways to either side; beyond these, the Mall was shown as open, unplanted space, occupied by closely spaced buildings. The result was that instead of being a park through which a road had been cut, the Mall became an open plain into which trees were introduced only as elements of the overall composition.

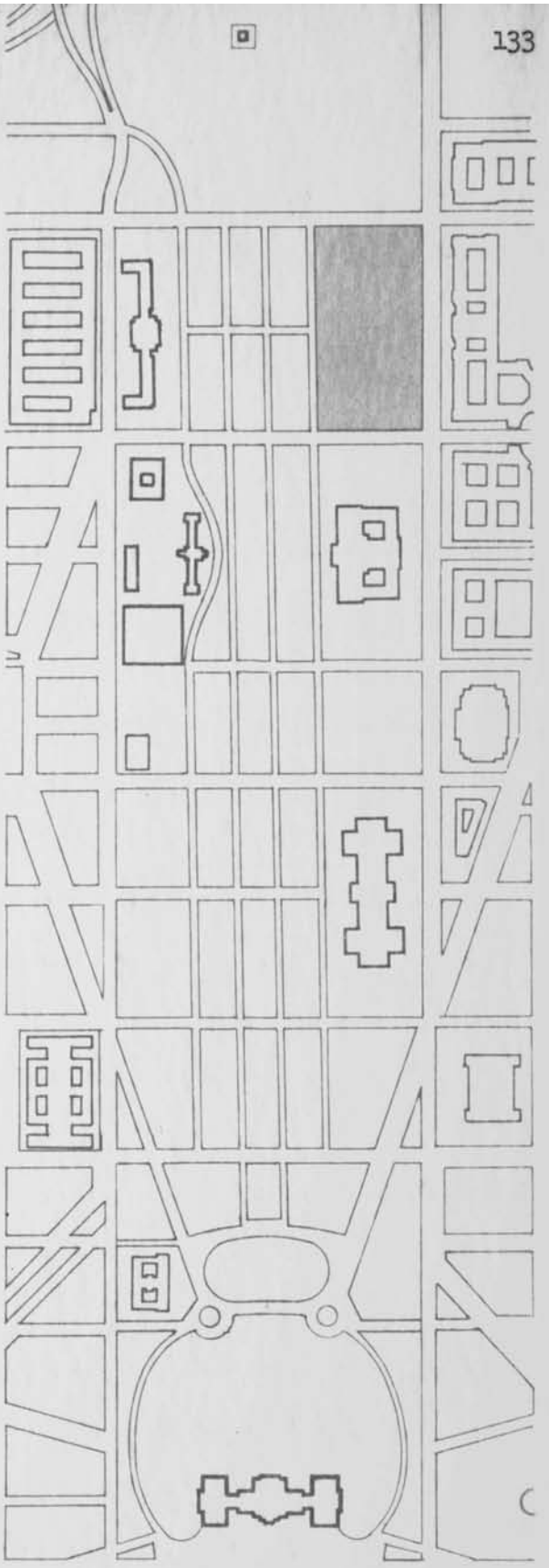
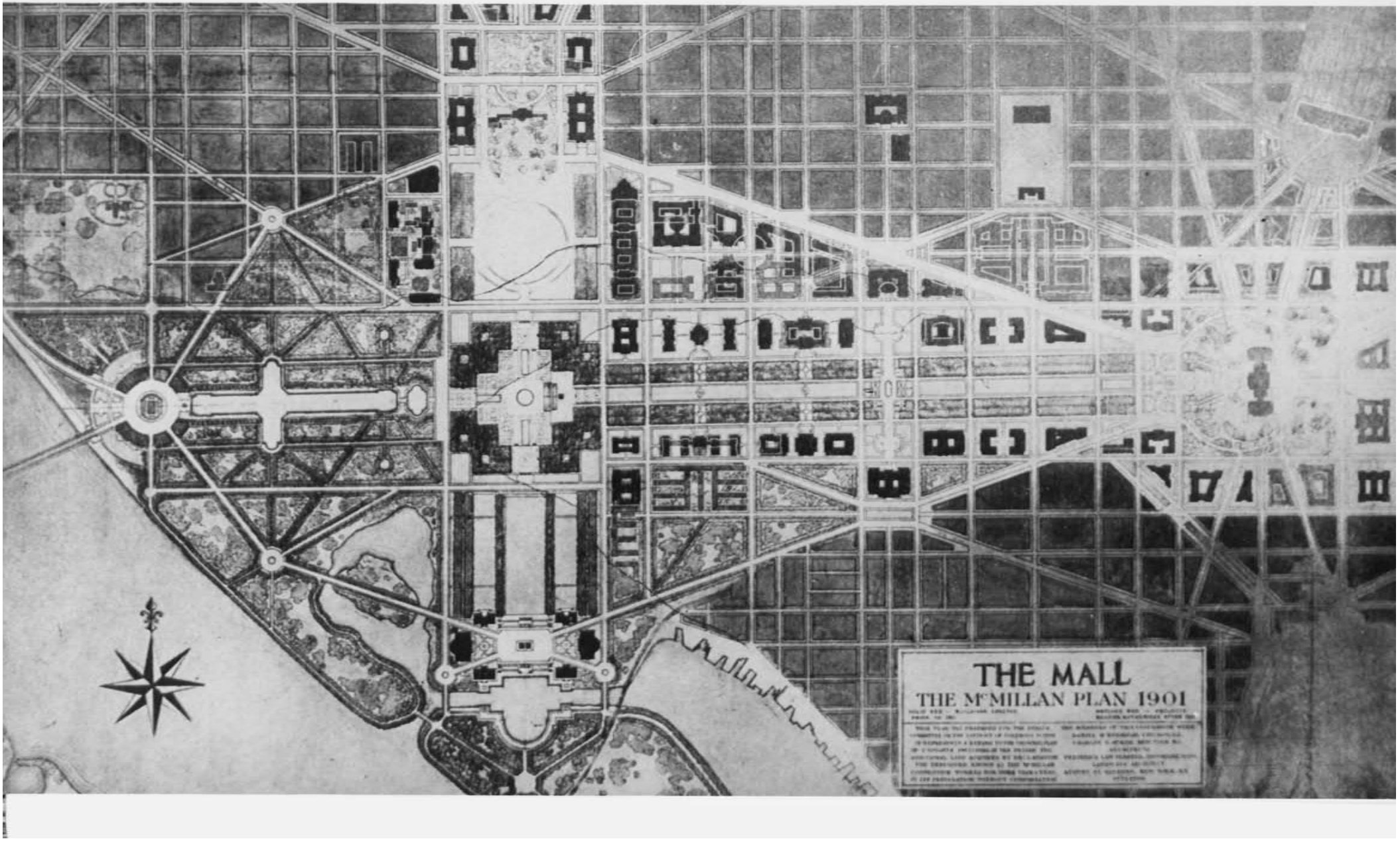


ILLUSTRATION: M-6: The McMillan Plan - 1901


THE MALL
THE McMILLAN PLAN 1901

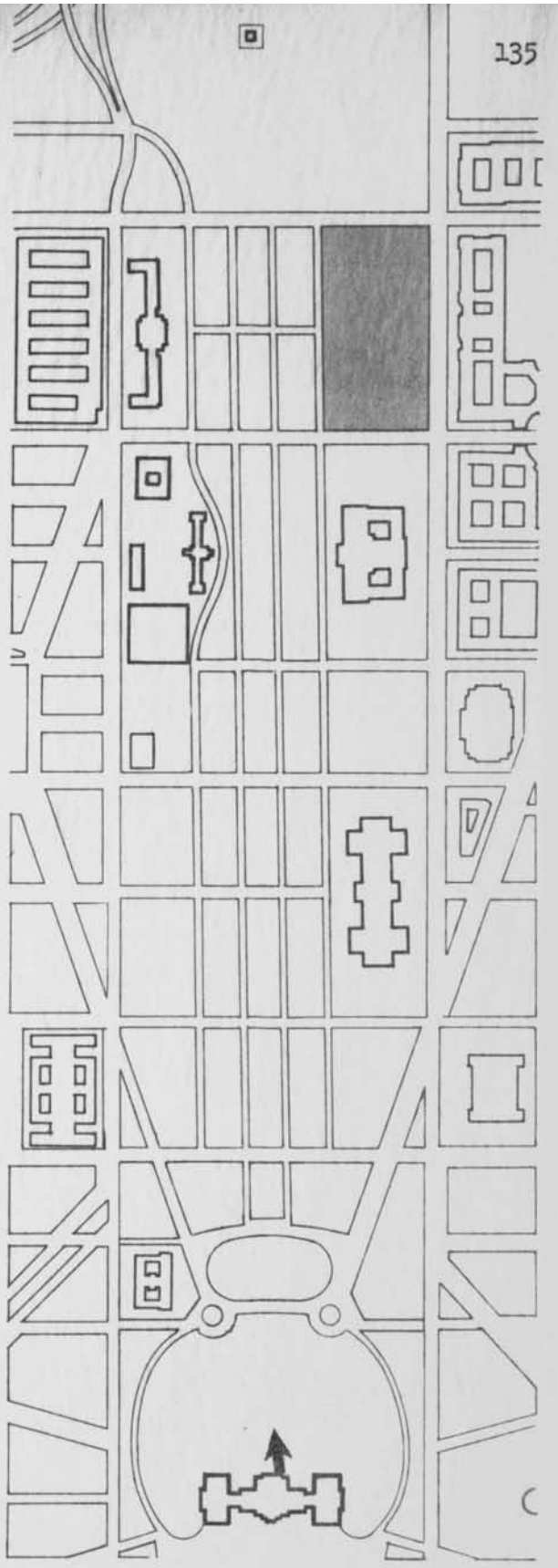


ILLUSTRATION: M-7: The Mall - 1937 - From the Capitol

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

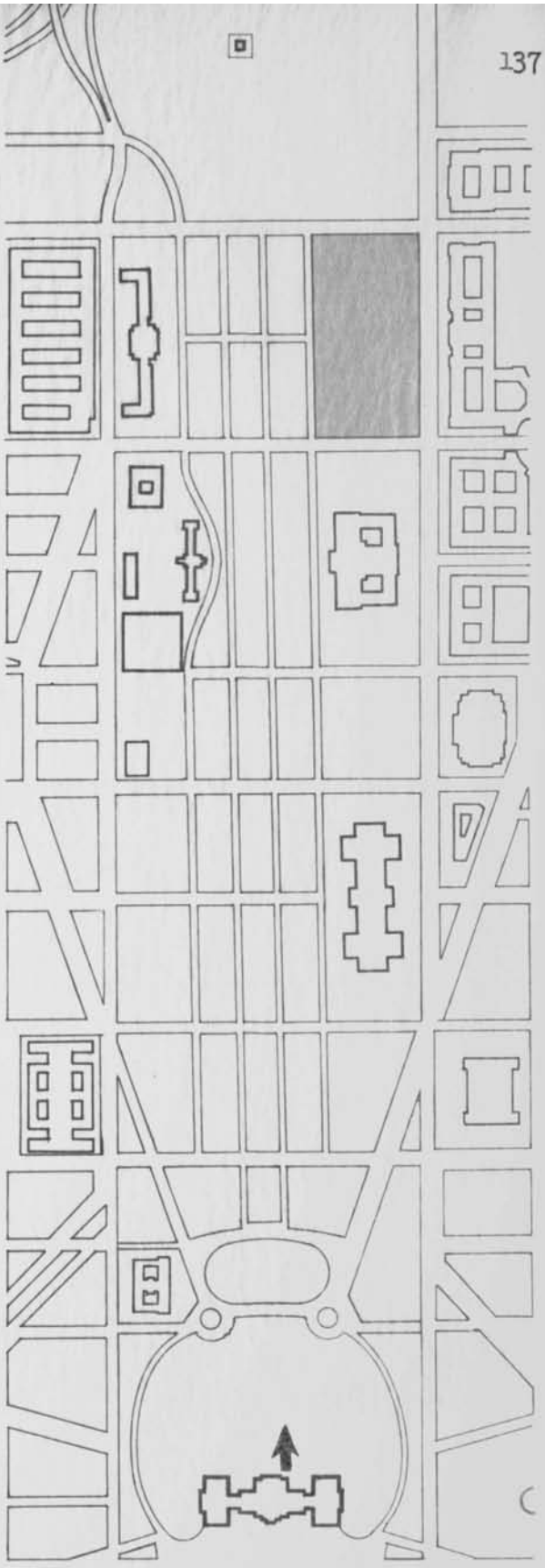


ILLUSTRATION: M-8: The Mall - 1956 - from the Capitol

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

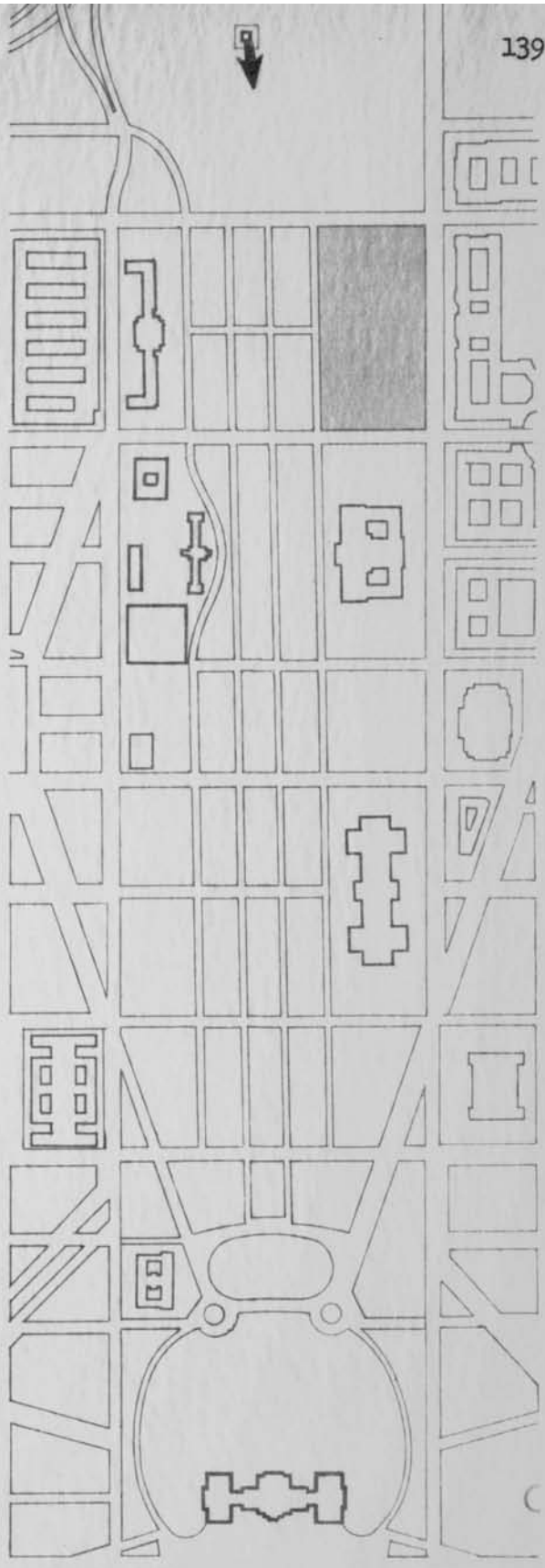


ILLUSTRATION: **M-9: The Mall - 1956 - from the Washington Monument**

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

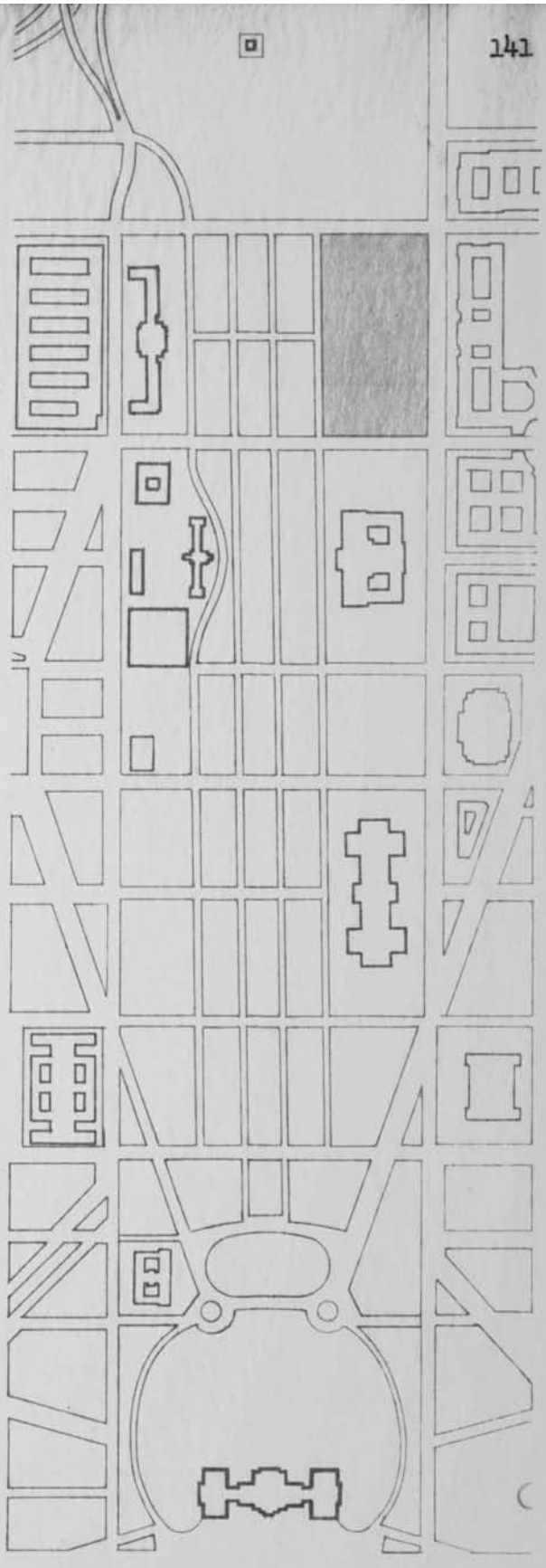
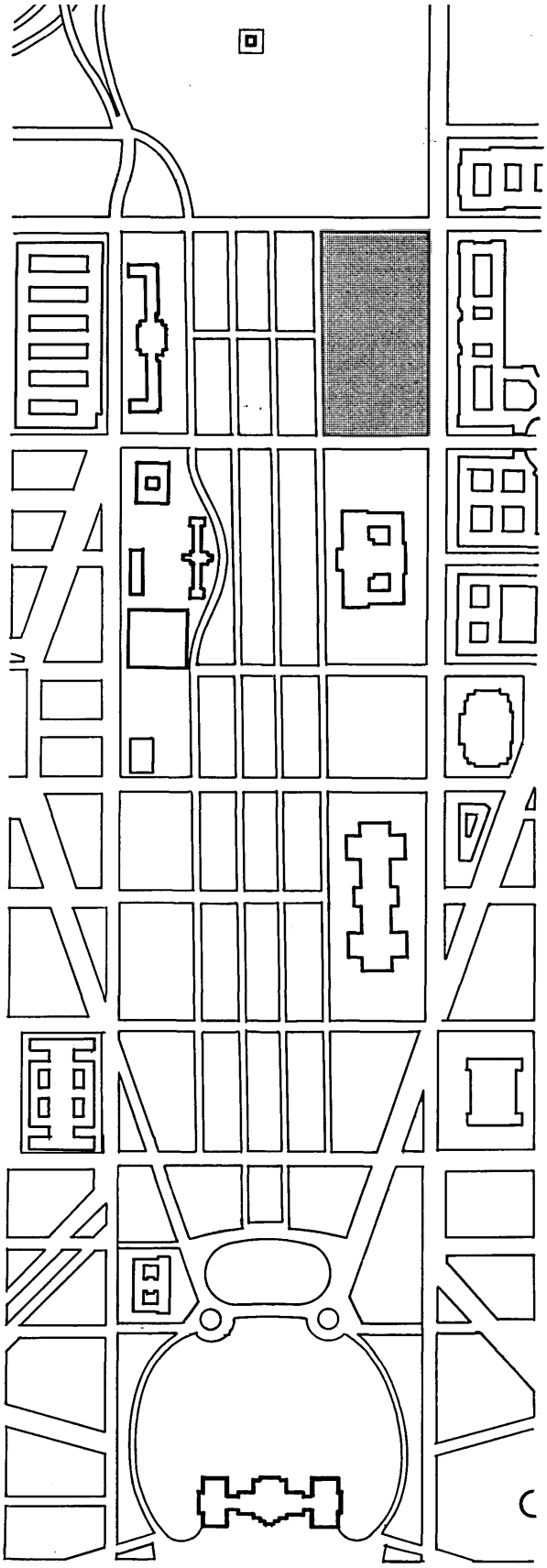


ILLUSTRATION: M-10: Plan of the Mall - 1956



While the McMillan Plan influenced the design of the New National Museum and the Agriculture Building (both 1900-1910), the execution of the general scheme was not started until 1933, when the temporary buildings on the Mall were removed, and the roadways were constructed (Illustration M-7). The construction of the National Gallery of Art (1936-1941) and the Federal Triangle Buildings (1930-1935), neither of which was anticipated in its present form in the McMillan Plan, established the character and scale of the Mall as it exists today (Illustrations M-8, M-9, M-10).

Conclusions:

Since the present form of the Mall retains from L'Enfant's Scheme little more than the idea of a green space connecting the Capitol and the Washington Monument, and since much of its character was determined by decisions made only twenty or at most fifty years ago, it seems pointless to be too much influenced by the feeling that there is an existing scheme for the Mall, which should be completed. It seems much more profitable to consider the Mall as it exists physically at present, and to attempt to produce a design for this new building which will enrich the visual and spatial qualities of the whole Mall, rather than restating that which already exists.

In this connection, the following points seem to be important:

1. This is to be the last building on the North side of the Mall. It should close the composition of the Mall, to indicate this fact, not suggesting, as does the Agriculture Building opposite that other buildings could as well follow it.

2. The existing buildings on the Mall are very definitely determined volumes, set on open sites, so that there is a sharp

division between building and open space with no effective transitional space between. The introduction of exterior spaces, developed at a smaller scale than the overall treatment of the Mall could provide a more varied spatial experience than is now possible.

3. The site is adjacent to the great shaft of the Washington Monument which should be considered in the design.

4. Scale: The scale of the Mall is not understandable in any context but its own. It is almost a mile and a half from the Capitol to the Monument, of which about 4000 feet is occupied by the three museum sites on the North side (with the exception of the single square before the Archives). The National Gallery is about 770 feet long, only slightly shorter than the Capitol. The Natural History Building next to the site is over 550 feet long on its main facade. The Agriculture Building opposite is again about 770 feet long, while the combined facades of the Federal Triangle have an extent of about 3600 feet. The site for the new Museum is roughly 600 feet by 1000 feet, and its location at what is effectively a corner of the Mall indicates that it must be a building of comparable dimensions in order to retain its own identity and to provide an effective termination for the row of existing buildings on the Mall.

These four points will be considered again in Chapter 8, after the other factors in the design have been introduced.

CHAPTER FIVE: EXTERIOR CHARACTER OF THE BUILDING

SYNOPSIS

Contrast of utilitarian design of Smithsonian and Arts and Industries Building With intended monumentality of Natural History Building and National Gallery. Methods of design by which effect is obtained in these two buildings.-detailling, landscaping, massing, entrances etc. Other buildings adjacent to site: Federal Triangle - detailling quality and its effect on this building. Washington Monument-relation of simple high shaft to massing of new Museum. Conclusions: relation of external character of existing buildings to intended use of this Museum. Discussion of apparent conflict; qualities desired: massing, detailling, materials, landscaping to accomplish.

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an expanded discussion of the above will be supplied later.

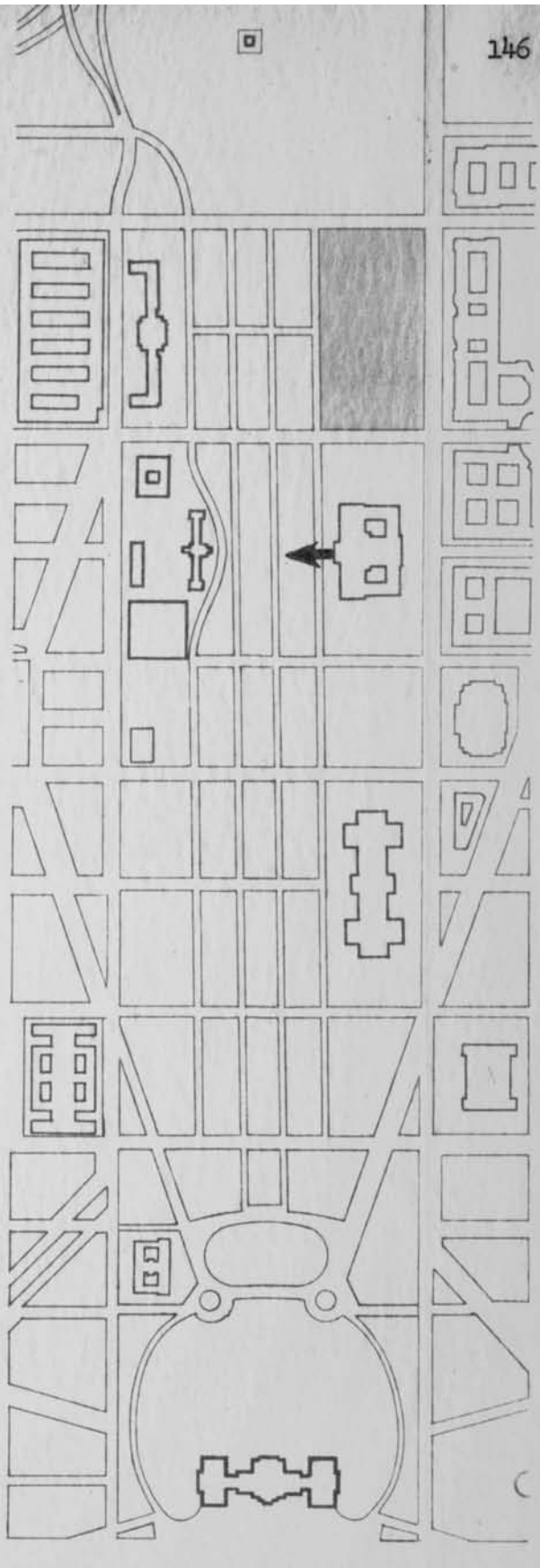
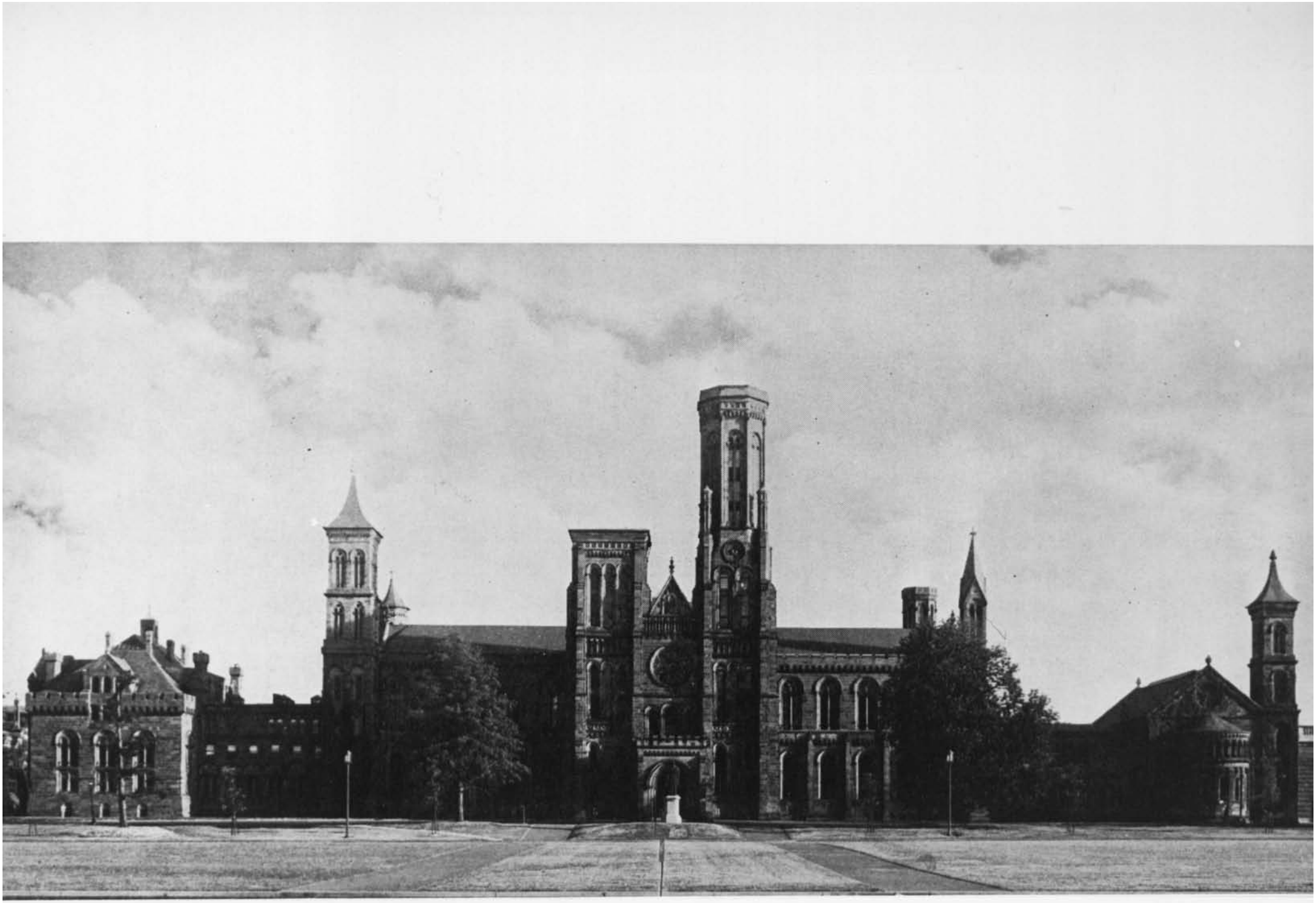


ILLUSTRATION: B-1: Smithsonian Institution - original building



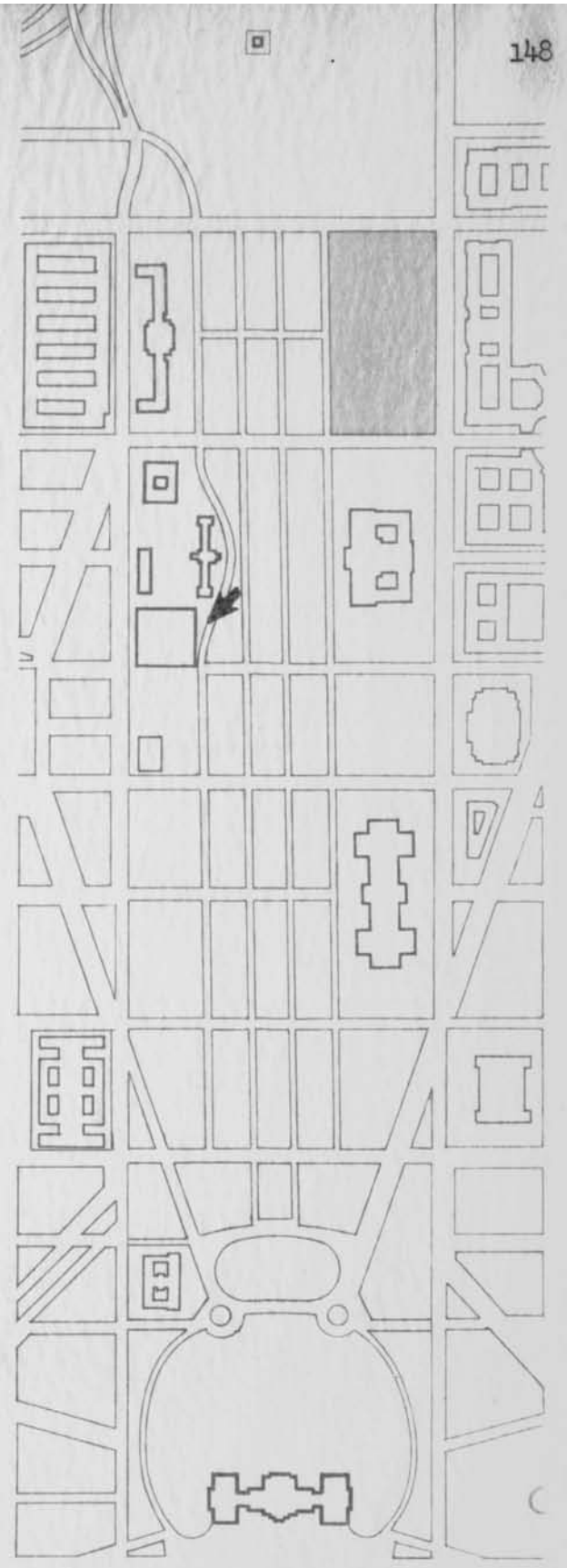


ILLUSTRATION: B-2: Arts and Industries Building - Entrance

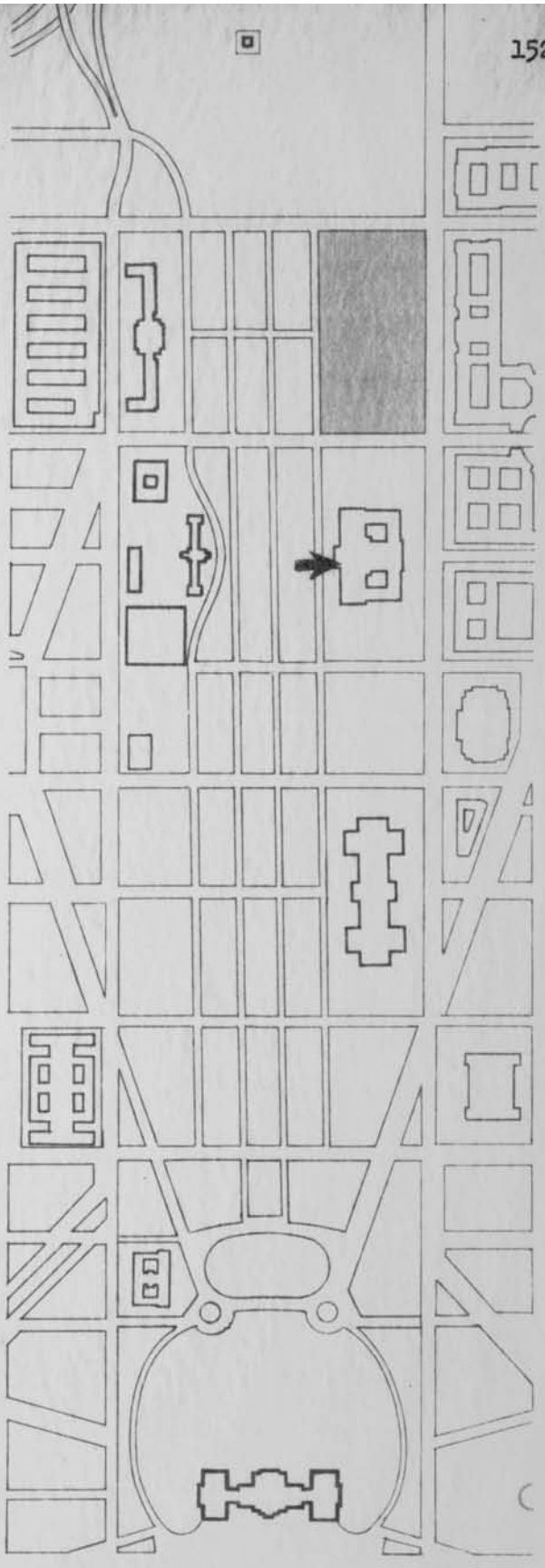
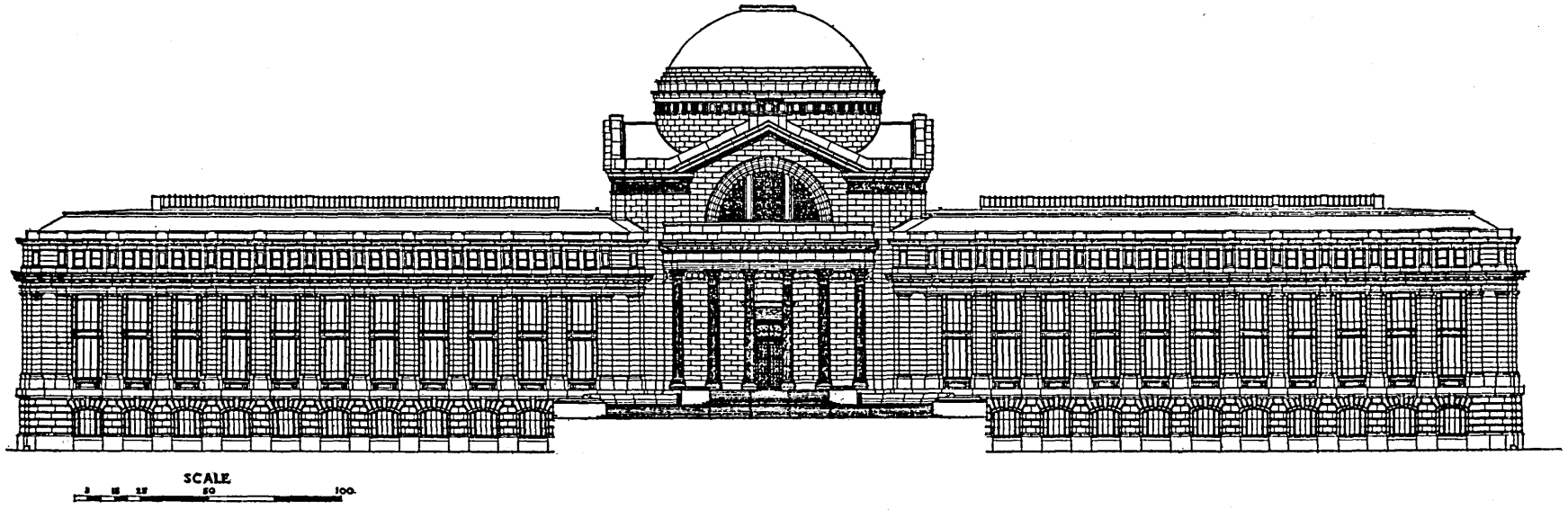


ILLUSTRATION: B-3: National Museum - South Elevation



SOUTH ELEVATION OF BUILDING.

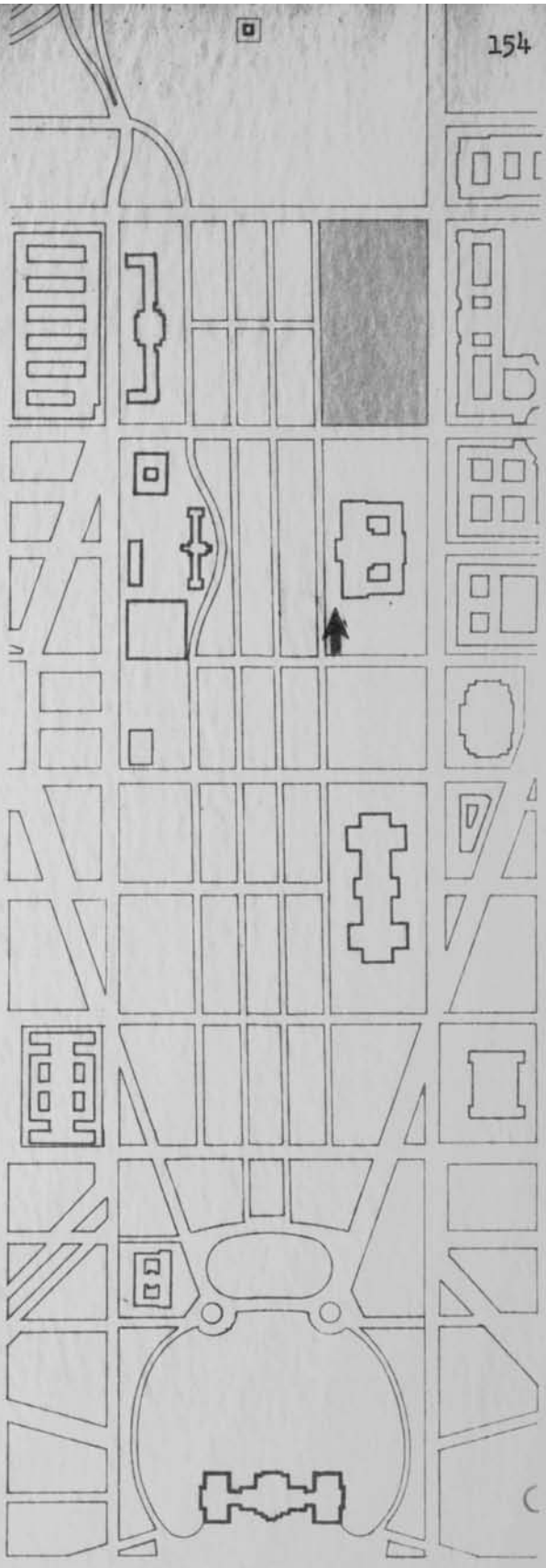


ILLUSTRATION: B-4: National Museum - from the Mall

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

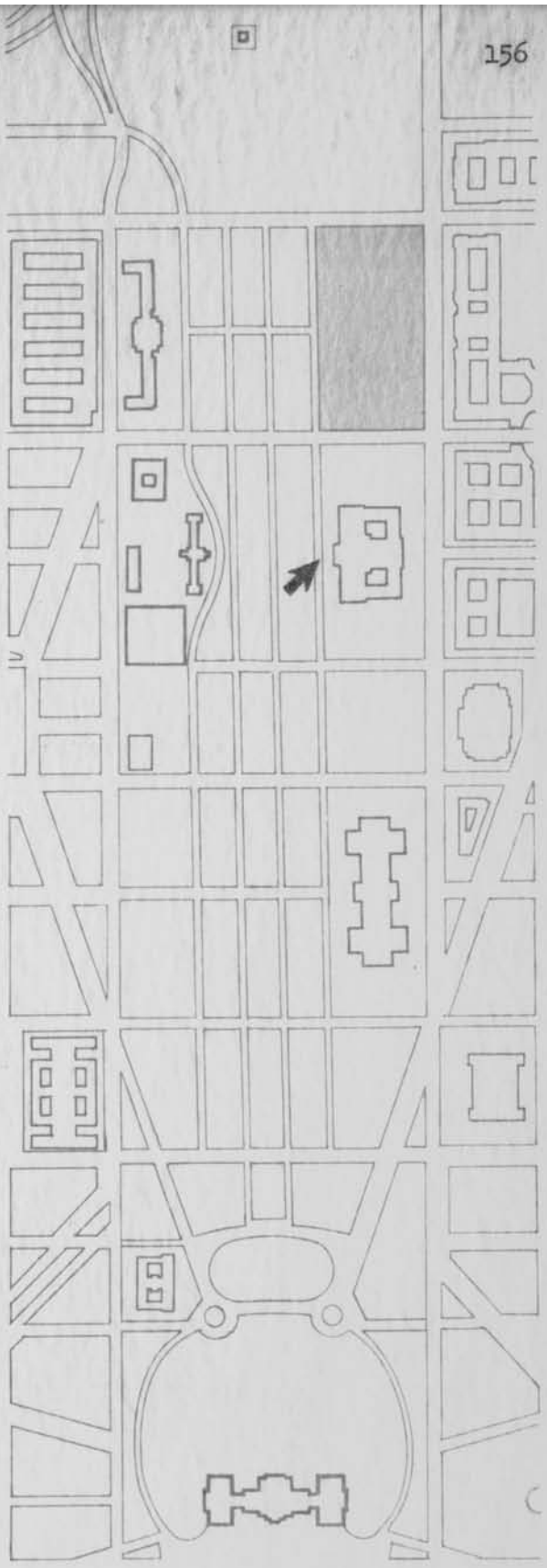
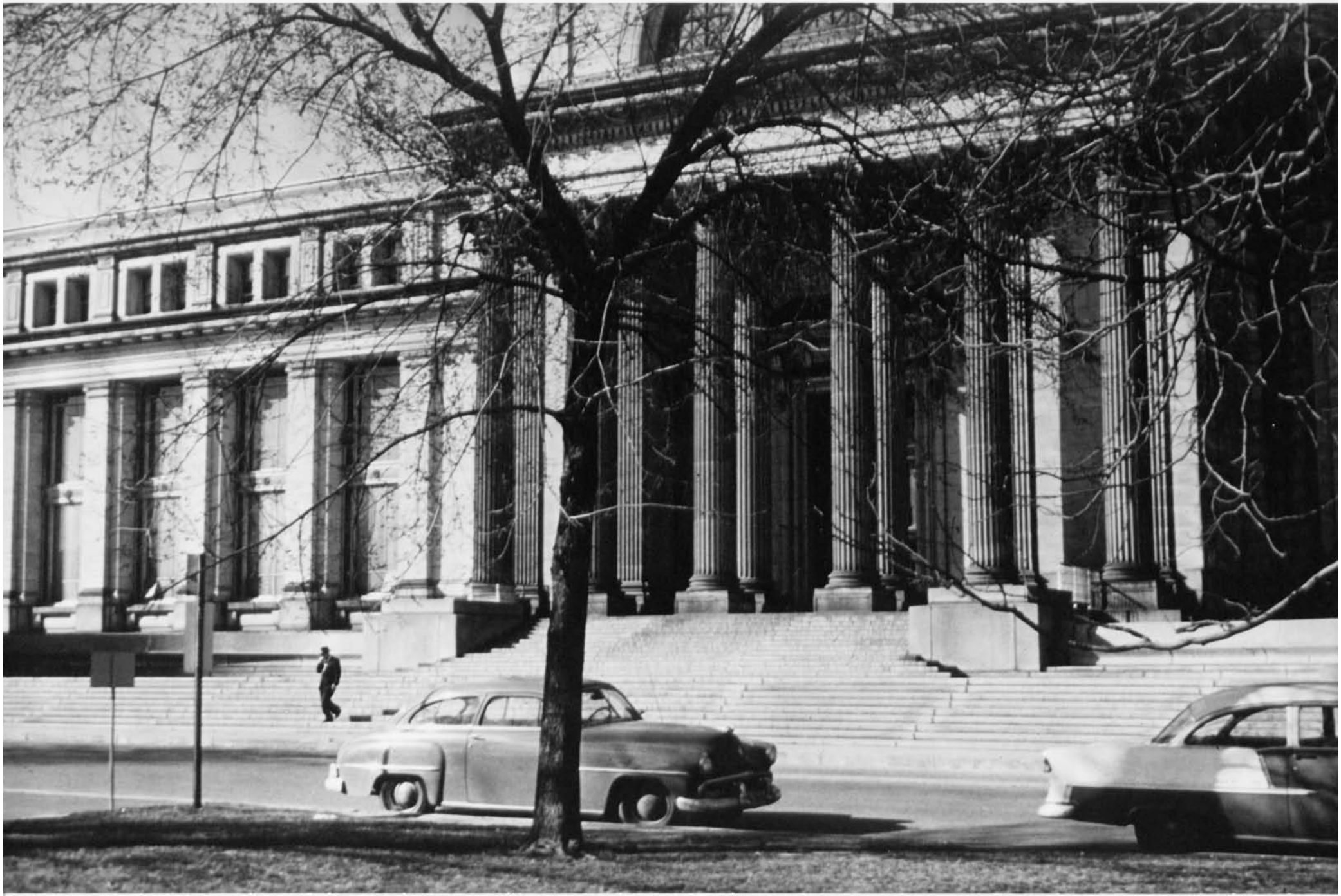


ILLUSTRATION: **B-5: National Museum - Main Entrance**



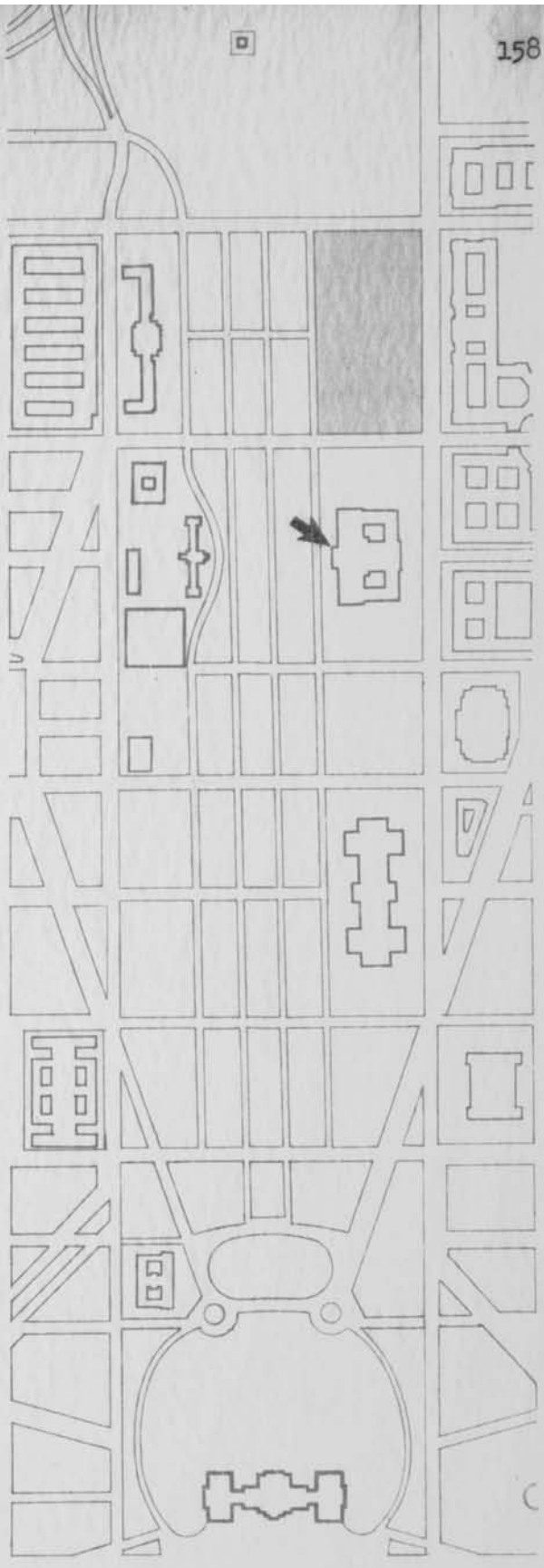
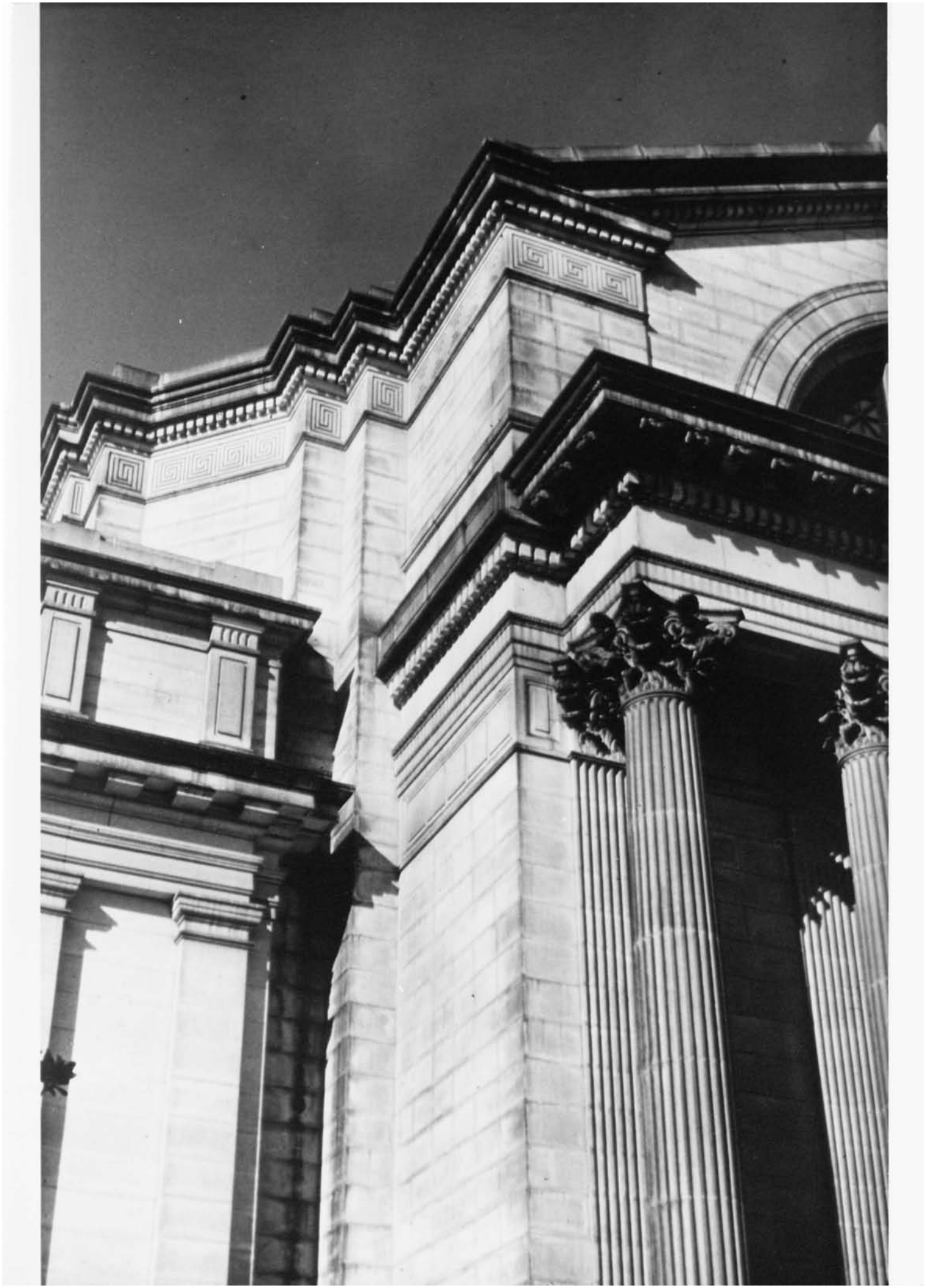


ILLUSTRATION: B-6: National Museum - Detail of Masonry



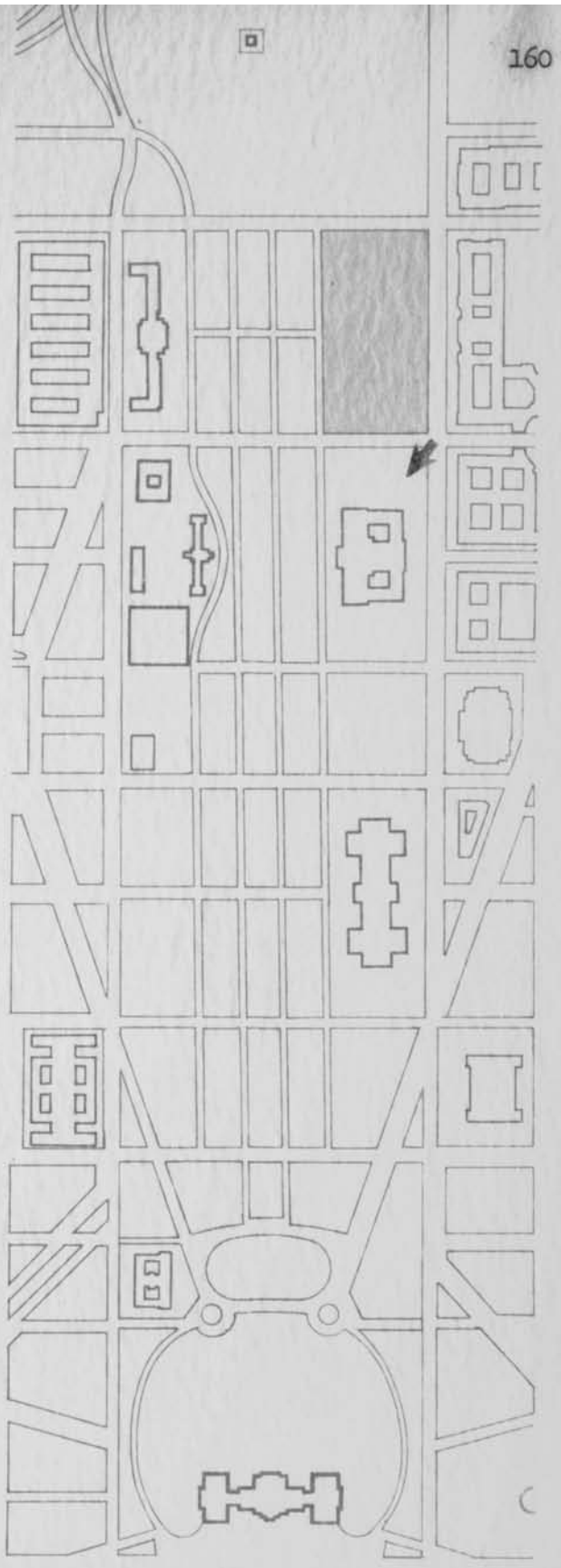
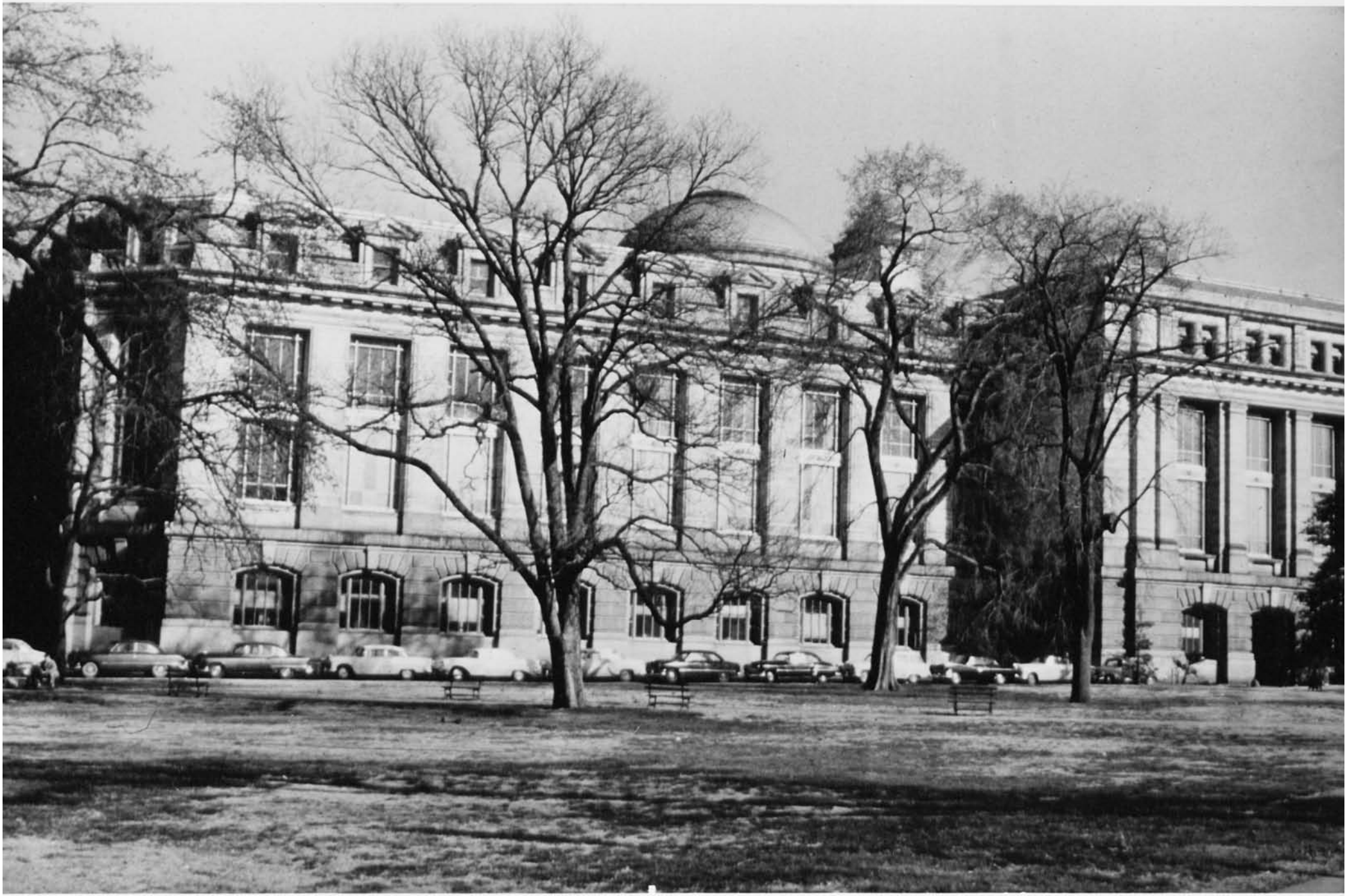


ILLUSTRATION: B-7: National Museum - from Twelfth Street



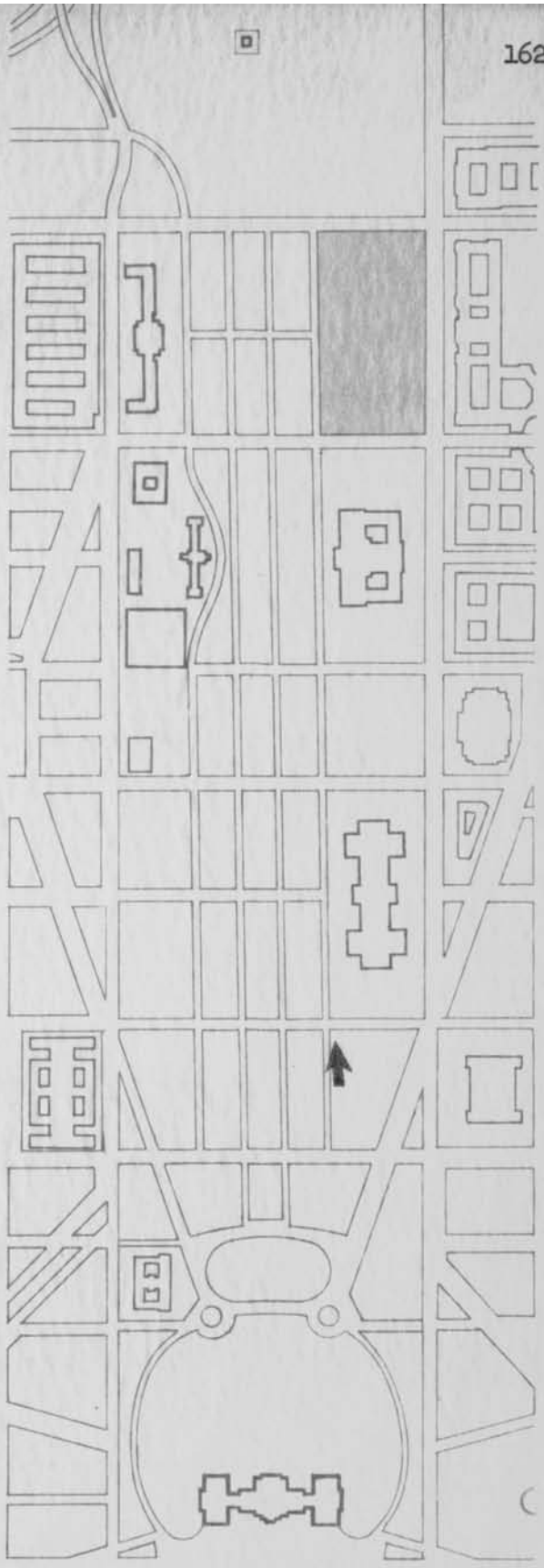


ILLUSTRATION: B-8: National Gallery of Art - along The Mall

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

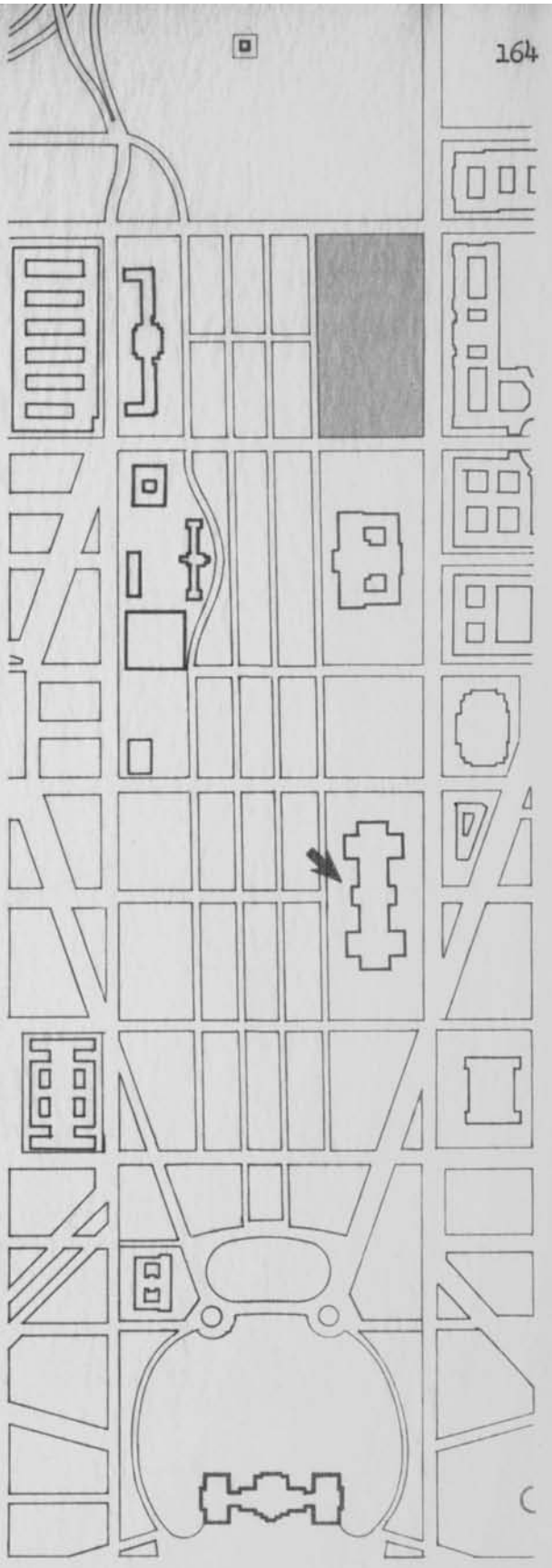


ILLUSTRATION: B-9: National Gallery of Art - Entrance

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

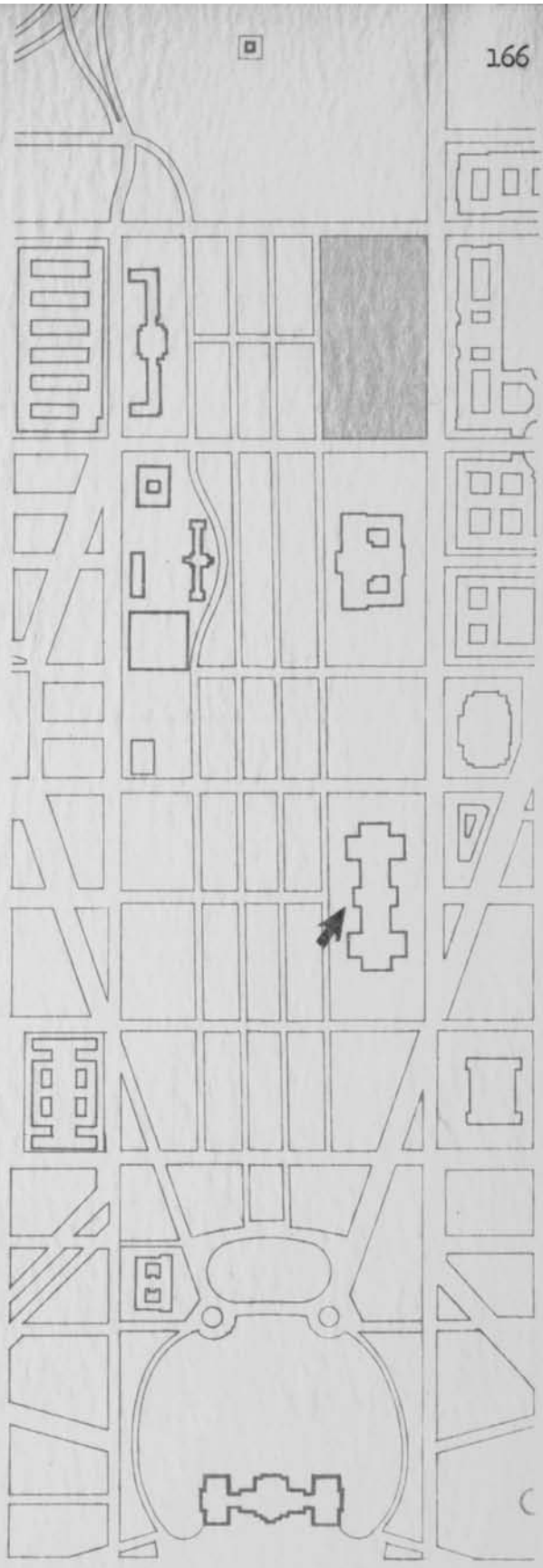


ILLUSTRATION: B-10: National Gallery of Art - Steps at Entrance

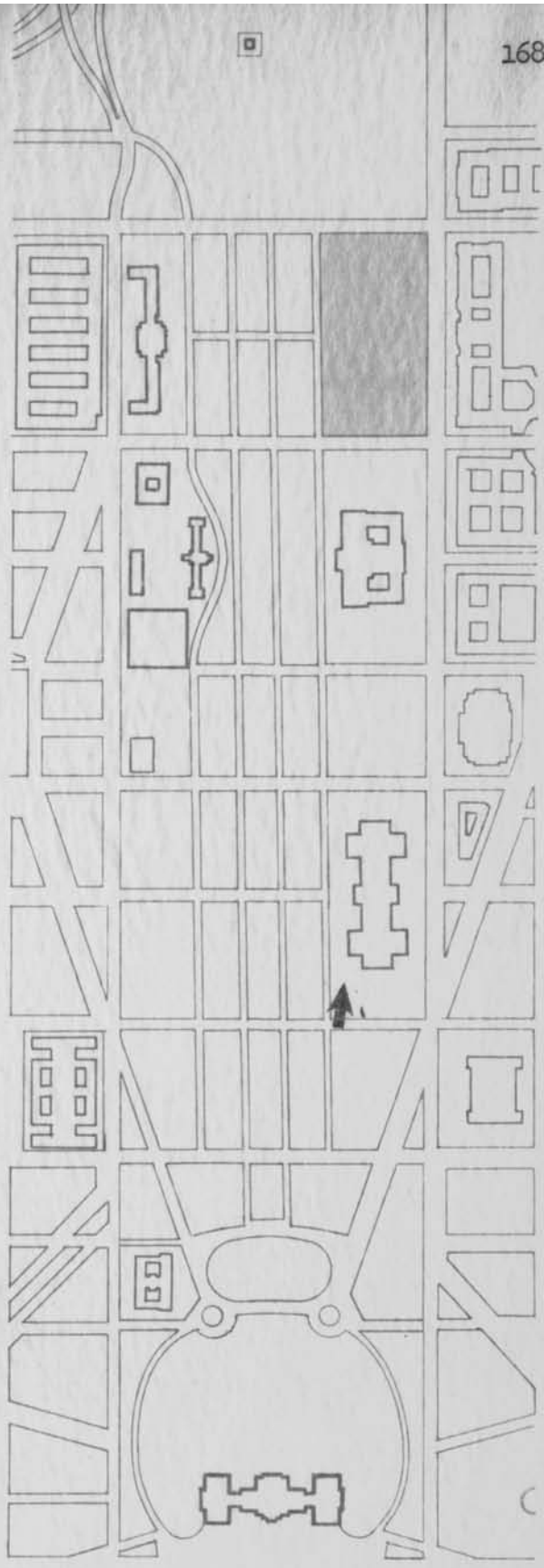


ILLUSTRATION: B-11: National Gallery of Art - Landscape

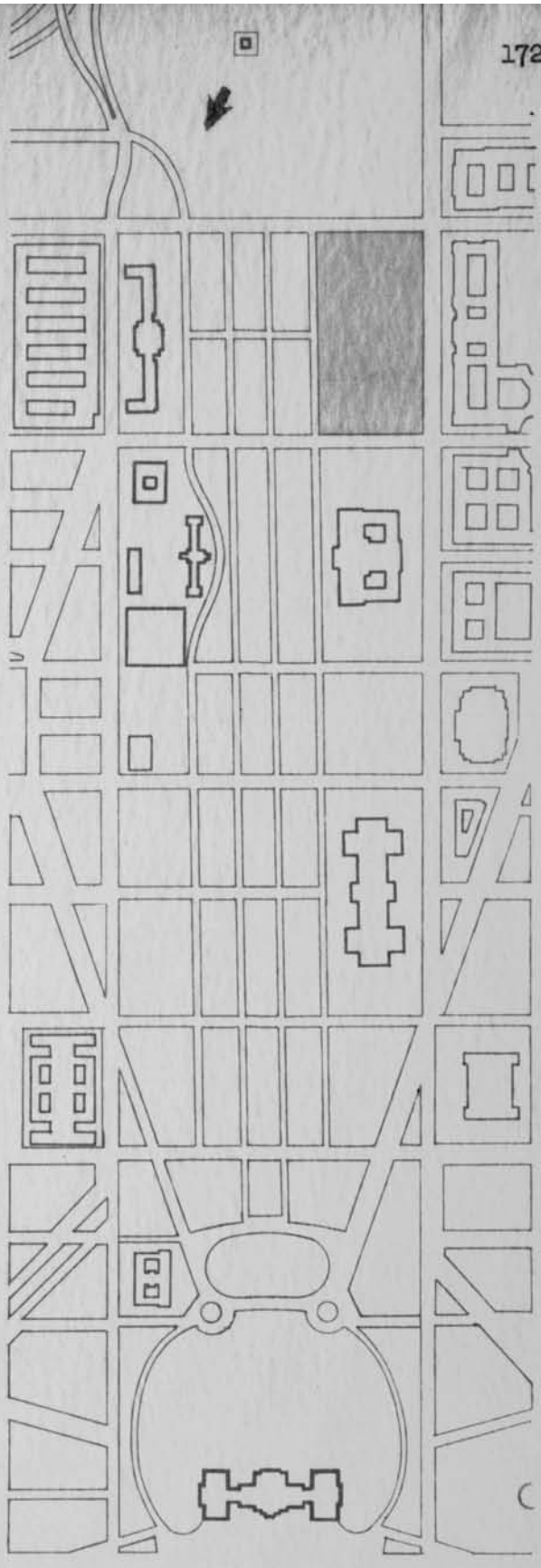


ILLUSTRATION: B-12: Department of Agriculture Building

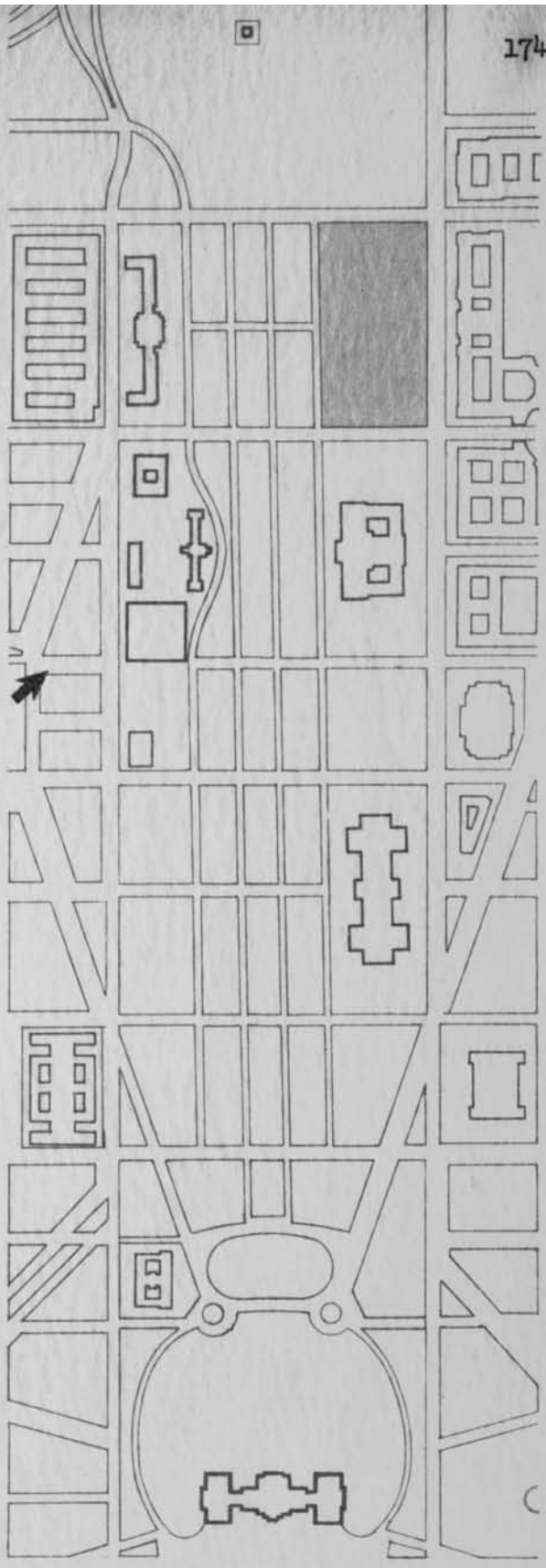


ILLUSTRATION: B-13: Federal Triangle Buildings - I.C.C.

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

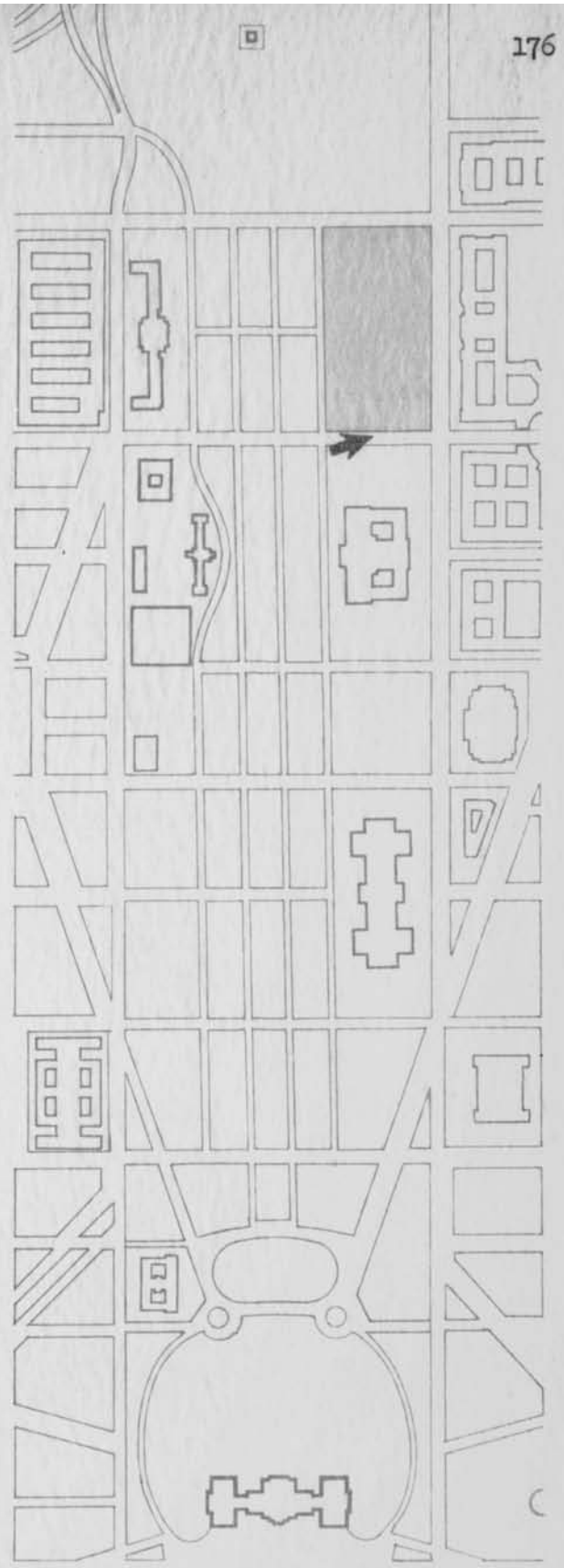


ILLUSTRATION: B-14: Federal Triangle - I.C.C. Building

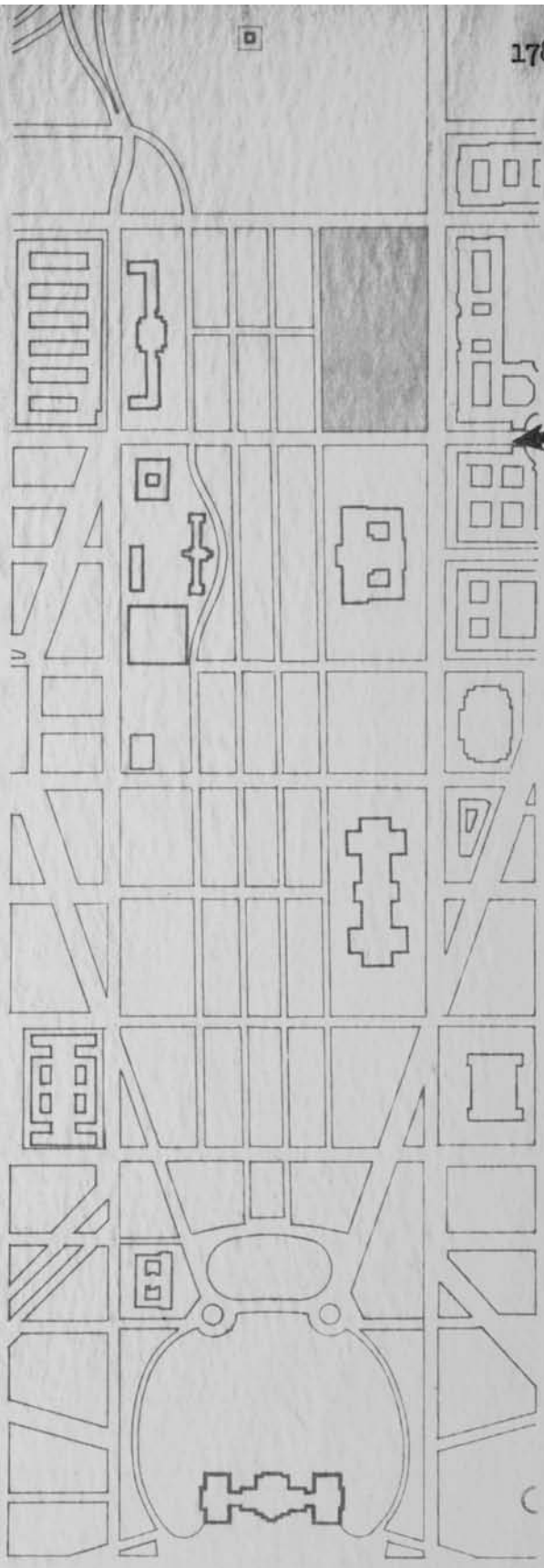


ILLUSTRATION: **B-15: Federal Triangle Buildings - Detail**

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

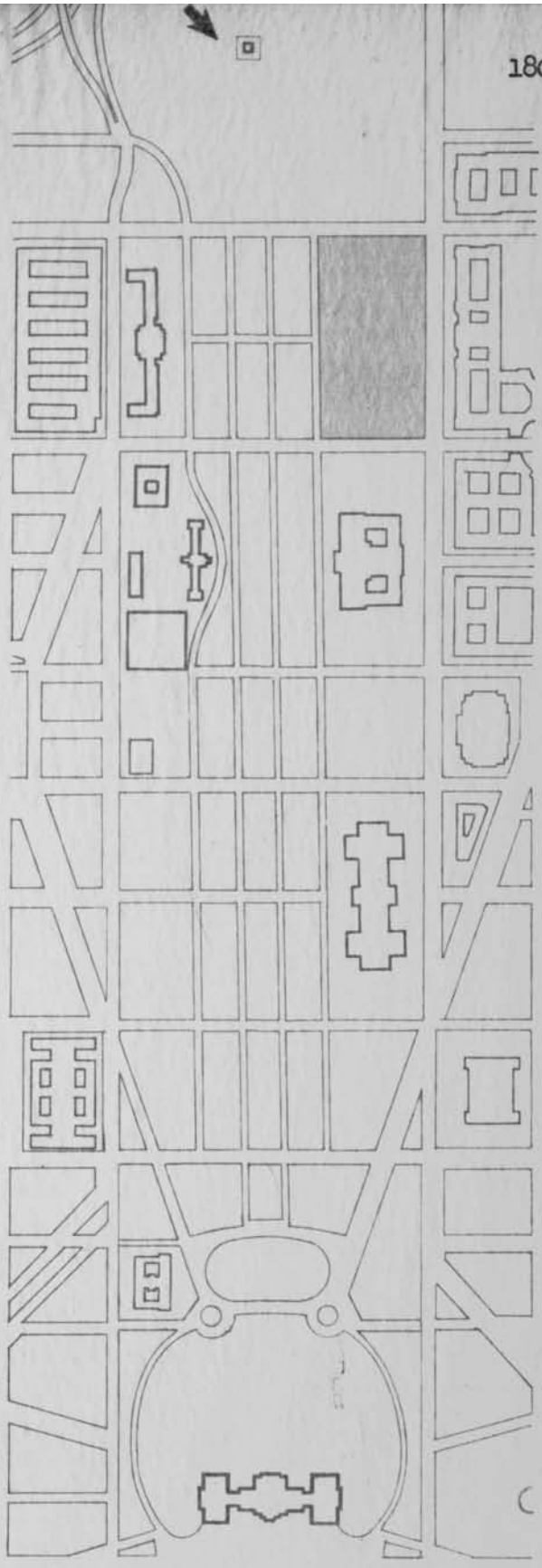


ILLUSTRATION: B-16: Washington Monument

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

CHAPTER SIX: PLAN ARRANGEMENT

SYNOPSIS

Problems of maintaining orientation, unddrstandable plan in large exhibition areas. Comparison of small museum- Smithsonian- in whih poblem hardly exists and in whi closed spaces are frequent; intermediate size-Arts and Industries which is pricipally one lare space with many mezzanines and works; and Natural History Building which is much sub-divided and doesn't work (very confusing); National Gallery which is very large, subdivided and works mostly because of the three large spaces which form foci for the exhibition galleries. Conclusions: Consideration of whether type of material to be displayed requires closed or open spaces - decide open. Use of central areas to provide orientation. Division into two main sections to make plan more comprehensible.

An extended discussion of the above will be supplied later to replace this sheet and pp. 184,185,193,194.

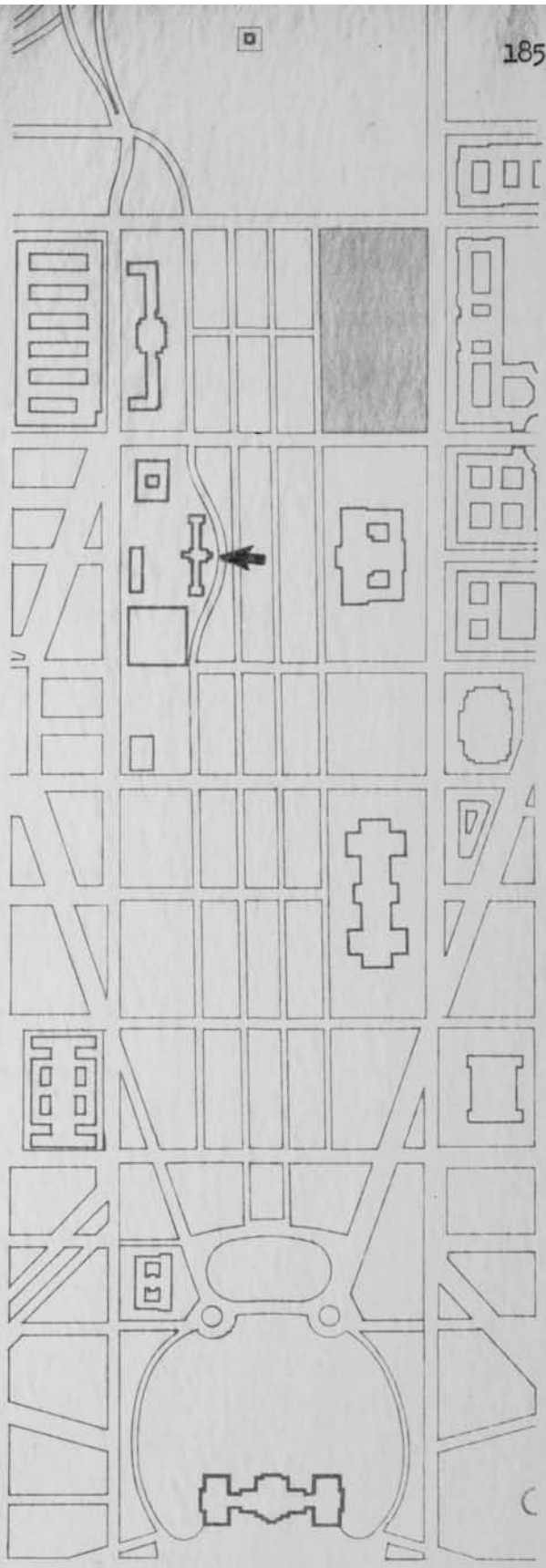


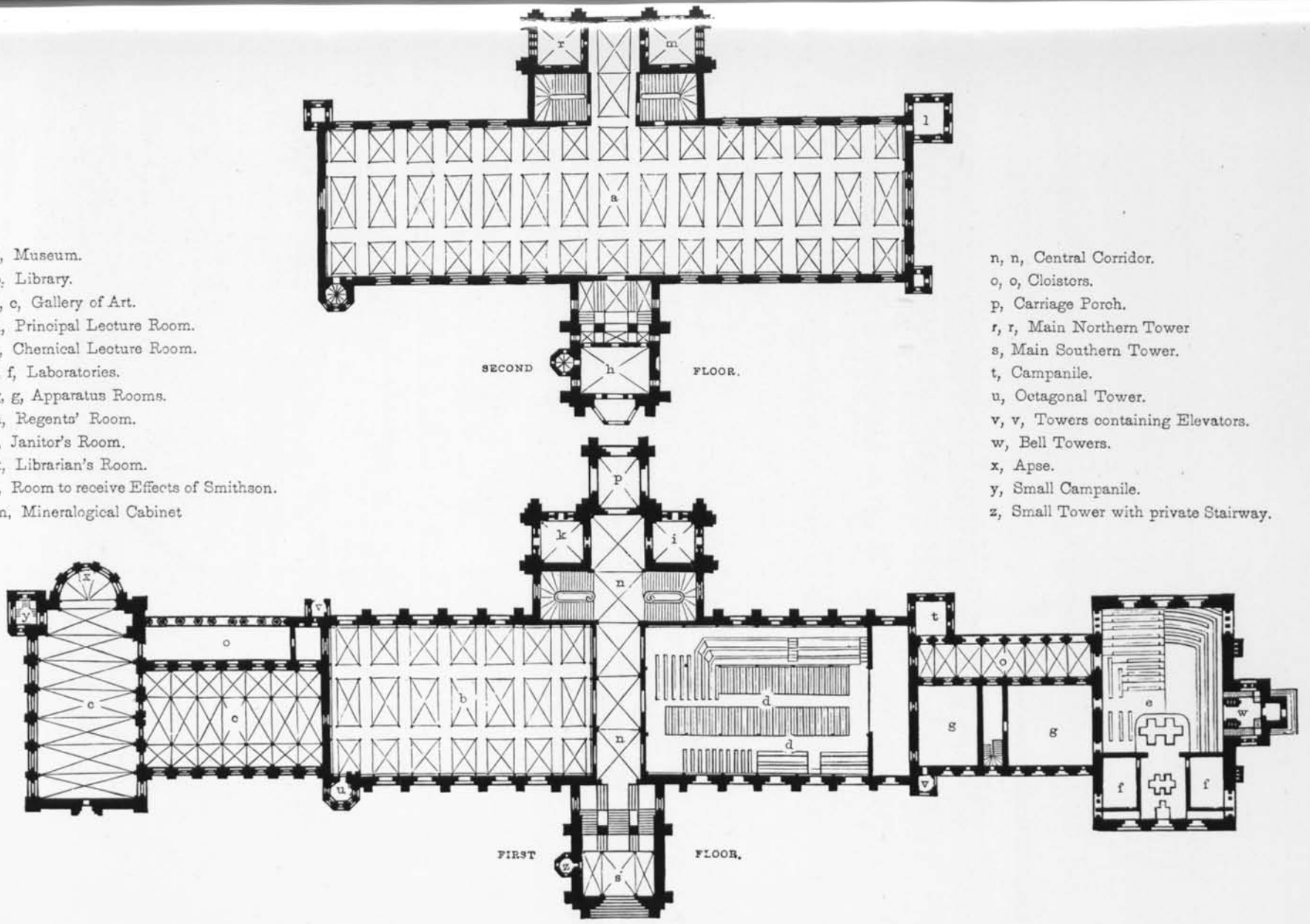
ILLUSTRATION: **P-1: Smithsonian Institution - Plan**

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

a, Museum.
b, Library.
c, c, Gallery of Art.
d, Principal Lecture Room.
e, Chemical Lecture Room.
f, f, Laboratories.
g, g, Apparatus Rooms.
h, Regents' Room.
i, Janitor's Room.
k, Librarian's Room.
l, Room to receive Effects of Smithson.
m, Mineralogical Cabinet

n, n, Central Corridor.
o, o, Cloistors.
p, Carriage Porch.
r, r, Main Northern Tower
s, Main Southern Tower.
t, Campanile.
u, Octagonal Tower.
v, v, Towers containing Elevators.
w, Bell Towers.
x, Apse.
y, Small Campanile.
z, Small Tower with private Stairway.



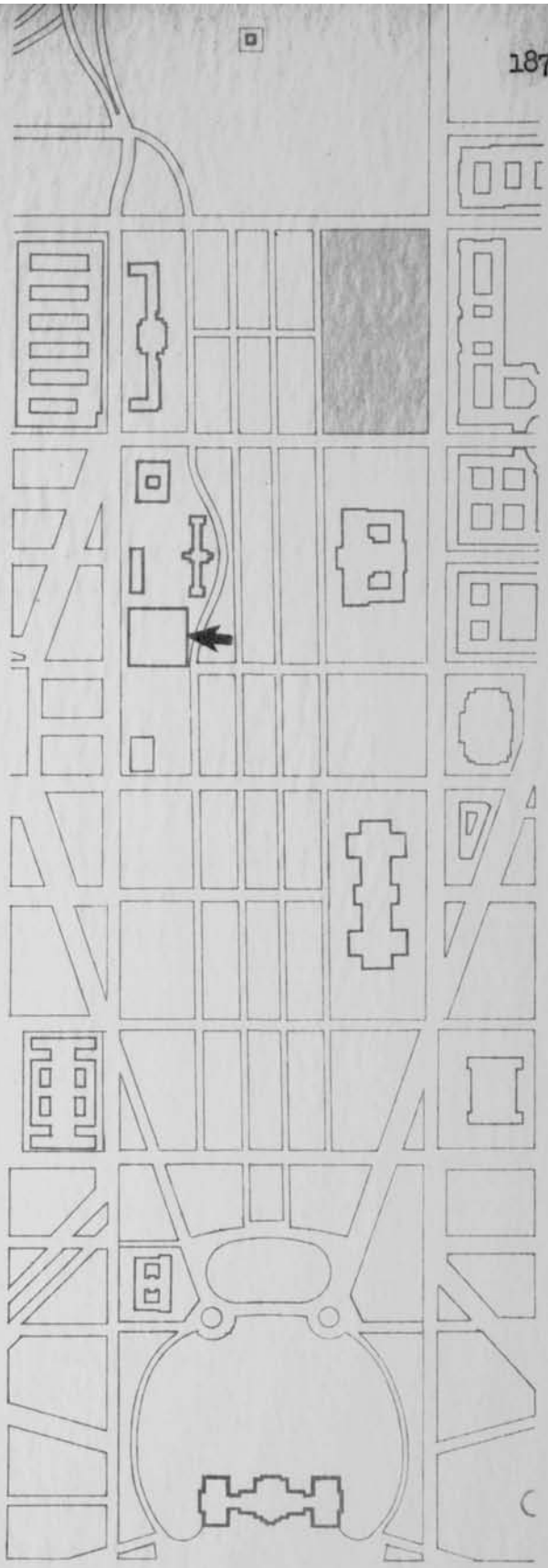
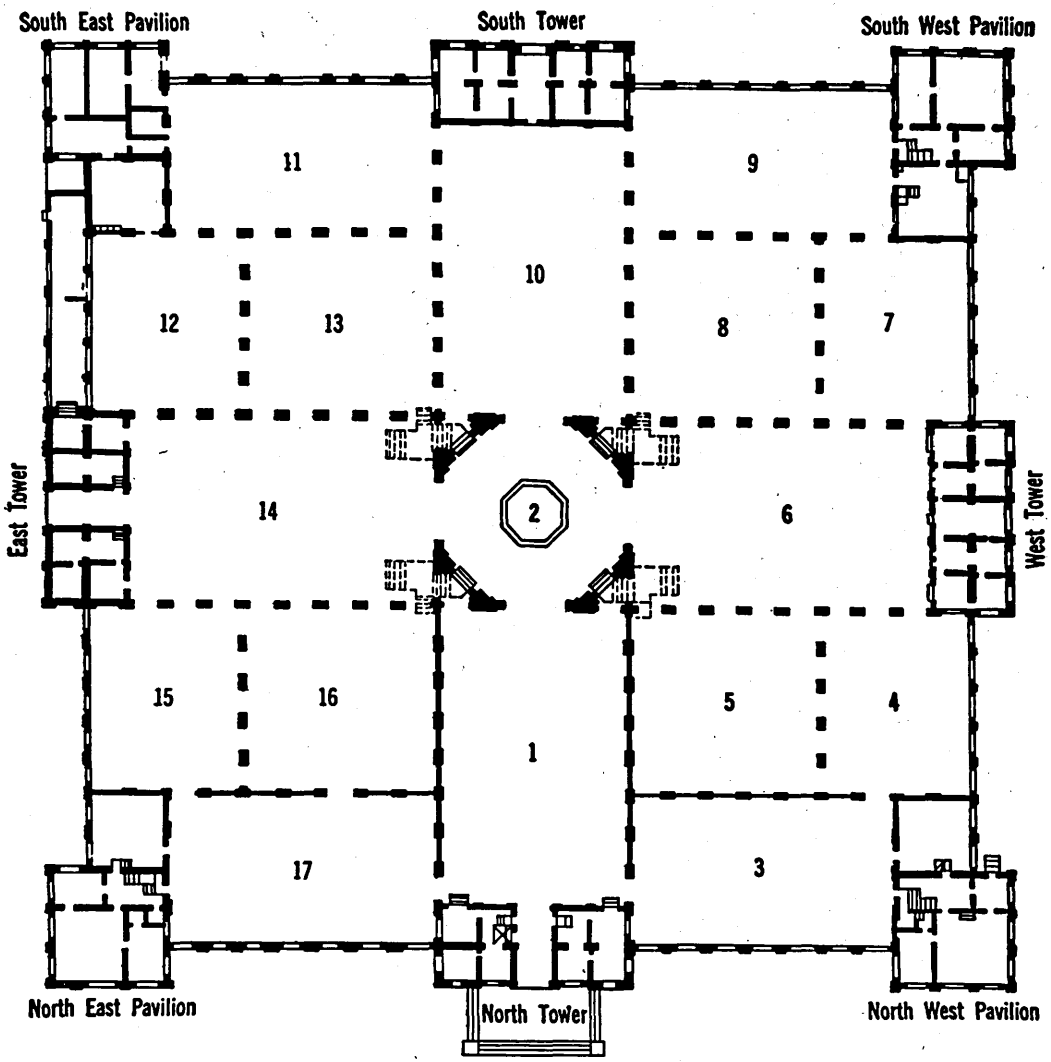


ILLUSTRATION: **P-2: Arts and Industries Building**

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION



FLOOR PLAN OF ARTS AND INDUSTRIES BUILDING

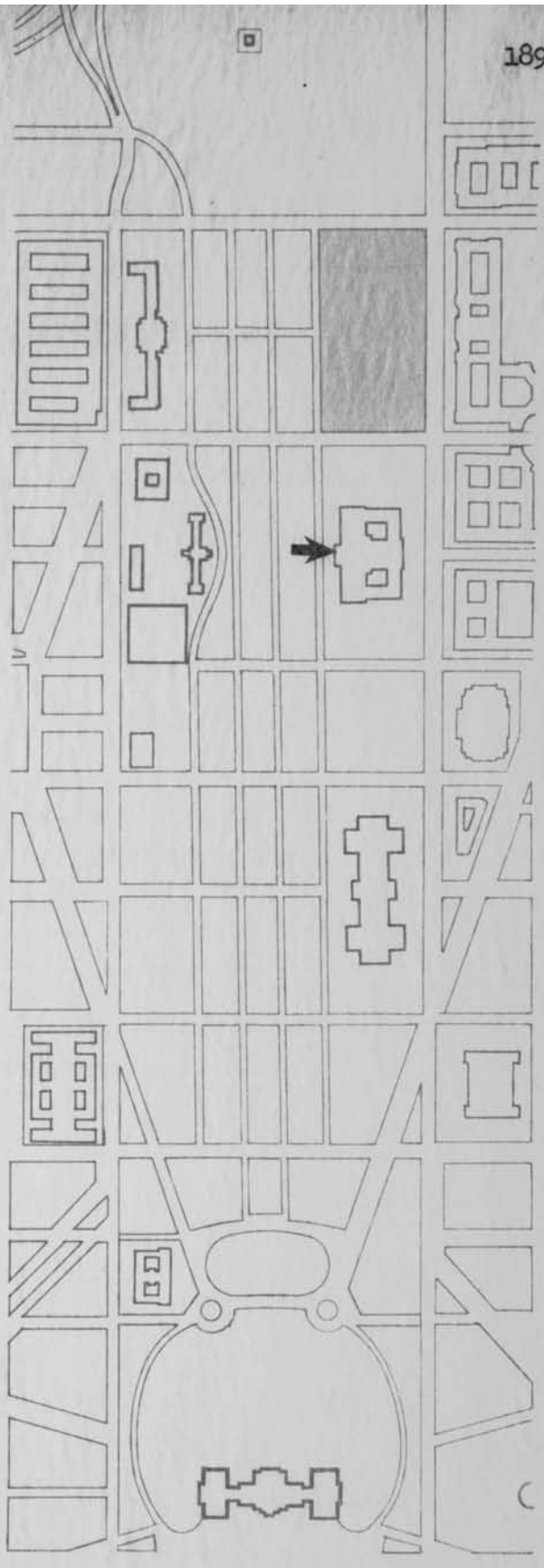
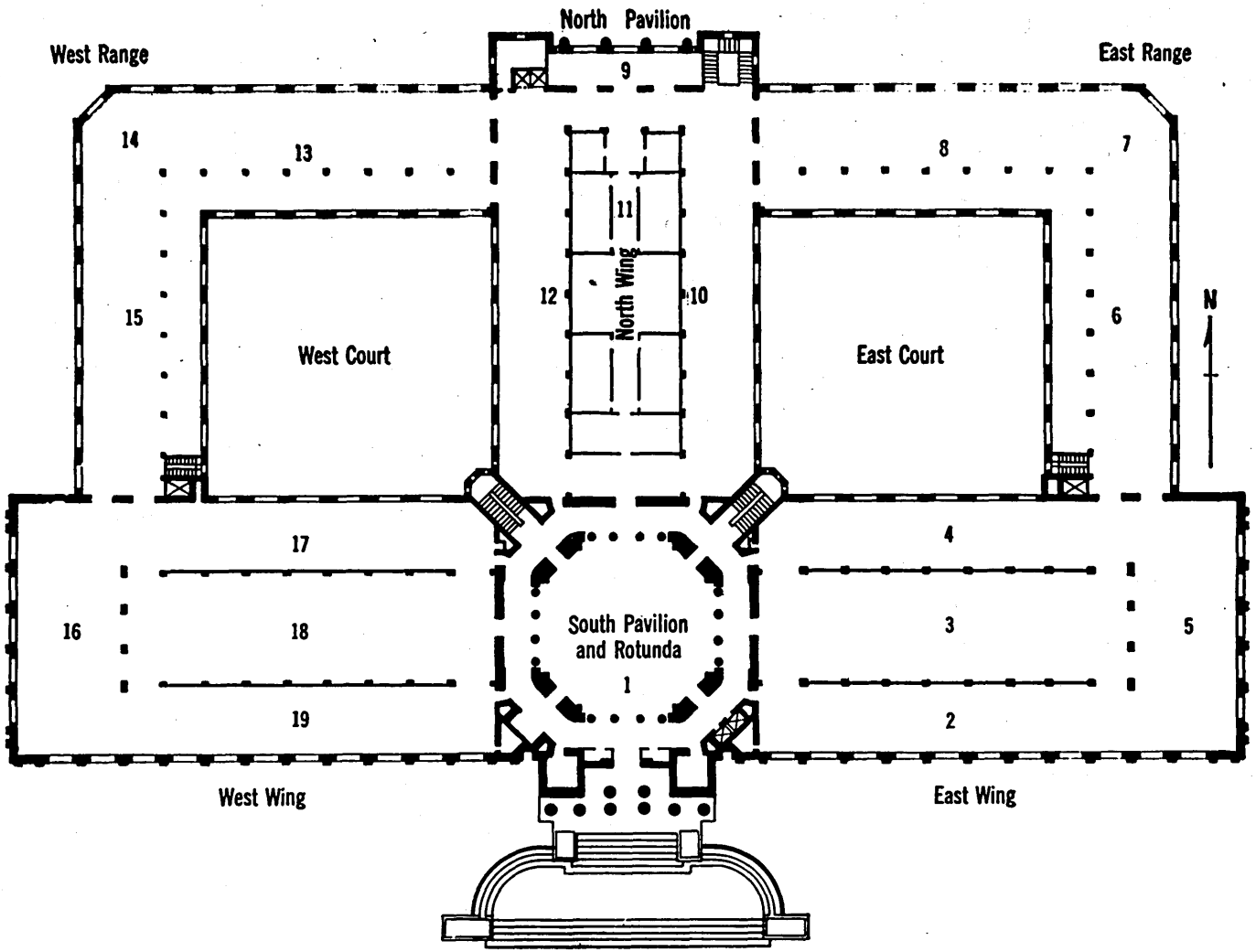


ILLUSTRATION: P-3: Natural History Building - Plan



FIRST FLOOR PLAN, NATIONAL HISTORY BUILDING

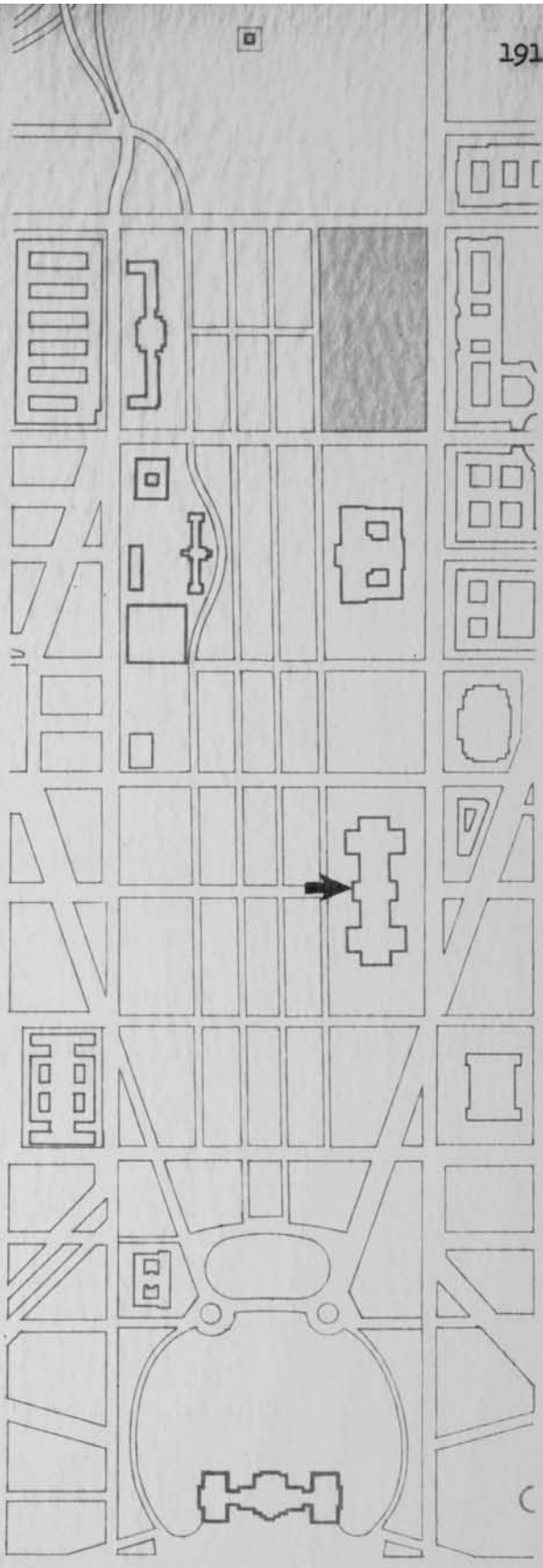
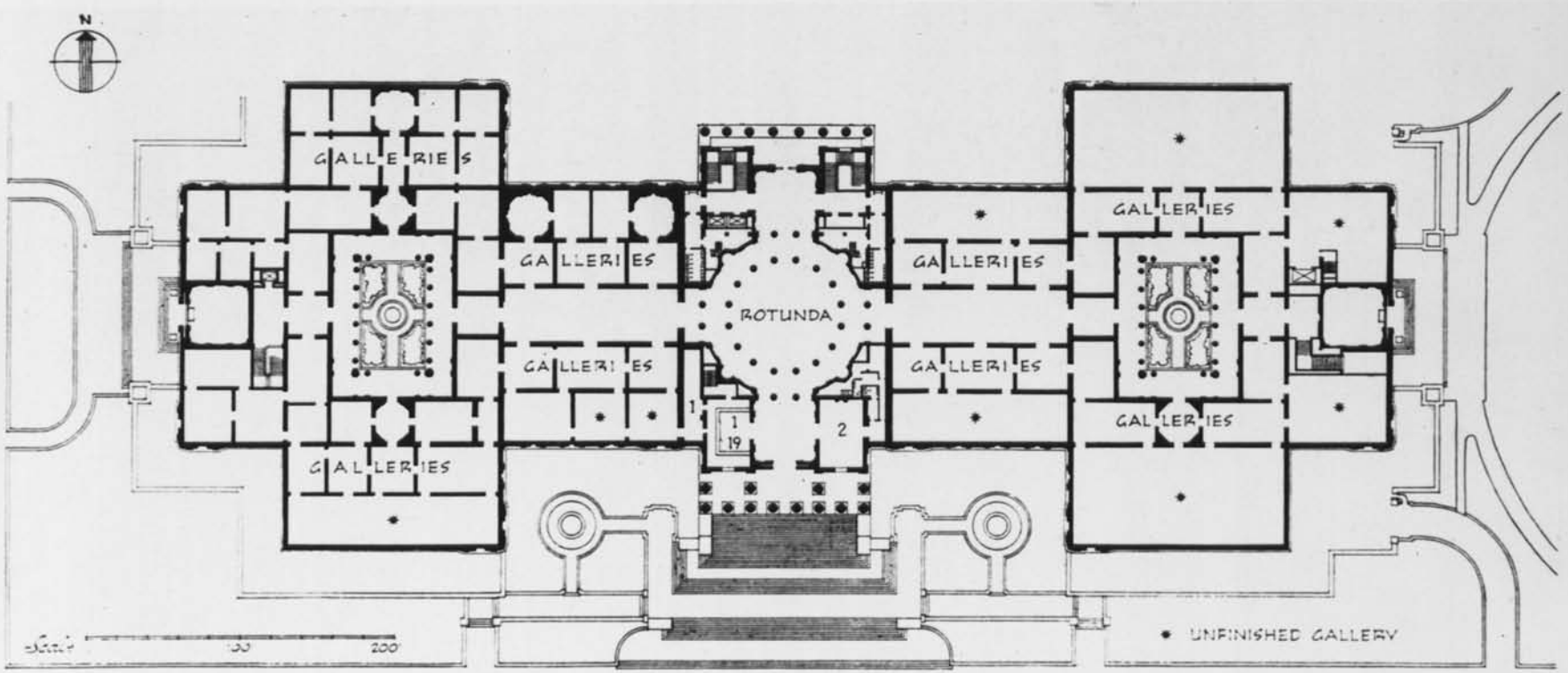


ILLUSTRATION: P-4: National Gallery of Art - Plan


N
GALLERIES
GALLERIES
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GALLERIES
ROTUNDA
GALLERIES
GALLERIES
GALLERIES
GALLERIES
1
1
19
2
100
200
UNFINISHED GALLERY

CHAPTER SEVEN: CHARACTER OF INTERIOR SPACES

SYNOPSIS

Comparison of Exhibition type structure of the Arts and Industries Building withethe typical Museum interior of the Natural History Building, a and with the palace-like interior of the National Gallery. Conclusions: Is the character of the material to be displayed such that it would justify the opulent detailling of the National Gallery? Demands of national pride and significance of the museum as a whole contrasted with the value of individual value of the articles to be displayed. Difference between art museum and Science Museum. Open, simple character to be sought in exhibition areas, more studied treatment in other features. An extended discussion of the above will be supplied to replace this sheet and pp. 196,198,200,202,209, 216,217.

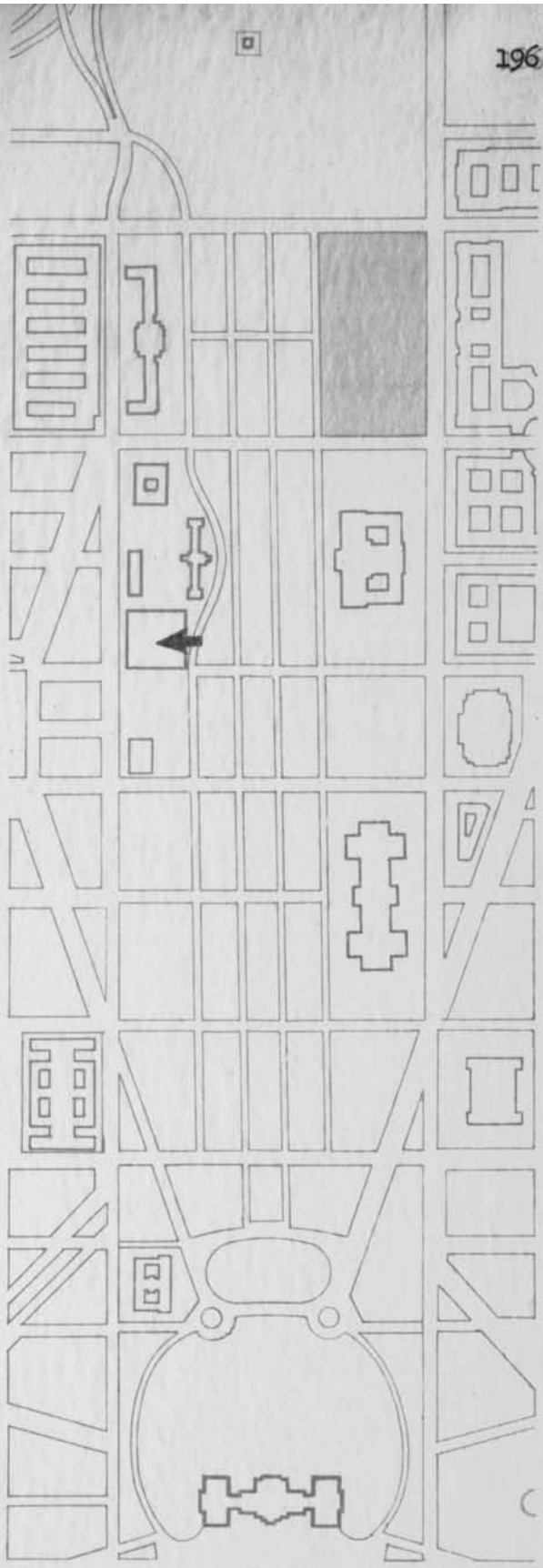


ILLUSTRATION: **I-1: Arts and Industries Building - Interior**

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

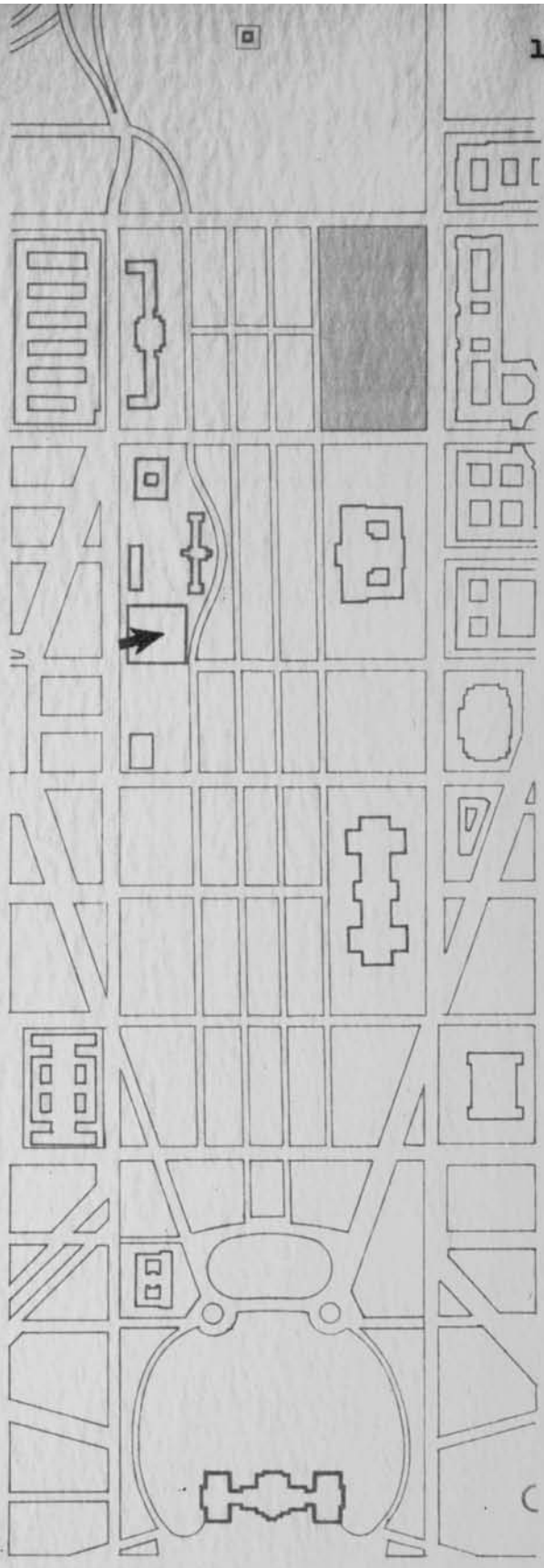


ILLUSTRATION: I-2: Arts and Industries Building - Interior

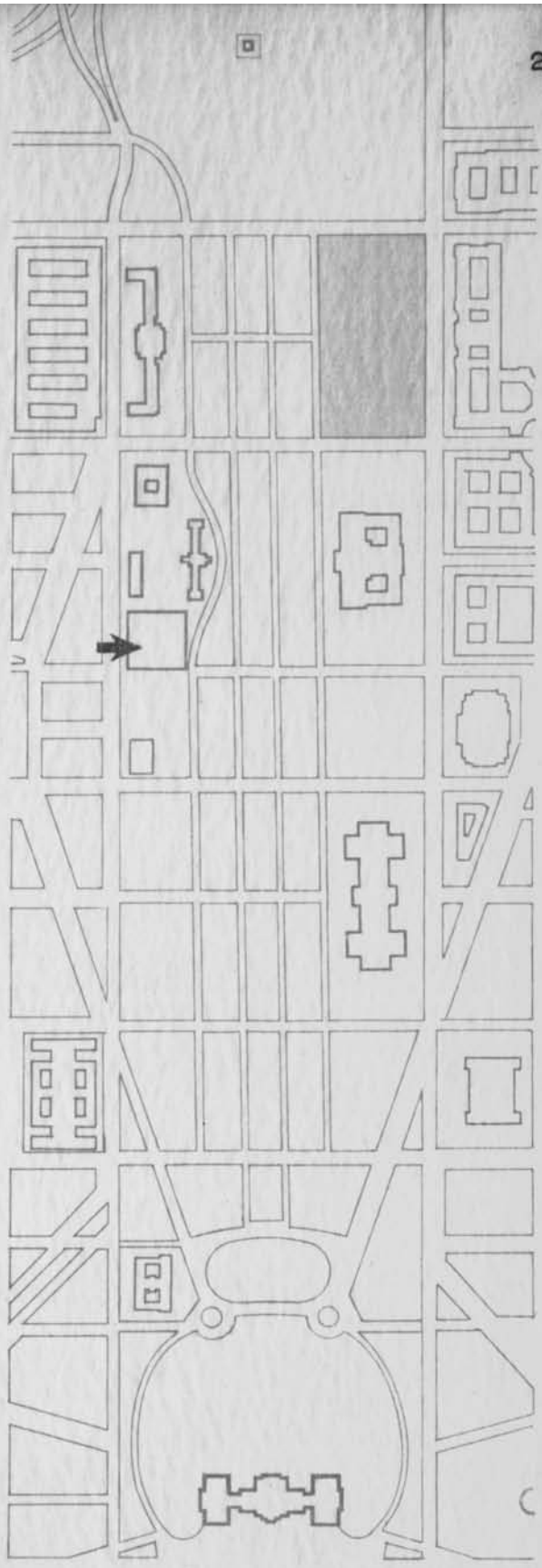


ILLUSTRATION: I-3: Arts and Industries Building - Interior

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

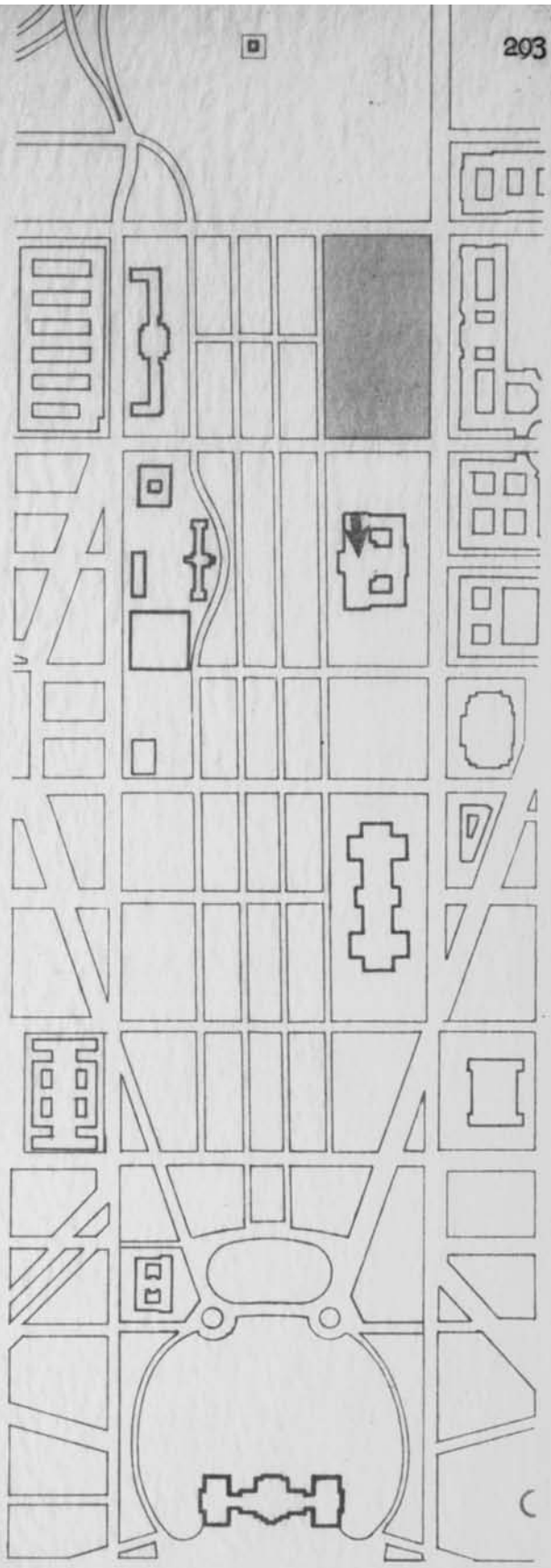
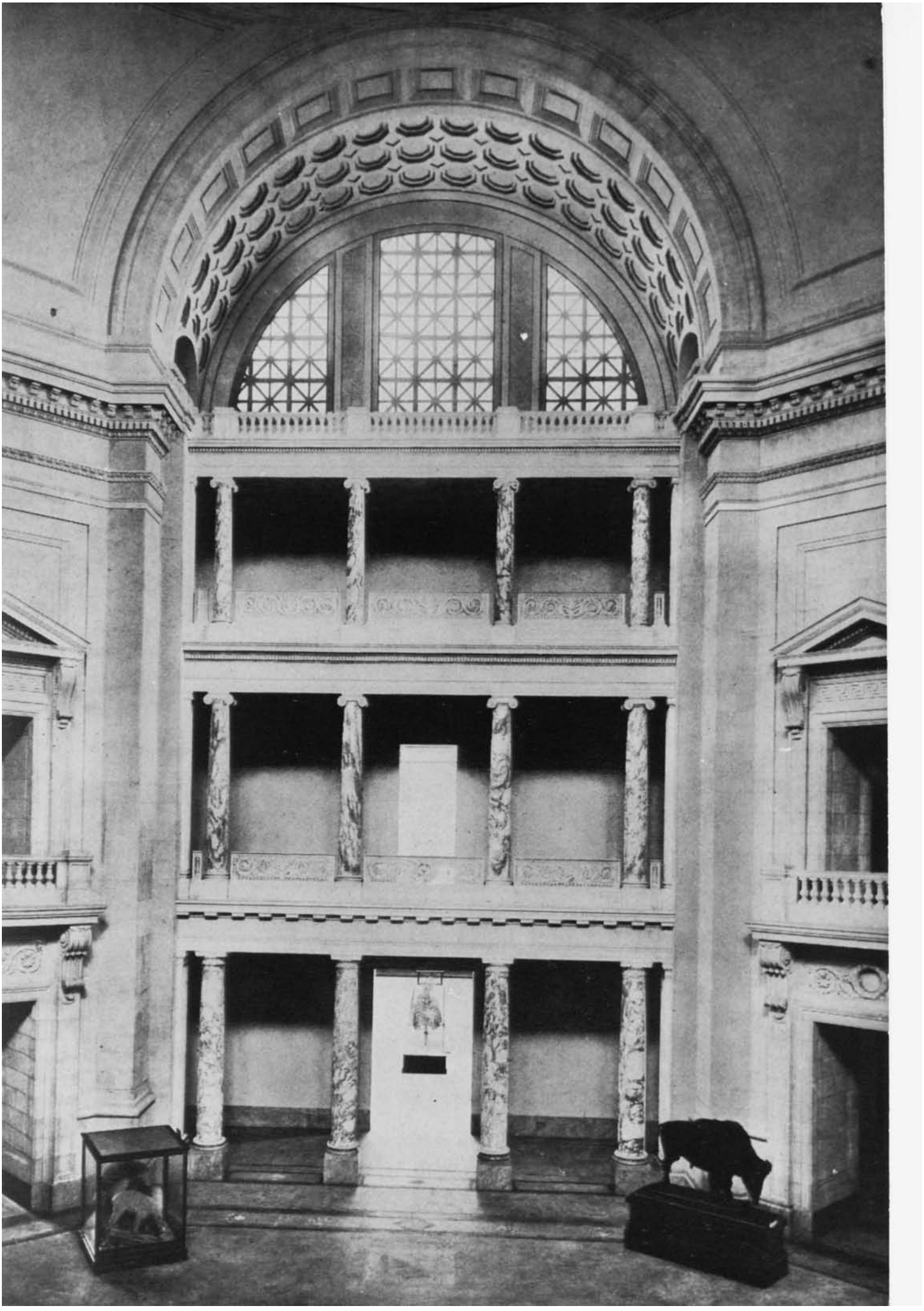


ILLUSTRATION: I-4: Natural History Building - Lobby



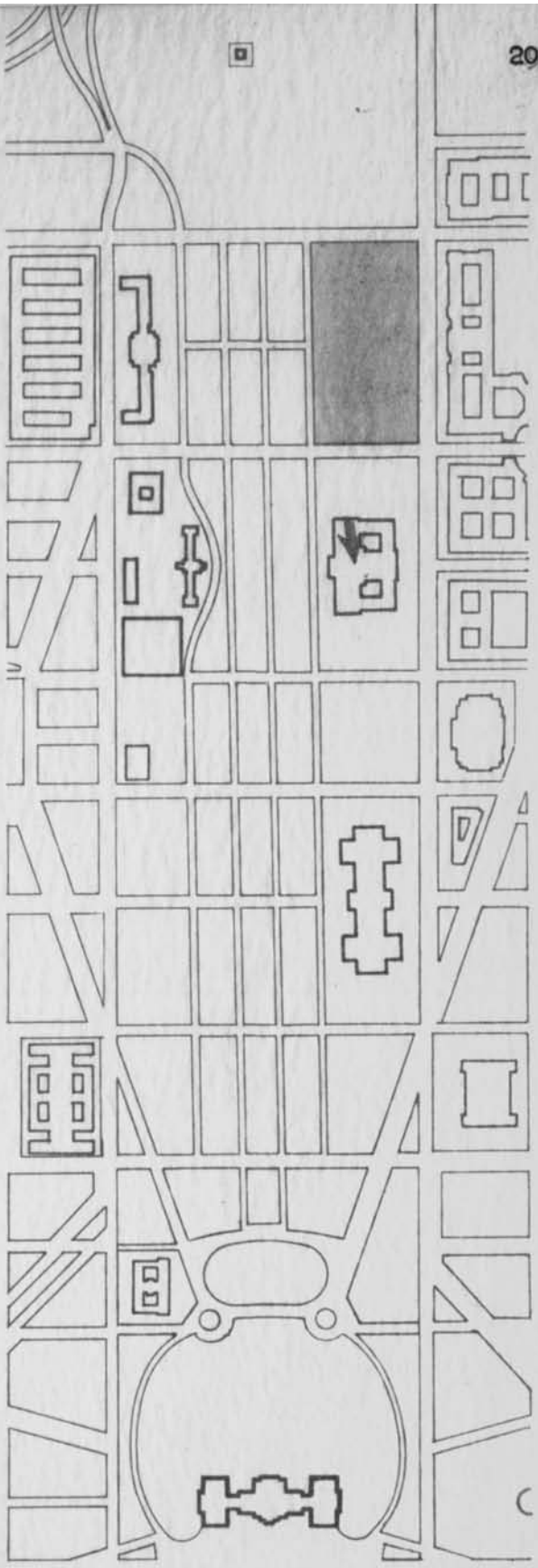
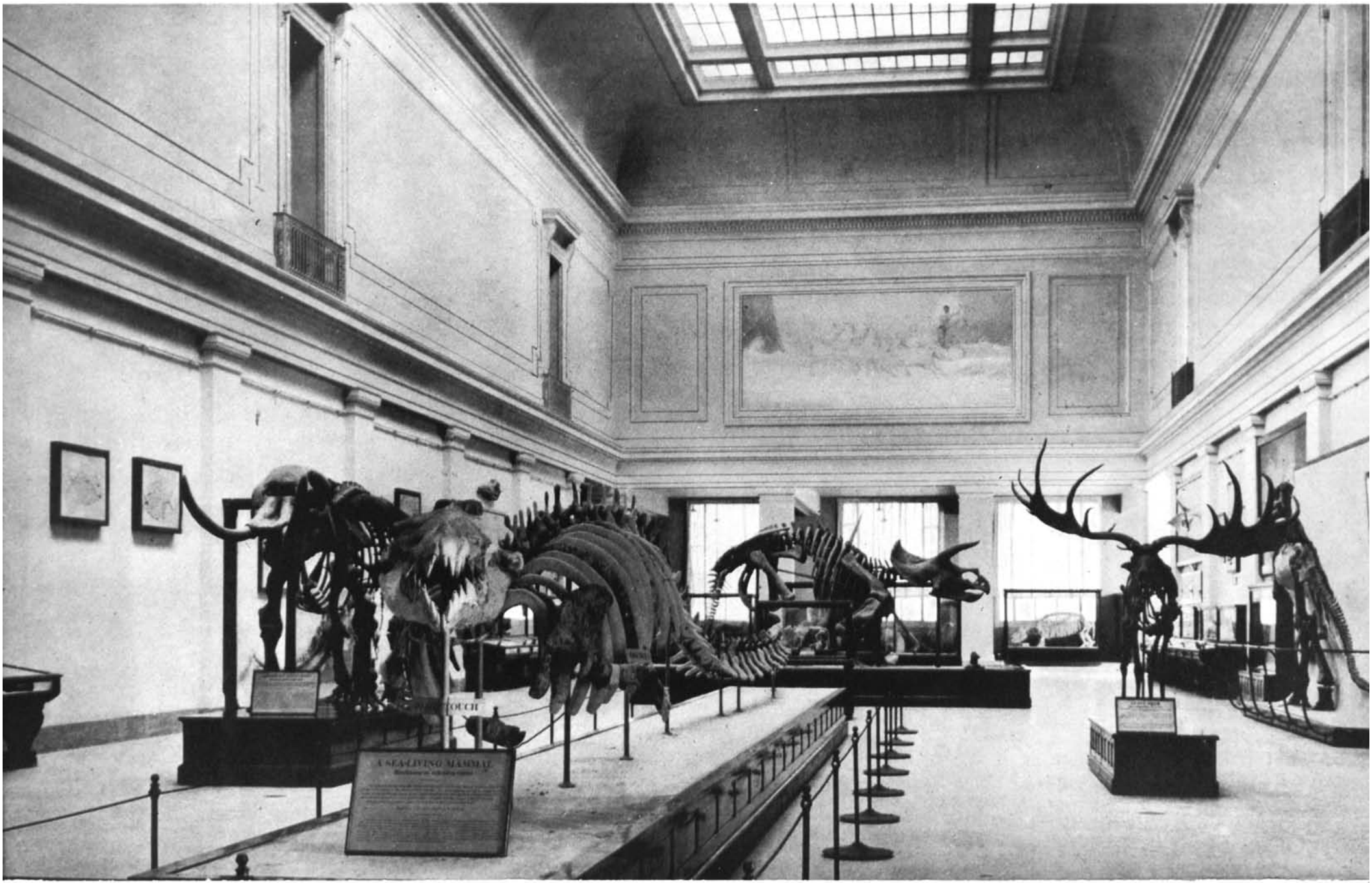


ILLUSTRATION: I-5: Natural History Building - A Main Hall


A SEA-LIVING MAMMAL

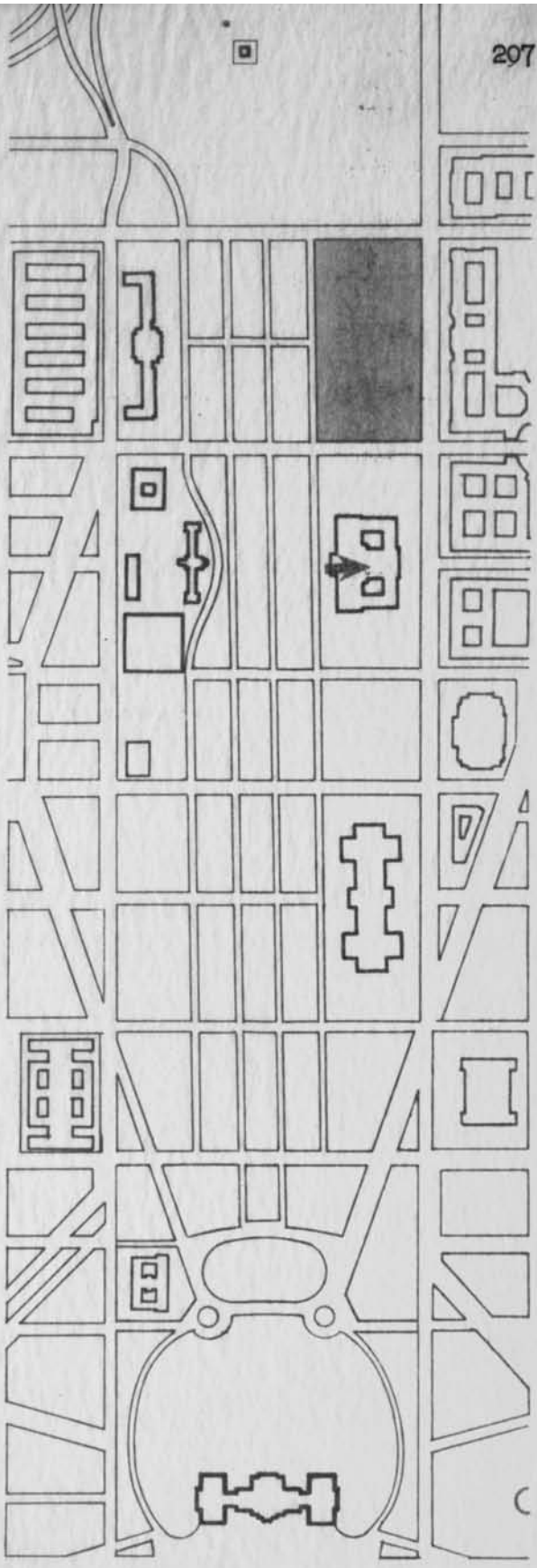


ILLUSTRATION: I-6: Natural History Building - Picture Gallery

A MUSEUM OF HISTORY AND TECHNOLOGY

FOR THE SMITHSONIAN INSTITUTION

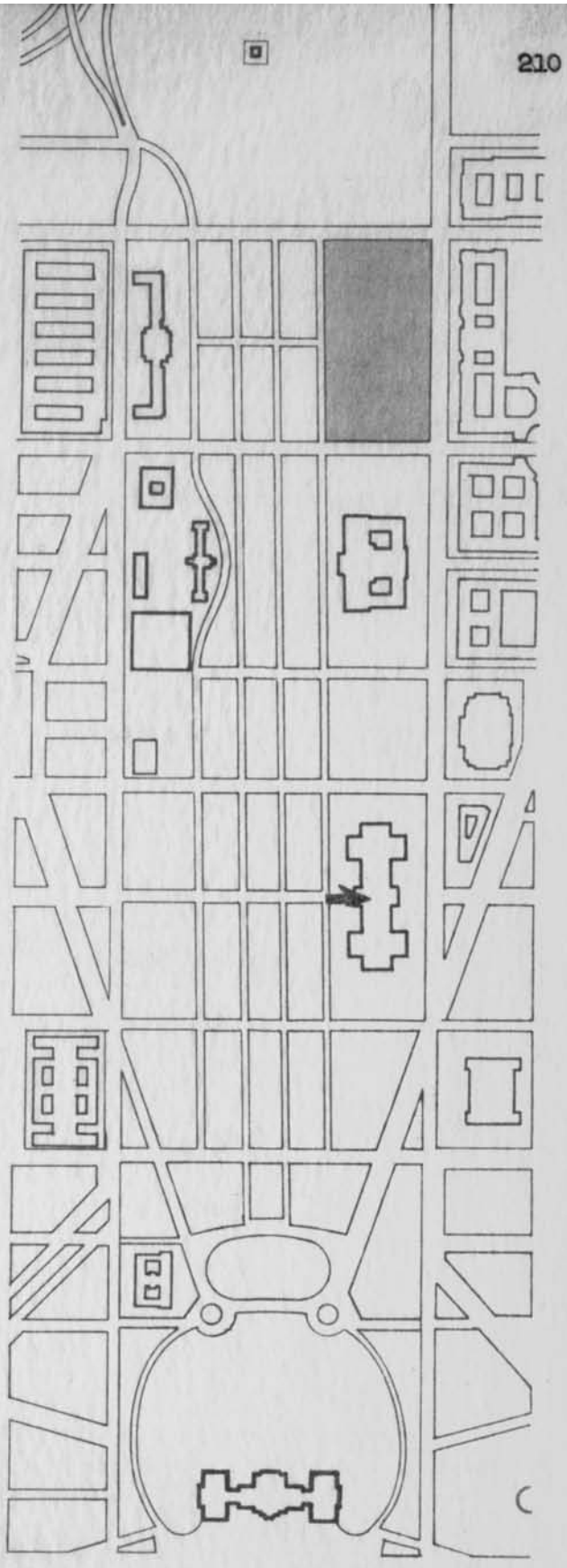


ILLUSTRATION: I-7: National Gallery of Art - Rotunda

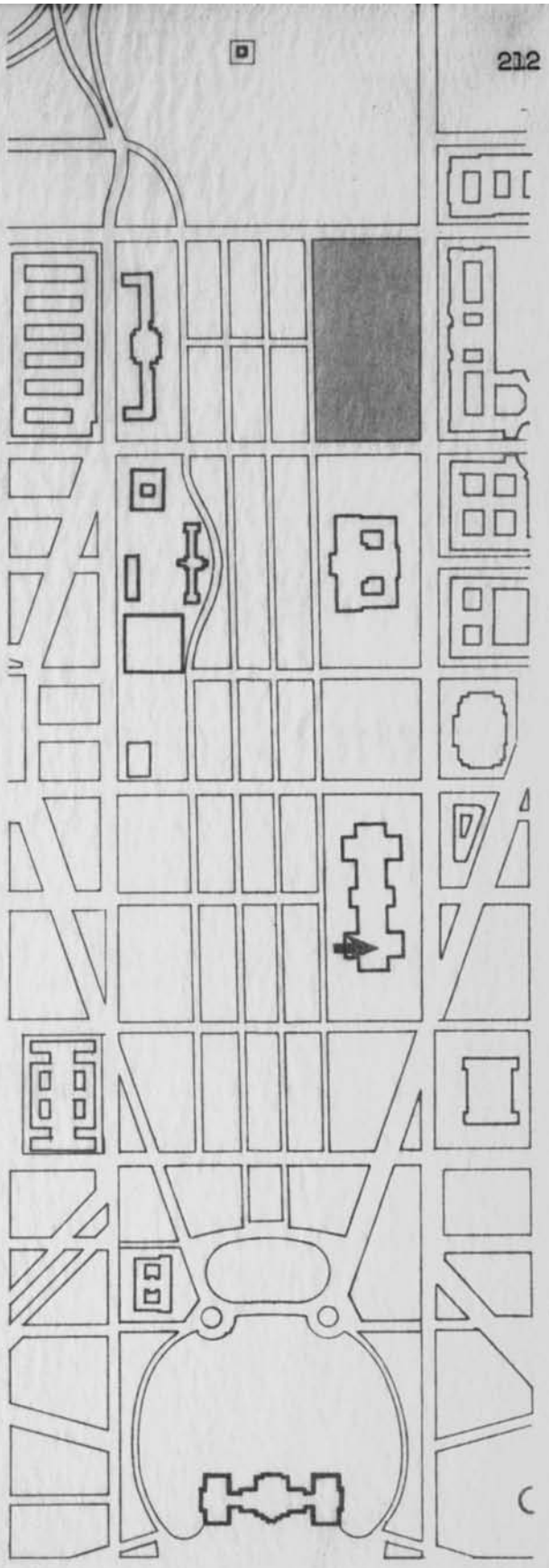


ILLUSTRATION: I-8: National Gallery of Art - Garden Court

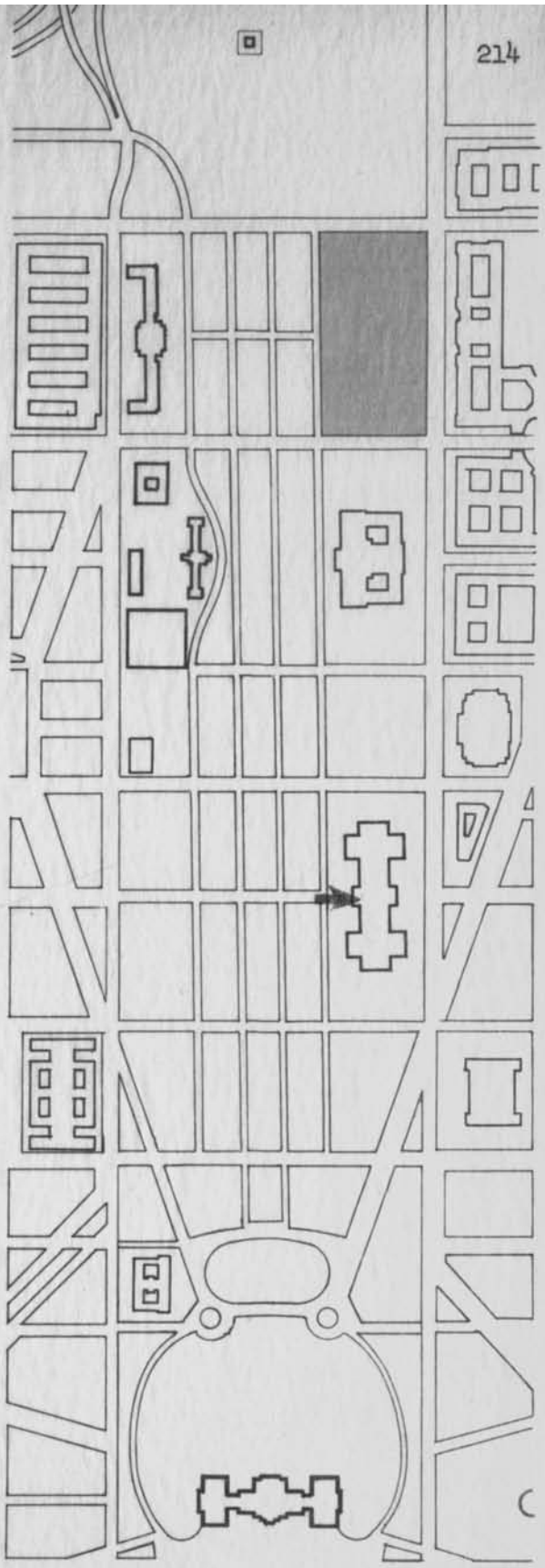
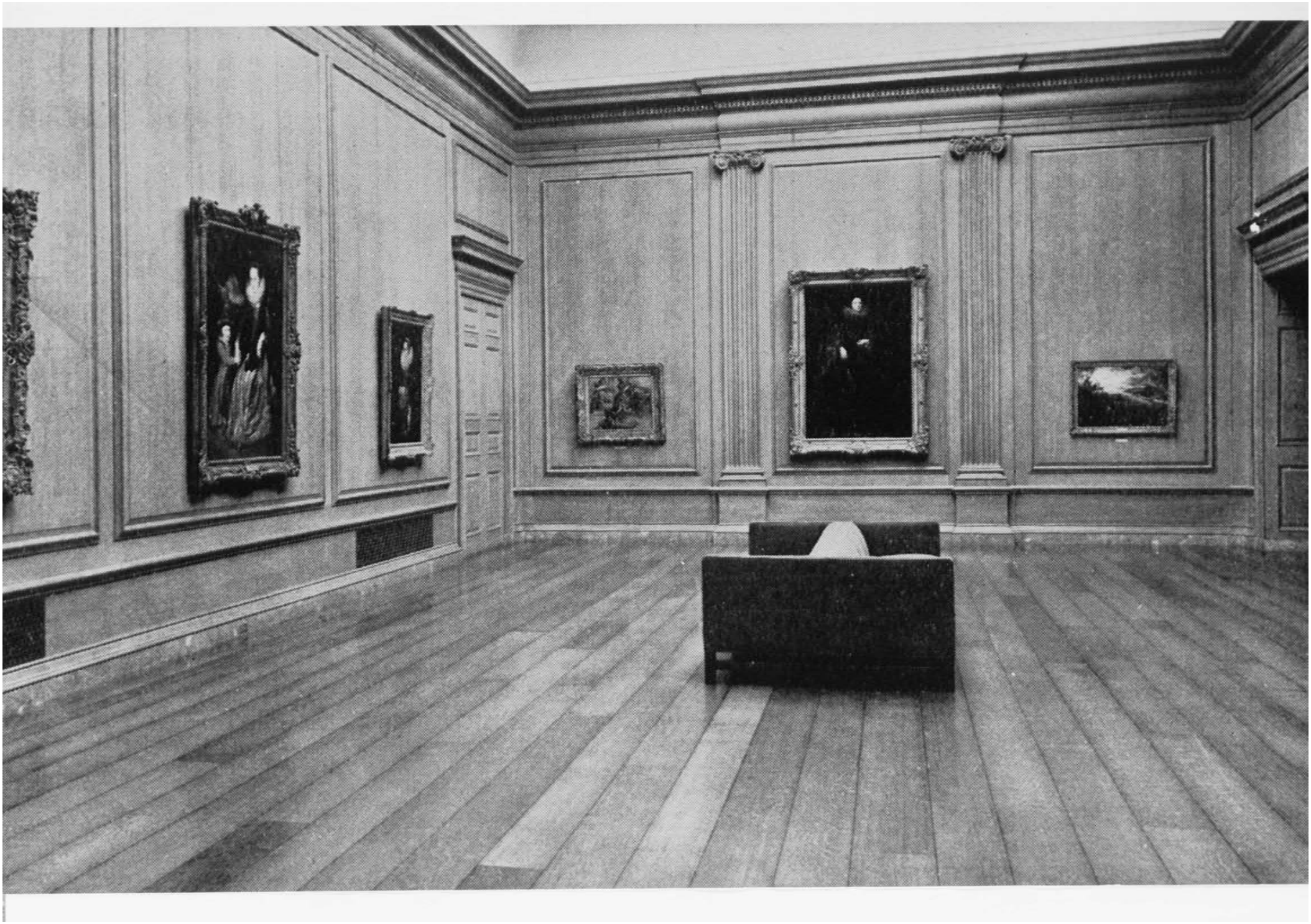


ILLUSTRATION: I-9: National Gallery of Art - One of the Galleries



A MUSEUM OF HISTORY AND TECHNOLOGY FOR THE SMITHSONIAN INSTITUTION

PART THREE: DESIGN

CHAPTER EIGHT: GENERAL QUALITIES DESIRED IN THE NEW BUILDING

SYNOPSIS

Problem of important public building. Particular problems involved in building for the Mall. Monumentality justified by purpose, but not the overgtatement found in some other buildings. Saarinen's Scheme for Smithsonian Gallery of Art. Very personal statement-sseries of design decisions rather than a basic order. Unsatisfactory quality of other entered designs. Qualities desired in the new Museum - monumentality but not through repetition of estaglished forms; texture and detailing in harmony with other buildings; recognition of it location in the overall composition of Mall; relation to Monument; need for stong pattern seen from above; creation of transitional spaces from exterior to interior; direct plan; good orientation of visitor; minimum division of interior space; no closed areas with exhibition units; simple detailling, principle expression through spaces.

To be extended to replace this and pp. 226,227,228

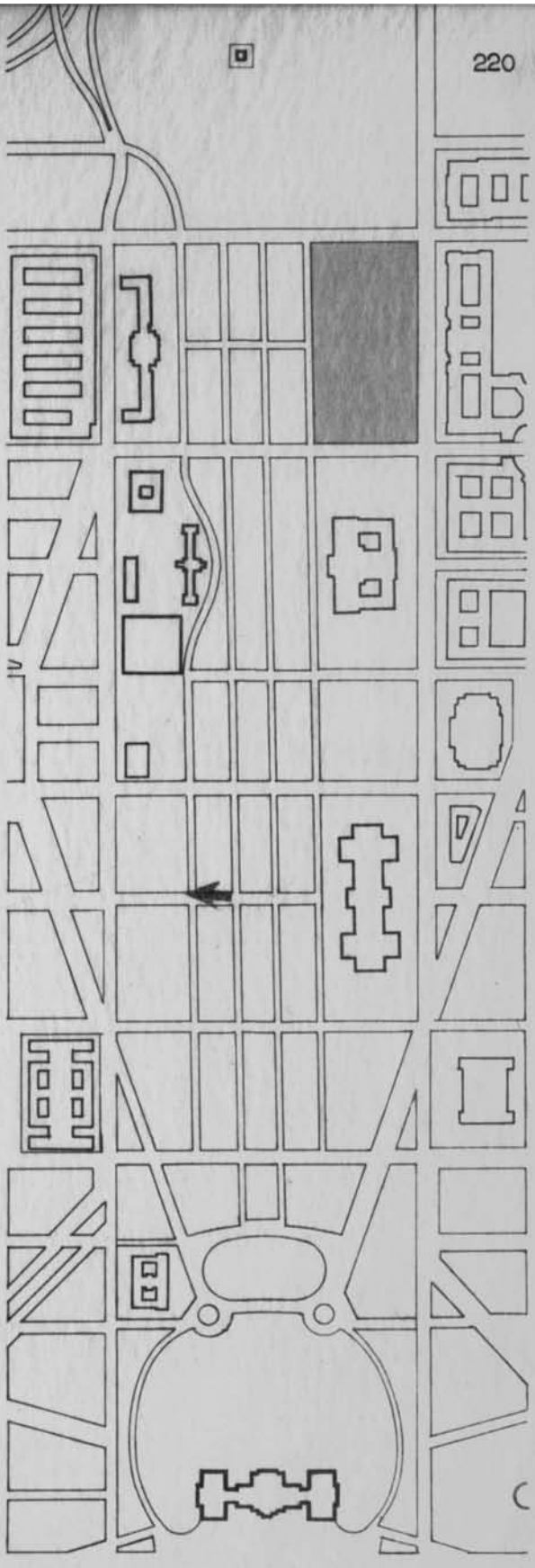
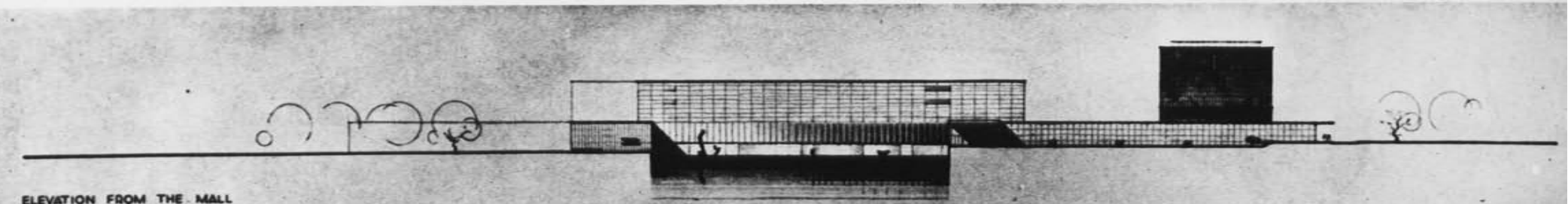
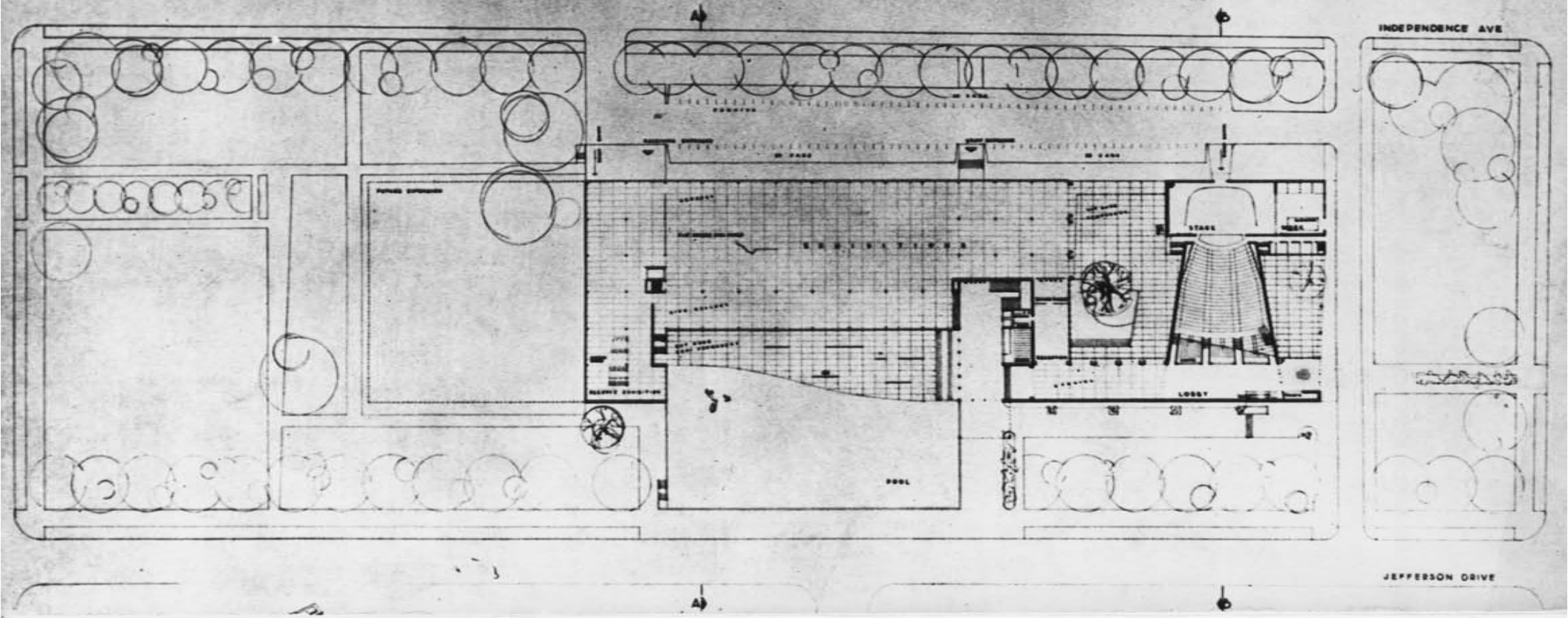


ILLUSTRATION: D-1 : Saarinen Scheme for Smithsonian Gallery of Art



ELEVATION FROM THE MALL



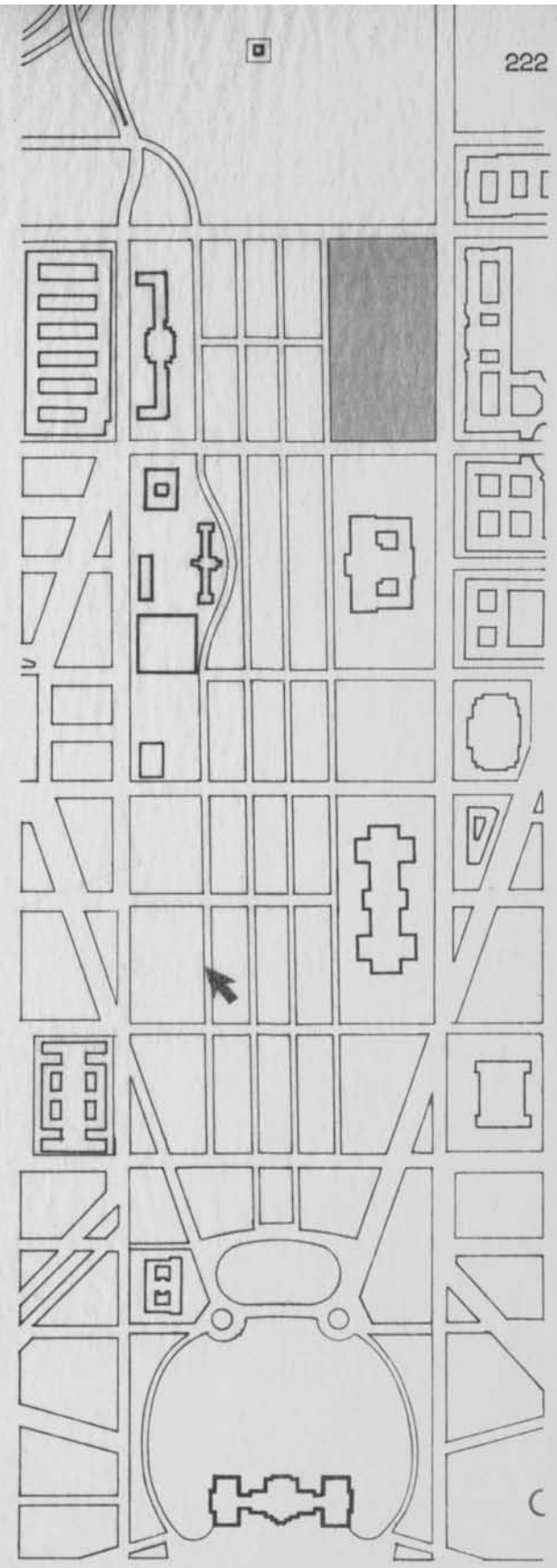
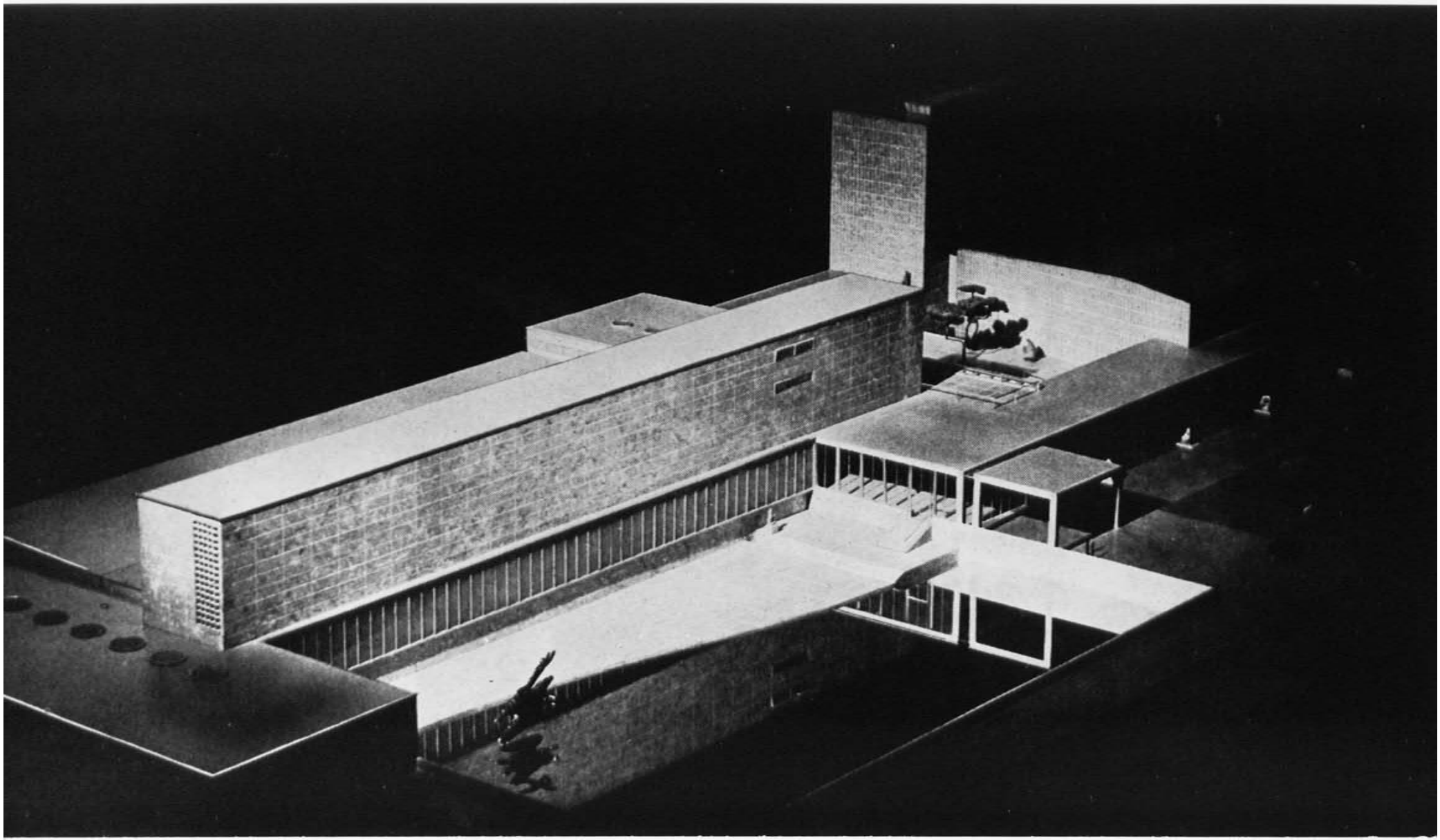


ILLUSTRATION: D-2: Saarinen Scheme - Photograph of Model



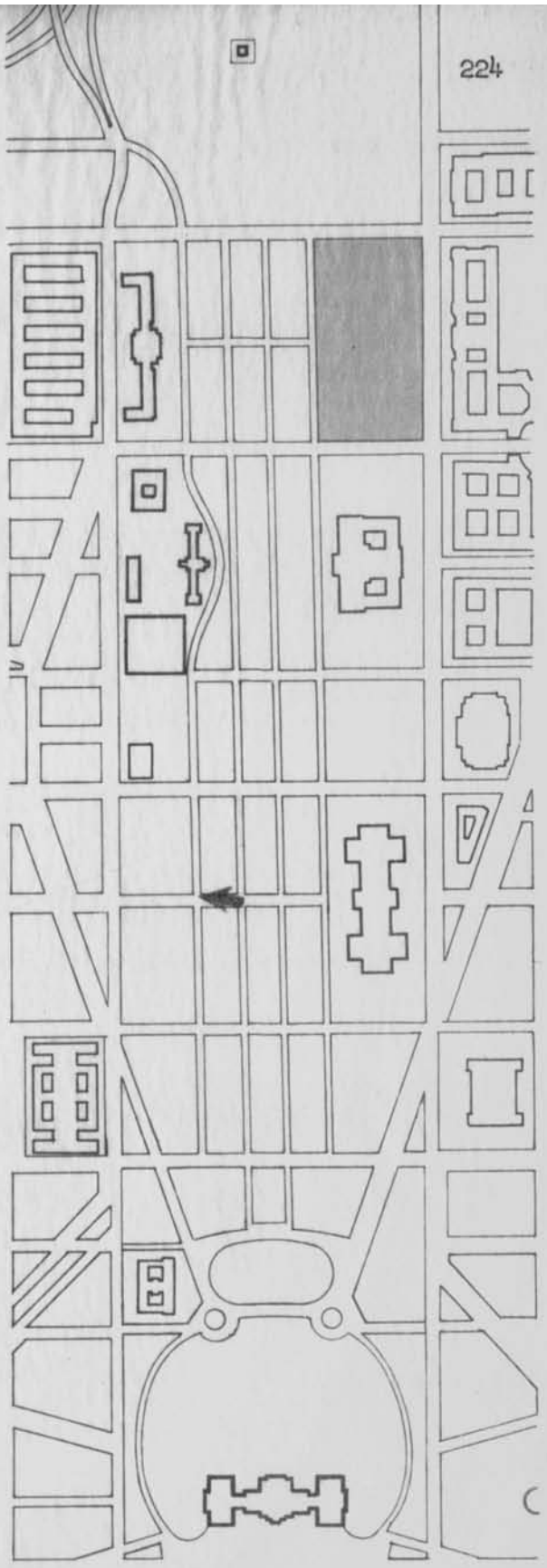
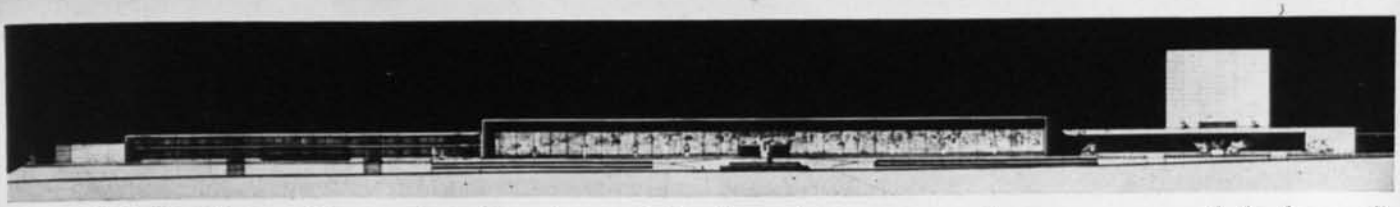
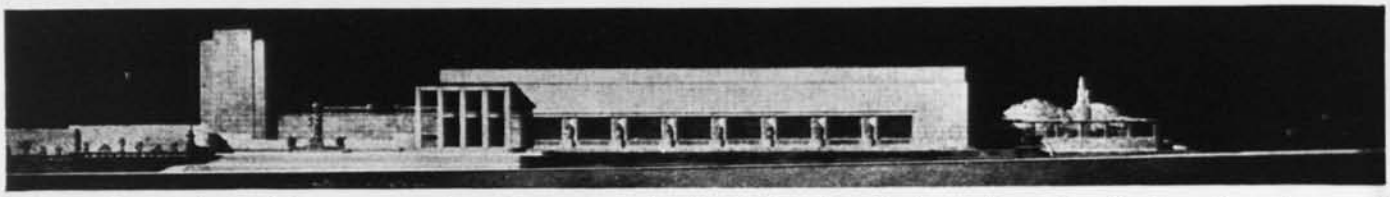


ILLUSTRATION: D-3: Third-Place Schemes - Smithsonian Gallery of Art

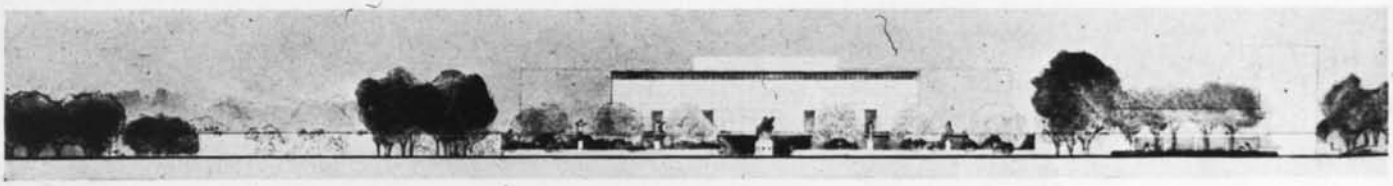


J. Mitchell, D. Ritchey. " . . . admirable scheme, but galleries too narrow, work areas unnecessarily broken up."

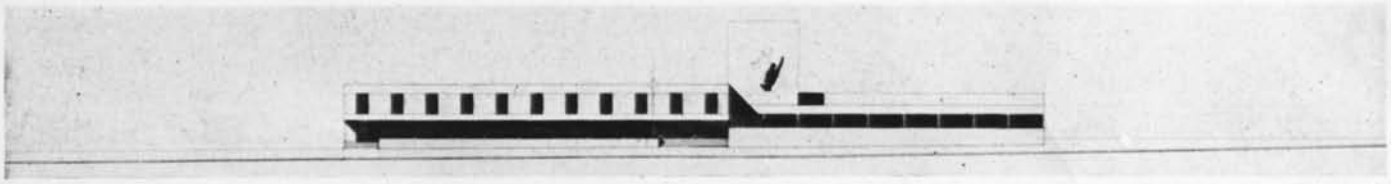
G. H. Perkins. " . . . well organized; faults are 2nd floor access to auditorium, excessive work-area lengths."



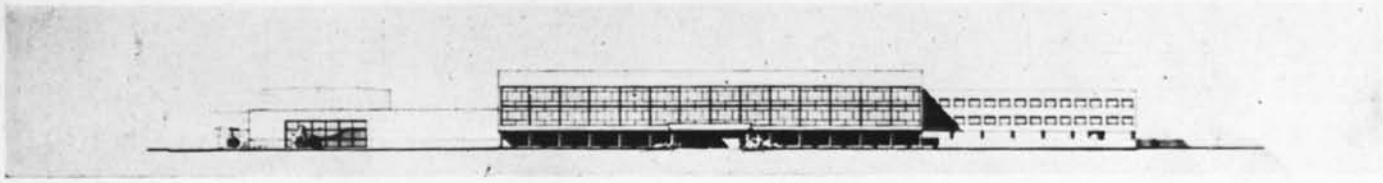
P. Cret. " . . . admired for presentation. Court impairs flexibility of galleries and . . . functioning of work areas."



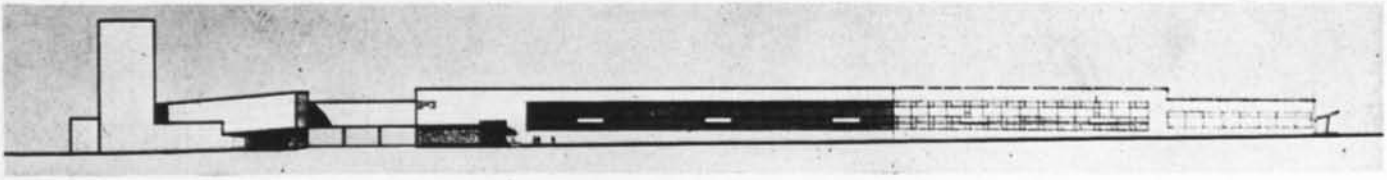
E. D. Stone. " . . . excellent grouping; introduction of overdeveloped circulation elements . . . impairs flexibility."



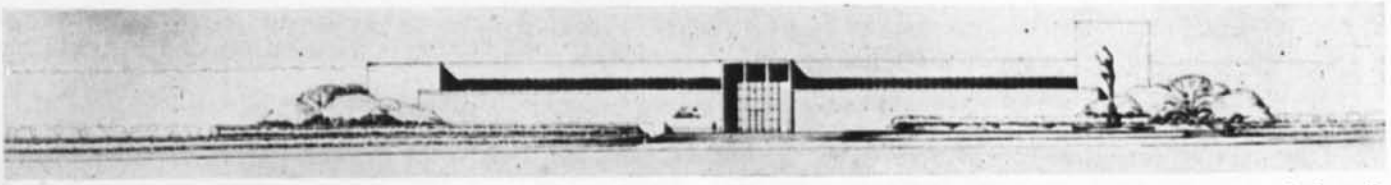
P. L. Goodwin. " . . . well organized; auditorium in center . . . results in . . . congestion in circulation."



Peter and Stubbins. "Unification of elements . . . considered excellent; . . . the two courts are . . . useless."



E. Noyes, R. Kennedy. " . . . compact plan; design unusually straightforward; . . . elevations unsatisfactory."



H. F. Manning, D. W. Carlson. " . . . well organized galleries; . . . complication of working areas a defect."

NOTE: LIBRARIAN

Remove this sheet and insert pp. 229-253, description of solution and photographs of thesis drawings etc. to be furnished after oral presentation.

A MUSEUM OF HISTORY AND TECHNOLOGY FOR THE SMITHSONIAN INSTITUTION

APPENDIX

Public Law 106 - 84th Congress
Chapter 201 - 1st Session
H. R. 6410

AN ACT

To authorize the construction of a building for a Museum of History and Technology for the Smithsonian Institution, including the preparation of plans and specifications, and all other work incidental thereto.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Regents of the Smithsonian Institution are hereby authorized and directed to have prepared drawings and specifications for, and to construct, a suitable building for a Museum of History and Technology (with requisite equipment, approaches, architectural landscape treatment of the grounds, and connections with public utilities and the Federal heating system) for the use of the Smithsonian Institution, to be located on that part of reservation 3 which is bounded by Twelfth Street Northwest on the east, Fourteenth Street Northwest on the west, Constitution Avenue on the north, and Madison Drive on the south, title to which is in the United States, at a cost not to exceed $36,000,000.

Smithsonian Institution.
Museum of History and Technology.
Construction authority.

SEC. 2. That the exact location of the building on the site shall be approved by the National Capital Planning Commission, and the design shall be approved by the Commission of Fine Arts.

Approval of site and design.

SEC. 3. That the preparation of said drawings and specifications, the design and erection of the building, and all work incidental thereto shall be under the supervision of the Administrator of the General Services Administration in accordance with provisions of the Public Buildings Act of May 25, 1926, as amended.

SEC. 4. That there is hereby established a Joint Congressional Committee on Construction of a Building for a Museum of History and Technology for the Smithsonian Institution. It shall be the duty of the Joint Committee to advise with the Board of Regents of the Smithsonian Institution during the planning and construction of such building. The Joint Committee shall be composed of ten members as follows: Five Senators appointed by the President of the Senate, three of whom shall be the Senate members of the Board of Regents of the Smithsonian Institution; five Representatives appointed by the Speaker of the House of Representatives, three of whom shall be the Representative members of the Board of Regents of the Smithsonian Institution. The Joint Committee shall from time to time, but at least once annually, submit to the Congress a report on the progress of the planning and construction of the building. Upon completion of the building, the Joint Committee shall submit a final report.

Joint Congressional Committee.
Reports to Congress.
69 Stat. 189.
69 Stat. 190.

SEC. 5. That there are hereby authorized to be appropriated to the Regents of the Smithsonian Institution such sums, not to exceed $36,000,000, as may be necessary to carry out the provisions of this Act: *Provided*, That appropriations for this purpose, except such part as may be necessary for the incidental expenses of the Regents of the Smithsonian Institution in connection with this project, shall be transferred to the General Services Administration for the performance of the work.

Appropriation.
Transfer to GSA.

Approved June 28, 1955.

CHECK LIST AND OUTLINE OF REQUIREMENTS FOR THE DESIGN OF THE MUSEUM OF HISTORY AND TECHNOLOGY

This paper is a statement of space and facilities requirements, plus a check list of elements large and small which appear desirable to have in this museum building. Innumerable details remain to be filled in.

Nothing in this is intended to suggest the design character of the building. Nothing in this other than the determined space, space location, facilities, and equipment, will be used as data for design. Such matters as the practicability of the tunnel, the location of building lines, allowable height, grades, etc., are for the architect to determine.

Table of Contents

Estimate of Visitors to
The Museum of History and Technology

Year		Visitors to Arts and Industries Building, Counted	Estimated Visitors to Mus. of H & T, on basis of 5,000,000 annually
1954:			
September		133,332	400,000
October		102,130	305,000
November		85,346	255,000
December		45,168	135,000
1955:			
January		50,459	155,000
February		58,848	175,000
March		109,107	330,000
April		251,946	750,000
May		237,199	715,000
June		206,963	620,000
July		191,975	575,000
August		195,036	585,000
	Total	1,667,509	5,000,000
Largest day's attendance:			
May 8, 1954		34,983	60,000
May 21, 1955		24,223	

Museum will be open 9:00 to 4:30 every day except Christmas.

In a building having 3 exhibition floors with entrances on the first and second floors it is estimated that the number of visitors circulating on the 1st, 2nd, and 3rd floors will be 2/3, 2/3, and 1/3 of the total, respectively.

3

Hypothetical Horizontal Building

Dimensions: 300 ft. x 775 ft. x 96 ft. high

Five floors, and basement. (Note: Basement is not included in PBS estimated building.)

Gross area each full floor.....230,600 s.f.

Net area each full floor (67% of gross)..... 154,000 s.f.

General Use of Building

Basement: Parking, receiving and shipping, heavy storage, special entrances.

First Floor at Constitution Avenue grade: Visitors' entrance, permanent and special exhibits of science, engineering and industry, auditorium, and cafeteria.

Second Floor at Madison Drive grade (approx.): Visitors' entrance, "Main Floor" exhibits of history by periods, Growth of America series, First Ladies, and decorative arts.

Third Floor: Permanent and changing exhibits of history and science.

Fourth Floor: For storage of part of the study collections, laboratories, shops, and service offices.

Fifth Floor: Curators' offices, studies, library, inquiries center, laboratories, and "show" study collections.

Note: This arrangement violates the rule that the museum's main exhibits should be on the ground floor. This may be unavoidable if the engineering collections require first floor location. It is helped somewhat by the Madison Drive entrance close to grade.

4

Discussion of Space Requirements

The attached tables of space requirements are based on the concept of the museum outlined in the brochure, "Museum of History and Technology." The exhibits in this plan consist of three principal blocks or types: the "Growth of America" series; the "Science and Technology in Industries" series; and the many galleries devoted to subject matter exhibits of collections of high museum interest such as the history of transportation, ceramics, textiles, the history of science, firearms, furniture, and costumes, among others.

The "Growth of America" series will outline the development of the United States in 10 units. Each unit will be based on a significant period in the Country's history. The character and contribution of each period will be illustrated with selected original objects of the period, such as machines, weapons, documents, costumes, models, vehicles, and personalia. These objects will be selected and exhibited for their value in graphically communicating the meaning of the period. This new museum device will be the central series of halls to which the casual first-time visitor will be directed first.

The "Science and Technology in Industry" series is a block of 10 units of modern industrial or business exhibits. The subjects of these occasionally will be important industries such as communications, iron and steel, petroleum, and chemical manufactures; or they will be current industrial features such as automation, atomic energy, and industrial design; or again they might exhibit the functions of crafts, trades, or professional occupations. Each of these exhibits would start with a large symbolic machine or model of the latest design and develop backward with devices illustrating the technological and scientific developments which are of outstanding importance to the industry. They will be centrally located and the total area devoted to them will be large enough to create an impression that the museum exhibits in technology are up to date and progressive. These exhibits will change with appropriate rapidity.

These two series will occupy a little less than one-fourth of the exhibition space planned. About three-fourths will be devoted to modern displays of the collections for which the Smithsonian Institution is famous; numismatics, military and naval collections, the gowns of the First Ladies, watercraft, medical history, engineering, science, those mentioned in the first paragraph above, and others. These also, where appropriate, will feature the modern with the historical development which produced it.

5

Exhibition Space Arrangement

The space requirements for exhibits necessitate two or three exhibition floors. The "Growth of America" series (50,000 s.f.) should be located centrally and serve as the introduction to the museum for first-time or one-time visitors. It would be appropriate, though not essential, that exhibits of the history collections (80,000 to 100,000 s.f.) be located near these. Most of these are of moderate sized objects which can be displayed under ceilings 12 to 14 feet high. However, the First Ladies Hall, objects such as the Book House, and possibly some items of military history, will require ceiling heights up to 23 feet. Therefore about 1/6th of the total space should have 23-foot ceiling height. A diagramatic sketch of halls with high ceilings in the center and storage mezzanines over the side areas is attached.

The technology exhibits will consist of two general groups, a series devoted to "Science and Technology in Industry Today" (50,000 s.f.) and exhibits of the collections related to the history of science and technology (150,000 to 190,000 s.f.). Most of these, too, will be accommodated in space with 12 to 14 foot ceilings. However, at least 1/5th of the space (both groups) should have 23-foot ceilings. Most of the technology items are also of moderate weight (machine tools, automobiles, and smaller). A few in number -- but bulky in size -- as locomotives, large engines, and turbines are very heavy. It appears that these very heavy objects should be exhibited on the ground floor, possibly in a large machinery hall. There is some reason to keep all of the technology exhibits in proximity to each other.

Another group of exhibits (40,000 to 75,000 s.f.) will be devoted to collections in the decorative arts, (ceramics, glass, silver, prints, photographs, textiles, and furniture). All of these will be accommodated in space with 14-foot ceilings or less. They all appropriately could be located near the historical collections, though many -- if not all -- have some technological interest.

The arrangement of these blocks of exhibition space to provide the sequences and the relationships suggested is a major problem in design.

Reference Collections Storage Space

The reference collection storage space is based on the fact that this museum will function as a museum of record and that its collections will continue to attract students who will make increasingly active use of them. These collections will be housed for greater accessibility than they have now and attractive facilities for showing them to collectors and inquirers, as well as students, will be provided.

The reference collection storage space recommended is large by comparison with existing space and collections. It is small in the opinion of experienced museum people and small by formulas which recommend staff and collections space equal to public space.

6

Laboratories and Shops

The shop and laboratory space is based on estimates of space required for preservation laboratories, such as textiles, (which would be used also for costumes, uniforms, and flags): metal and wood treatment laboratories; the photographic laboratory, moderately enlarged; the print shop; and exhibits preparation shops.

The space for miscellaneous activities such as auditorium, cafeterias, sales and check spaces, orientation rooms, and others, will be developed with the advice of the architect.

7

MUSEUM OF HISTORY AND TECHNOLOGY

Net Space Requirements

Exhibition Space, including reserve	450,000 s.f.
Reference Collections Storage Space	150,000 s.f.
Offices, Office Collections and Library	70,000 s.f.
Shops and Laboratories	35,000 s.f.
Auditorium, Lecture Rooms, Sales, etc.	65,000 s.f.
Total	770,000 s.f.

Additional Space Requirements include large circulatory spaces on two exhibition floors and inside parking for 350 employees' cars.

Ceiling Heights, Floor to Beams

Exhibition Space[1]	375,000 s.f.	14 ft.
Minimum of	75,000 s.f.	13 to 23.5 ft. [2]
Reference Storage Space	100,000 s.f.	13 ft.
	50,000 s.f.	12 ft. (see office space)
Shops and Laboratories		13 ft.
Offices, Library and Laboratories		12 ft. (or advice of architect)

(1) The heights of the hung ceilings suspended below the beams in individual exhibition areas will be specified as determined by the plans for exhibits.

(2) These areas may have storage mezzanines at sides and ends with high ceilings in center.

8

Exhibition Space

Ground Floor (1st)	Area Sq. ft.
*Science and Technology in Industry, 10 units	50,000
*Hall of Physics and Metrology	7,500
Hall of Chemistry	7,500
Hall of Electricity	10,000
Hall of Tools	5,000
Hall of Light Machinery	5,000
*Hall of Power Machinery	10,000
Hall of Automobiles and Coaches	15,000
*Hall of Railroad Equipment	10,000
*Hall of Agriculture and Food Technology	10,000
*Hall of Forestry and Woods	10,000
Special Exhibits	10,000
	150,000

Main Floor (2nd)	
*Growth of America by Periods, 10 units	50,000
First Ladies Hall	10,000
Hall of Presidents	5,000
Hall of Famous Americans	5,000
*History of Defense	30,000
*Hall of Colonial Furnishings and Folk Lore	5,000
*Hall of 19th Century Furnishings and Folk Lore	5,000
Hall of Costumes and Accessories	5,000
Hall of Ceramics	10,000
Hall of Glass	5,000
Reserve, 4 units	20,000
	150,000

Third Floor	
Hall of Heating and Lighting	5,000
Hall of Watercraft	10,000
Hall of Textiles	5,000
Hall of Textile Machines	10,000
Hall of Graphic Arts	10,000
Hall of Photography	10,000
Hall of Health	5,000
Hall of Medical History	5,000
Hall of Pharmaceutical and Dental History	5,000
Halls of Philately and Postal History	10,000
Hall of Numismatics	10,000
Hall of Musical Instruments	5,000
Special Exhibits	20,000
Reserve	40,000
	150,000

* Part or all requires high ceiling

Specifications for exhibition space, later.

9

Reference Collections Storage Space

Fourth Floor

Storage of heavy mechanical collections with associated work rooms and study spaces. Schematic detail, later.

	Area Sq. ft.
Physics and Chemistry	5,000
Mech. and Civil Engineering	10,000
Transportation	10,000
Electricity	10,000
Agriculture and Forestry	10,000
Medical Science	5,000
Military and Naval History	20,000
Civil History and Costumes	15,000
Reserve	15,000
	100,000

Fifth Floor

Storage of reference collections of finer quality and most active collector and inquirer interest.

Numismatics	5,000
Philately	5,000
Textiles	10,000
Furnishings, Silver and Folklore	10,000
Ceramics and Glass	5,000
Prints, Graphic Arts and Photography	10,000
Musical Instruments	5,000
	50,000

Specifications for reference storage space, later.

10

Office and Personnel Space
Shops and Laboratories

Fourth Floor

Photographic laboratory, including Office, files, stages, etc.	6,000 s.f.
Television and motion picture, including Offices, files, dressing rooms, etc.	6,000 s.f.
Print shop, including office, linotype, photosetter, presses, multilith, etc.	2,000 s.f.
Exhibits laboratory, including offices, design rooms, mock-up stages, spray booth, silk screen, light mechanical shops, storage	20,000 s.f.
Preservation laboratories (7), total	5,000 s.f.
Lunch room (carried lunches) for lab. pers.	800 s.f.
Locker room for laboratory personnel	600 s.f.
Showers, lavatory for laboratory personnel	800 s.f.
Class rooms near reference collections (2)	1,500 s.f.
	42,700 s.f.

Guard Office (Central reporting)	
Lieutenant	200 s.f.
Squad room	600 s.f.
Locker room	500 s.f.
Pantry, vented	150 s.f.
Showers, Lavatory	600 s.f.
	2,050 s.f.

Labor Force	
Foreman	200 s.f.
Locker room	500 s.f.
Pantry, vented	150 s.f.
Showers, Lavatory	500 s.f.
Storage of supplies	200 s.f.
Equipment room	1,000 s.f.
	2,550 s.f.

11

Fourth Floor (cont.)

Char Force	
Forewoman	150 s.f.
Locker room	500 s.f.
Pantry, vented	150 s.f.
Showers, Lavatory	500 s.f.
Supplies	200 s.f.
Equipment room	300 s.f.
	1,800 s.f.
Telephone Room (S.I. Central), consult Telephone Company for size and location, estimated	600 s.f.
TOTAL	49,700 s.f.

Additional specifications for laboratories will be developed in consultation with the chiefs of laboratories and by architect's research.

12

Office Space

Fifth Floor

Director's Offices	4,500 s.f.
Administrator	1,000 s.f.
Director of Research (Historian)	1,000 s.f.
Director of Public Services (Education)	1,000 s.f.
Director of Exhibits	1,000 s.f.
Asst. Superintendent	700 s.f.
Staff division offices (curators, etc.) 20 suites at 1,800 s.f.	36,000 s.f.
Inquiries office (close to elevator from lobby)	500 s.f.
Visiting researchers, 5 at 150 s.f.	750 s.f.
Staff lounges, 2 at 600 s.f.	1,200 s.f.
Library	5,000 s.f.
	52,650 s.f.
Public Services Area: Pending future decisions about the public services program, the central inquiries section and the organization of the library; provide an office area located near elevators from the lobbies and central to the museum divisional offices (details later), Total	6,500 s.f.
TOTAL	59,150 s.f.

Office and Personnel Space (cont.)

Basement

Offices and work rooms of International Exchange Service located (with advice of architect) probably adjacent to shipping platform in basement. (See below.)

Shipping Office adjacent to shipping platform. (See below.)

13

Details of Requirements by Floors

Basement

Note: The following requirements include a public visitors' entrance and public parking for visitors' private automobiles in the basement. These two items should be considered as desirable only if, after study, the matter of public parking proves to be practicable to control and, more importantly, if enough space can be developed in the basement for public parking to make it worth the effort. If not, the public parking, the public entrance and lobby, and the escalators to the basement will be eliminated.

Some of the required facilities in the basement are:

A public entrance to the building for visitors arriving by private automobiles, taxicabs and busses; parking for employees' automobiles; parking for visitors' automobiles; parking (in the winter only) for chartered busses; International Exchange Service operations; central shipping and receiving facilities for all Smithsonian Institution; a separate entrance for alternate special uses (see below); shops and storage.

Data and recommendations for the design of these:

Visitors' Entrance and Lobby. Provide separate driveways, in and out, for vehicles unloading passengers; a passenger unloading platform large enough for at least four vehicles at a time, passengers to reach entrance without crossing drives; stand for 4-6 taxicabs. This entrance must be conspicuously identified so visitor will be able to return to it on leaving. Provide one or two quiet, safe, areas where bus driver or tour escort can assemble 40-60 persons standing around him for instructions. Provide an orientation lounge (about 900 s.f.) with chairs and settees where visitors can rest and see graphic directions for visiting the museum, rest rooms off of this. This should be located for receiving over-flow crowds waiting for the building to open. This and a large check room for garments and parcels require locations between guard post and door (Security). Lobby will have information desk, publications and reproductions salesroom or island, writing desks, mailbox, drinking fountains, space for wheel chairs, directory and directing devices, guard post, public telephones. (Note that some of these services which are duplicated in other lobbies might be closed in slow seasons.) Escalators, to three exhibition floors, elevators and stairs to all floors. Escalators may be arranged to shut down units for slow season operation at less than capacity. The part of the total number of visitors expected to use this entrance is estimated to be 1/5th in busy months, 1/3rd in slow months. Directing devices will urge first-time visitors to go first to starting point on main exhibition floor.

Parking for Employees' cars:

Most will arrive before building is opened to public and leave after building is closed. Estimated number of employees -- 350. Include parking space for 4 SI trucks.

Basement (cont.)

Parking for Visitors' cars:

It is recommended to use all space available for visitors' parking after all other requirements are met. (Suggestions have been made for developing area under the mall south of Madison Drive, at both basement and Constitution Avenue levels of the building.) Provide separate driveways for visitor parking. Visitor parking will be unattended. The entrance will be controlled by a guard or a light. An automatic "Lot Full" signal would be desirable. Design space so visitors enter building without walking across driveways. Provide suitable devices to assist visitor to find his automobile when he returns.

Parking for chartered busses:

It space is available it is desirable to provide for parking of busses bringing classes from nearby schools for schedules conducted visits to the museum. This might be planned for winter months only. Up to 8 busses at one time.

Separate Special Entrance:

A special entrance is desirable for school classes brought to the museum by appointment. It is also desirable to have a separate entrance for receiving visiting dignitaries including the President. A handicapped visitors' entrance and an unobstructed ambulance entrance are also useful. It is suggested that one entrance might be designed for all such uses. The Secret Service could advise on requirements for the safety of the President. A small, attractive reception hall directly connected by special elevator to similar halls on the exhibition floors and to a lounge with rest rooms adjacent to the auditorium stage would be useful. Locate near this entrance two classrooms equipped with projectors, each to seat 50, built to open into one large room. A first aid room should be provided at this entrance.

International Exchange Service:

This bureau receives publications from Government Printing Office, Departments, private institutions, and foreign offices of the Exchange. Unpacks and packs parcels and shipping boxes. Parcels and boxes move in and out by express, mail, and freight trucks. Empty packing boxes are delivered by truck (high) and stored. Large storage area for filled boxes is required. Design for greatest facility in handling shipments and for moving trucks in and out. Requires total of 10,000 s.f. for business office, sorting and packing rooms, box storage and temporary storage of shipments, all in one unit, adjacent to shipping platform. Consult the Chief, IES, for detailed requirements for platform scales, hoists, etc. Investigate necessity to locate the offices and packing rooms near shipping platform.

Basement (cont.)

Central Shipping Facility:

Shipping platform will accommodate all Smithsonian shipping including the International Exchange Service (above), Natural History Museum, mail, library, GPO, express, and supplies. Comes in vehicles of all sizes up to largest trailer vans. Occasionally a large heavy machine will be unloaded assembled from a low bed trailer. Recommended size of platform 30' x 50'. One section of platform will have adjustable height. Shipping clerk's office, packing room with counters and scales, temporary shipment storage room, and a separate and secure mail room require a total of 3,000 s.f. adjacent to the loading platform. Provide a platform scale flush with loading platform. See Registrar for details.

Supplies storage adjacent to platform requires 1,500 s.f. See Supply Officer for details.

Fumigation room near platform, requires special venting. 800 s.f.

Temporary storage for incoming collections provide 1,500 s.f. near shipping office.

Provide separate driveway for receiving and shipping with ample doorways and turning space for largest vans. Motor operated doors under control of guard.

Shops:

Provide 1,600 s.f. for heavy shops not practicable to place on the 4th floor. For shop storage and miscellaneous equipment provide 2,500 s.f.

Storage vault bomb-proof and water-tight for quick "evacuation" of selected objects. 3,600 s.f.

Freight Elevators:

One large freight elevator serving all floors should be located as near as practicable to loading platform. 20-ton capacity, 15' x 25' platform.

Two others located to provide the least movement of heavy objects over upper floors. Provide convenient access at basement level with loading platforms for high bed and low bed trucks. Give special attention to necessary ceiling height over access route, hoists, etc., and also to the locations relative to split levels of floors, if any.

Tunnel to Natural History Building:

It would be a great convenience to have a tunnel for the use of visitors and employees, and for moving collections, exhibits, shipments, and supplies. Suggestions for this include travelator, electric trucks, conveyor for books and parcels, exhibits, and air raid shelter. Ventilated. Inquire about grade of 12th Street in Southwest development plan.

General requirements for the basement:

Entrance, lobby, work and storage spaces and loading dock, air conditioned and heated. Parking areas ventilated.

Provide partitions or doors for the shipping and service entrances to exclude public. (Security) Motor-operated doors under control of guard.

Ceiling heights will be as required for parking areas, driveways, shipping docks, office spaces, etc. Consider carefully the ceiling height of access to freight elevators for maximum usefulness in taking large objects to exhibition floors and storage spaces. Ample access doors to basement and loading areas.

Exposed parts of driveways will have heating coils installed for snow removal. Driveways will be protected from floods. Provide sump and pump with emergency diesel drive. Capacity subject to advice.

Emergency panic lights required in all areas without daylight or designed for night use.

Give careful attention to present and future traffic situations in locating the driveways. Inquire about plans for 12th Street traffic in SW redevelopment and the Constitution Ave. Bridge (proposed) traffic.

Secure advice of Civil Defense on shelter area requirements.

In designing basement consider layout of driveways to accommodate 6-8 vans at one time unloading at night for the installation of a special exhibit.

Lobbies: One critical problem of design relates to the duplication of lobby areas and facilities at several entrances to the building. Faulkner eliminated this by devoting one floor to all checking, orienting, selling, and similar "reception" functions (plus auditorium, etc.).

Parking for visitors:

This depends in part on the space available and the methods that might be worked out for effective and courteous enforcement of "parking for visitors only" restrictions.

Ground Floor (1st Floor)

Two public entrances, this floor.

This is the floor at the Constitution Avenue grade. It may have two public entrances, one from Constitution Avenue and possibly a south entrance in a subway under the Madison Drive front. Both entrances should have sheltered unloading space for several cars (or 3 busses) at one time. Cab stand at Constitution Avenue entrance. Each entrance must be plainly marked with a distinguishing name so that the visitor will remember where he came in.

Lobbies.

Well-designed lobbies are required to receive visitors, put them at ease and orient them to the contents of the building. Lobbies control traffic to exhibits, to meeting rooms and auditorium, to the curators' offices. A problem of design is to provide adequate lobby services at all public entrances without excessive duplication. One solution (Faulkner) is to have principal entrances on one floor and devote this floor to "processing" the visitor before he reaches the exhibits.

Entrance and lobby facilities.

Typical entrance facilities include: A heated vestibule for early visitors waiting for doors to open. This might connect to a lounge with rest rooms used to accommodate overflow waiting crowds and doubling as an orientation room. This should be securable from other parts of building. 1,000 s.f.

Check room for garments and parcels should be located between the guard post and the outside door with no access to the rest of the building except past guard.

Guard post should combine efficient location with the least disturbance to the visitor's feeling of being welcome. (A side position is better than a position facing the incoming crowd.)

An "island" Sales Counter for publications, reproductions, post cards and slides, should have or be adjacent to a writing counter with mailbox, located out of the traffic ways. Provide space for display and for two attendants.

An Information Desk for inquiries about exhibits and inquiries for curators should be located within sight of principal passageways, elevators and escalators. Equipped with charts of building, city maps, inside and outside telephones. Large enough for two clerks.

Index and Orientation Devices will be large enough and high enough to be read over the heads of crowds. Service conduits to these large enough for TV connections if desired.

Entrance and Lobby Facilities (cont.)

Rest rooms at each entrance. Provide for telephones, drinking fountains, benches, space for wheel chairs, guide-a-phone rentals, and first aid room (one each, first and second floor). Scale some of this to child's size.

Circulation:

It is estimated that about two-thirds of the total of visitors will move through the ground floor entrances. It is planned to urge the touring visitor to start his inspection of the museum at a starting point on the first floor above. Passageways, orienting devices, escalators, stairs and elevators will be located to influence the visitor in this direction before his attention is taken by ground floor exhibits. Passages will provide for two-way traffic without clogging.

Passages will provide direct routes to all collections and offices for visitors who have special interests and who know where they want to go.

Introduce visitors to the ground floor exhibits in a "distributing" area from which they will pass to exhibits groups. Identify and indicate the directions of the exhibits groups with typical large objects.

First Floor Exhibits.

Fifty thousand square feet of area will be occupied by one group of industrial and business exhibits known as "Science and Technology in Industry." One hundred thousand square feet of area will be devoted to exhibits relating to the history of science and technology, including physics, chemistry, electricity, prime movers, and transportation. Beyond the compact industrial group, no particular arrangement of exhibition space is required.

Exhibition Unit Area.

A workable unit area is 50' x 100'.

Ceiling Height.

Most of these exhibits will be accommodated under a ceiling of 12' to 14'. About 35,000 square feet should have a ceiling height of 22' to 24'. One suggestion is to have a machinery hall of this area with a high ceiling. Another is to provide the same area in unit size halls built with high-ceilinged centers and storage mezzanines around the sides. (Note: Ceiling height will be discussed thoroughly with architects before final decisions are made.)

Specifications for exhibition space.

General specifications for exhibition space are given below. Special requirements for the technology exhibits are floors which can be opened for engine pits; service channels to operable exhibits at all locations including electricity, compressed air, water, and gas as required; built-in rails and platforms for railroad equipment; special outside doors, ramps and elevators for moving large objects in and out; and built-in cranes and hoists.

Provide one exhibits preparation and temporary storage room 2,500 s.f., each side of building.

Class rooms.

Two class rooms are required in the exhibits areas. Capacity 40 children each. Equipped with projectors.

Special Exhibits space.

Space for changing exhibits (10,000 s.f.) should be convertible to small rooms (30' x 40'). Locate close to auditorium, served by auditorium entrance and lounges for evening opening. Lighting of these should be extremely flexible.

Storage and preparation space (3,000 s.f.) is required near special exhibits space.

Auditorium.

First floor location for the auditorium is preferred. Capacity, 1,000 seats. This should be convertible to small meeting rooms and if possible to use for special exhibits. Locate for separation from rest of building with separate entrance, but also for entrance from the lobby. Lounges with rest rooms, a pantry, and a reception room are required nearby. The reception room (1,200 s.f.) should be equipped to convert to a meeting room. A "backstage" lounge with rest rooms and dressing rooms should be provided. Backstage room for preparing demonstrations would be useful. Box office.

Auditorium stage and equipment should include adequate lighting (with footlights or outlets for similar lighting), public address, two-way television circuits, projection TV (broadcast reception), best possible accoustics, sound motion picture projection, slide projectors.

Cafeteria.

Location on first floor is most convenient and saves traffic on elevators. Location on fifth floor could have open terraces and a view. Subject to advice of Government Services Inc., and architects.

Cafeteria will operate as GSI cafeteria principally for lunch for visitors. It will be arranged to serve mornings and afternoons as a snack bar separated from tables, and to serve milk, ice cream, etc., to children's lunch rooms. It also will serve one Secretary's dining room and one employees' dining room. Capacity and equipment requirements will be obtained from GSI.

Two lunch rooms for children bringing lunches, seating 60 each, to adjoin cafeteria for milk bar service.

Keep cafeteria as close to food delivery point as possible to prevent spreading vermin through building. Provide refrigerated garbage room.

General Equipment.

Escalators to upper exhibits floors. Elevators and stairs to basement and all floors.

Smoking lounges with clear glass windows and adequate rest rooms in all quadrants of the floor.

Graphic guiding devices in all exhibition areas.

TV pick-up panels with built-in cables for both two-way closed circuit TV and for originating broadcasts, located in each exhibition hall.

Main power panel on this floor (or advice of the power company).

Emergency lights.

Shelter areas: Architect will consult Civil Defense.

Consider possibility of exposing the mechanisms of escalators, elevators, cranes, etc., to view as exhibits on this floor.

<u>All floors</u> must have the full complement of service and maintenance facilities including: Mop sinks, storage closets for cleaning supplies and equipment, outlets for scrubbing, vacuum cleaning and waxing. (Outlets should be located for occasional daytime cleaning with minimum interference with visitors.) Storage space for handling equipment, ladders, scaffolds, lamps, etc. Telephone outlets in all halls at guard posts.

Main Floor (2nd)

This is the main exhibition floor. It is as close to the grade of Madison Drive as possible.

Entrance from Madison Drive if more than three or four steps should be by ramps behind walls.

Refer to first floor notes for requirements for: Sheltered unloading, cab stand, vestibule, entrance and lobby details.

Visitors entering from Madison Drive should be given a glimpse of exhibits below and orientation on all contents of building, but should be urged to start visit at the central location. Visitors from entrances below will be merged with visitors entering from Madison Drive.

The starting point will be the display of the Star Spangled Banner with accessories. This requires a high ceiling -- possibly a shaft through the floor above -- to be planned with the advice of the architect. The flag exhibited vertically will require 40 feet.

Surrounding the starting area or adjacent to it will be 50,000 s.f. of exhibition area devoted to the "Growth of America" series.

Beyond this 100,000 s.f. will be occupied with exhibits of the collections such as the biographical exhibits of personalia, the First Ladies Hall, military collections, and the decorative arts. There is no requirement for grouping these halls in any pattern.

Ceiling height.

Most of these exhibits can be accommodated under ceilings 12' to 14' high but about 25,000 s.f. should have 22' to 24' high ceilings.

Specifications for exhibition space are given below. Refer also to description of the Ground Floor for notes on: Lounges, rest rooms, graphic guiding devices, TV cables, emergency lights, shelter areas, maintenance facilities, security.

Provide two classrooms with capacity of 40 children each, near exhibits. Equipment projectors and lecture platform.

Provide one room for exhibits preparation and temporary storage at each side of building, 2,500 s.f. each.

Escalators to Ground and Third Floor, elevators and stairs to all floors.

Ample corridors required on this floor.

Main Floor (cont.)

A good floor layout provides occasional locations from which the visitor can see a number of widely spaced large objects or architectural features upon which he can orient and from which he can select objectives for the remainder of his visit.

Third Floor

This is the uppermost exhibition floor. It has no outside entrance. It has escalators to the lower floors and elevators and stairs to all floors and the basement. Visitors can be expected to arrive on this floor by elevators and escalators in several locations.

The exhibits for this floor are listed in the exhibition space table. There are no large groups.

Ceiling height.

All exhibits on this floor will be accommodated under ceiling 12' to 14' high.

Provide two classrooms near the exhibits, 40 children each.

Provide an exhibition preparation and storage room each side of building, 2,500 s.f. each.

Refer to the descriptions of the Ground and Second Floors for details on mechanical equipment, security, etc.

Exhibition Space

The objective is to make the museum visit as informative and as enjoyable as possible. It is estimated that the annual attendance will be 5,000,000 with frequent peaks of 30,000 a day and occasional peaks of 60,000 a day. Most of the visitors will enter for their first and only visits. The building layout should receive and direct them without barriers and with the minimum of direction from guards, through areas in which they will see certain service facilities of the building (such as check rooms, rest rooms, sales rooms, and information desks) into a central area from which a logical start can be made for tours of the galleries. The starting point may be an area containing the Star Spangled Banner and related exhibits. The passageways to this point should provide space and facilities for informing the visitor of the scope and content of the building and for orienting him on the locations of the general areas of exhibits groups. Beyond this point the visitor should find reasonably integrated groups of exhibits, obvious features of the building upon which to check his position, and passages to permit his return from any quadrant to the door by which he entered the building or any exit of his choice.

Exhibition Space (cont.)

Passageways and vertical transportation must be adequate to handle the large crowds of visitors who come to see it all from the beginning and who move along in groups to the starting point. The individual visitor who comes to see a special exhibit should be able to by-pass these crowds and proceed directly to his destination.

Smoking lounges with clear windows should be provided in four corners of each floor. Provide rest rooms at these lounges.

Exhibition Space - Specification Schedule

The following program for detailed planning of the exhibition areas is suggested subject to the advice of the architects.

Locate the large areas with necessary service spaces to accomplish the circulation suggested in the discussion above. Design the building as freely as desired but permit these large spaces to be divided more or less regularly into unobstructed exhibition areas no smaller than approximately 50' x 100'. (Ceiling heights will be discussed further with the advice of the architect.)

As the design of the building develops, the Smithsonian Institution will designate the contents and details of the individual halls to permit the architect to complete the design -- including such details as, which halls will be connected to form larger areas, which ones will be partitioned into smaller rooms, what finished ceiling heights will be required, what form of ceiling will be used (as luminous, cove-lighted, or other), and what special treatment is required as double walls for recessed exhibits, unusual service requirements, and the few built-in exhibits fixtures which can be specified.

It is believed that this method will result in a good coordination of exhibits within the building and that the regular subdivision of the large areas is the best provision that we can make for the successful, continuous, and flexible use of the building for many years into the future.

Exhibition Space - Specifications

All galleries except a large machinery hall, if used, are inside rooms with no natural light. Lounges will have clear windows.

Galleries will provide a minimum of 5,000 s.f., unobstructed floor space. 50' x 100' is a workable gallery size. The large machinery and transportation hall, if used, should have a clear width of 75'. The starting area, entrance hall, and auditorium are other exceptions.

Specifications (cont.)

The greatest flexibility consistent with appropriate appearance and justifiable cost is wanted in the exhibition galleries. Walls should be removable between columns to permit two or more halls to be thrown together. Walls should provide the maximum of convenience for changing service outlets. Air conditioning and heating outlets should be in the ceiling. If required to be in the walls, should be at least 10 feet above the floor. Walls should be smooth finished to appear as plastered walls. Painted.

Consider double walls between halls in some areas to provide for recessed exhibition cases.

Ceilings should be smooth with recessed lighting. The ceiling design should permit the pattern of room lighting to be changed to fit exhibits arrangements and the installation should permit the greatest flexibility in mixing incandescent and fluorescent lighting and for the placing of accent and directional lighting elements.

Ceilings will provide for attachment of movable partitions in the exhibition halls.

Advice of competent lighting experts is desired.

Average suggested standards of lighting to produce 2 to 1 relative brightness of objects are:

10 foot-candles for room lighting

20-50 foot-candles for objects.

Room lighting by fluorescents (4500° color temperature) with incandescents (2800° - 3100° color temperature) as required by the objects to give 20-50 foot-lamberts of exhibit lighting.

Provide for use of light filters where required for preservation.

Television and radio pick-up and the lighting of exhibits for television and motion pictures will require special service outlets in all exhibition galleries and auditorium. Consult Boston Museum of Fine Arts. Inquire about need for micro-wave relay.

Telephone in each hall for use of guard should have quiet paging signal.

Exhibition Space - Specifications (cont.)

Floors should provide the greatest economy of maintenance, resistance to heavy foot traffic, resistance to pitting under heavy concentrated loads as casters, ease of moving heavy objects over them, fine appearance, and maximum comfort. Variety of floor coverings reduces fatigue. Floors should provide flexibility in changing service outlets. This includes special exhibition areas, and auditorium floor. The large machinery hall will require special floor design to permit recessing for flywheel and other pits, with channels for special requirements as water, compressed air, steam, etc., under floor.

Consider carpeting in some areas, using flush terazzo or tile at doorways, stairheads, and other concentrated traffic points.

Floor coverings should be flush with all surrounding areas. Design to bring tile, wood, carpeting, etc., flush with corridor and stairhead surfaces.

Security of building and collections. Consult Superintendent, S.I., and curators of sensitive collections. Build in circuits for burglar alarms as well as for watch turn-in.

Equip circulation spaces for special exhibits use in quiet seasons.

Sliding doors to close galleries for repairs and changes.

Wall surfaces at entrances should be cleanable indefinitely. These are sometimes "plated" with stone, glass or tile. Consider maximum use of wall surface panels which can be replaced in maintenance and future renovations.

Floors at entrances should have durable flush "stoops."

Wired recesses at entrances for illuminated room labels.

Include conduit for public address system, wired music, and audio-visual lectures in all exhibition halls.

All interior paints should be sulfur-free.

Special exhibition halls should have maximum flexibility for changing exhibits as well as good finish and appearance. Include ceiling attachments for varied lighting units, built-in attachments for varied partitioning, and good distribution of wall and floor outlets. Refer to recently built hotel exposition halls.

Fourth Floor

The Fourth Floor will contain 100,000 s.f. of space for the storage of reference collections, including work rooms and laboratories associated with these collections. It also will contain about 50,000 s.f. of space for shops and laboratories of a more general nature and for offices associated with these functions. The ceiling height of this floor should be 14', subject to further discussion.

Reference Storage Space

It is suggested that this space be located in the center of the floor, reserving the outside space, where windows can be provided, for offices and general laboratories.

Most of this space will be divided into relatively large areas using demountable partitions throughout. Within the space will be a number of work rooms and laboratories requiring vents. A sketch of the average arrangement of this space is attached. About 1/4th of the interior work rooms and laboratories will be partitioned. Services to all will be installed.

Supply perimeter walls of storage areas, and sufficient partition wall for subdivision into rooms 50' x 75' approximately, with wall for one work room and one laboratory, about 15' x 20', in each large room. Rough-in vents and utilities for laboratories and work rooms at these approximate intervals. Partition walls or screen panels over to extend to ceiling for security. All doors lock with individual symbols.

Ceiling finish, exposed beams, painted. Lighting by fluorescent fixtures in panels between beams. Provide room lighting of approximately 15 foot-candles at floor.

Floors to be concrete, painted. Aisle and workroom floor covering, if used, to be applied after installation of storage cases and collections.

All walls readily demountable. Wall panels should have adequate utility channels for most flexible use.

Occasional beams slotted for the attachment of chain hoists for unloading from trucks to pallets, etc.

Floor should contain service channels for maximum flexibility in partitioning and equipping laboratories and workrooms.

All doors open to ceiling or to have removable overhead. All doors and corridors between freight elevators and storage areas will have full beam clearance. Corridors from elevators to storage area will have the same width (15' ?) as the smaller dimension of the freight elevator, plus space at doors or entrances to storage areas, in which to turn large objects.

Fourth Floor (cont.)

Reference Storage Space, cont.

About 30,000 s.f. of this storage space at the center, adjacent to the public elevators, should be equipped for occasional special use as exposition space. Same specifications apply to this as to Special Exhibits space, except that finish will be rougher.

Office Space and Personnel Space

Office and personnel space, laboratories and shops are listed in detail in space tables, above.

For specifications on space for Guard Office, Labor Force, Char Force, and Telephone Room, consult the Superintendent of Buildings, S.I.

Photographic Laboratory.

This will be the central photographic laboratory for the Smithsonian Institution. Every effort will be made to provide for the increased work involved in color processing; film strip and possibly motion picture photography described in the Public Services Activities program; for photo-setter and silk-screen processes and other photographic work required by exhibits production; x-ray and micro-photography required by the natural science divisions, multilithography; and for photographic cataloging of specimens. All present activities will be included. The details of this will be worked up with the architects and Chief Photographer, S.I. The possibility of locating this laboratory on the Fifth Floor for better natural light requires more consideration. The best present estimate of the space required is 6,000 s.f.

Print Shop.

This will be the central printing shop for all the Smithsonian Institution. It will include the present equipment of linotype machine, proof and printing presses, paper cutters, stapling machines, etc. In addition it will have a photo-setter. Consult the Editor and the Printer for requirements. The estimate of space including space for the duplicating processes, multilith and mimeograph, is 2,000 s.f.

Exhibits Laboratory.

This will be the principal exhibits laboratory of the S.I. It will include office space, design rooms, mock-up stages, spray booth, silk-screen laboratory, and light mechanical shops. It will require the full complement of service connections, gas, water, and electricity. The space estimate includes storage of exhibits supplies and finished work. Details will be worked up with the Chief Exhibits Specialist of the Smithsonian Institution. 20,000 s.f.

Fourth Floor (cont.)

Preservation Laboratories.

These laboratories are required for the preservation of collections and the restoration of objects for display. The details of these laboratories will be furnished later. The space requirements are estimated to be as follows. They should be grouped together with direct access to and from the curatorial offices on the floor above.

Textiles laboratory for the cleaning and repair of textiles, flags, uniforms, and costumes	750 s.f.
Metals and wood preservation	1,000 s.f.
Mechanical models and instrument repair	500 s.f.
Glass and ceramics	500 s.f.
Ship models	500 s.f.
Document repair	400 s.f.
Furniture restoration	750 s.f.

Television Laboratory.

A studio type camera room is required for the production of television sequences to supplement scenes produced in the exhibition halls. This should include offices for the staff, a small art work room, dressing rooms and camera stages. Details to be worked out with the architects and expert consultants. This may alternate for motion picture work if desired. Estimated total space 6,000 s.f.

Two meeting rooms should be provided for scientific and historical panel groups, requiring proximity to the reference collections. Two at 750 s.f. 1,500 s.f.

Lunch rooms for personnel carrying lunches. Tables, chairs, soft drink and milk machines, water fountain and sink 800 s.f.

Locker room for laboratory personnel 600 s.f.

Showers for laboratory personnel 800 s.f.

Public elevators and stairs to all floors.

The location of stairs and automatic elevators for staff use between Fourth and Fifth Floors will be worked out for efficient passage up and down.

Conveniently located rest rooms for staff.

Fourth Floor (cont.)

All space, Fourth Floor, should have maximum flexibility of demountable walls; good access for electric trucks and large objects from freight elevators.

Shops and noisy laboratories might be separated from offices and study areas by the storage area.

Shops, laboratories and offices to have windows for natural light and "looking out."

Fifth Floor

Develop this floor, if practicable, for offices and studies with courts for natural light and terraces.

Reference storage space. In this will be housed the "show" collections, that is, the memorial or named study collections -- such as ceramics, textiles, watches, glass, firearms, scientific instruments, watercraft .....50,000 s.f.

The ceiling height of this floor will be subject to the architect's advice. Normal office ceiling height will be adequate.

The specifications for the reference collection space are generally the same as for the same type of space on the Fourth Floor, except that ceilings will be finished as in the offices. This space will surround the block of curatorial offices. Total required..... 50,000 s.f.

Space for the Public Services activities should be located near elevators from the lobbies and central to the curatorial offices. This should be easily isolated from the rest of the floor for possible use on Saturdays and Sundays. Including docent's room, public inquiries room and combined working libraries it is estimated that the total space requirement is ..... 11,500 s.f.

Offices to have natural light, overlooking court terraces or park.

Director's suite. This should be appropriately planned in expectation that a future Secretary of the Smithsonian Institution, or Director of the United States National Museum, might use it.

Director's office.....	400	
Study or laboratory.....	300	
Reception room(business) 2, total...	600	
Reception room (ceremonial).....	1,600	
Conference room.....	600	
Pantry.....	100	
Lavatory.....		
Administrative assistant.....	200	
Stenographers (2), total.....	300	
Messenger and supplies.....	100	
File clerk and files.....	300	4,500 s.f.

Fifth Floor (cont.)

Administrator.....	350	
Administrative assistant	200	
Stenographer.....	150	
Clerks (2).....	200	
Messenger.....	100	1,000 s.f.
Director of Research(Historian):		
Office.....	400	
Conference room.....	300	
Administrative assistant.....	150	
Stenographer.....	150	1,000 s.f.
Director of Public Services (Education):		
Office.....	400	
Study.....	150	
Administrative assistant.....	200	
Stenographer.....	150	
Messenger.....	100	1,000 s.f.
Exhibits Director:		
Office.....	350	
Administrative assistant.....	200	
Architectural assistant.....	150	
Chief designer.....	150	
Stenographer.....	150	1,000 s.f.
Assistant Superintendent of Buildings:		
Offices, 2 at 250, 1 at 200.....		700 s.f.
Curators' offices (20 groups as follows):		
Curator.....	200	
Associate curator.....	200	
Associate curator.....	200	
Stenographer-receptionist.....	200	
Museum aid - workroom.....	200	
Museum aid - workroom.....	200	
Museum aid.....	200	
Office collections - library, with lavatory.....	400	36,000 s.f.

Above will be grouped so that one stenographer can serve as receptionist and stenographer for three curators. Maximum privacy for curators.

All curators' offices should be as close to library as practicable, close to storage area, and close to elevators for quick access to storage area, Fourth Floor, and exhibits.

A sketch of a typical divisional group of offices will be furnished.

Fifth Floor (cont.)

Visiting historians' studies. 10 offices, 150 s.f. each. These should be spaced between curator groups as reserve offices for curators or additional clerks..... 1,500 s.f.

Professional visitors' lounge..... 900 s.f.

TOTAL, Fifth Floor space.....109,150 s.f.

Outdoors

Outdoor development will evolve as the design takes shape.

Public entrances to be obvious and inviting.

Parking areas with line of sight to nearest entrances. Areas on south side screened and shaded by trees. Off-street lanes for parking double rows of busses, Constitution Avenue and Madison Drive (two-levels), 12th to 14th Streets. Season control of these lanes by traffic signs.

Directional signs.

Build up anticipation and orientation as visitor approaches building.

Outdoor exhibits. Sculpture? Fountains?

Garden patios, shaded in summer, enclosed in winter.

Sheltered spaces for groups to assemble for instructions from tour leaders.

Areas for school classes to eat lunches outdoors -- spring and fall.

Possibly operate outdoor snack and refreshment oasis to exercise control and discourage street venders. Vending machines.

Approaches and drives have imbedded heating for snow and ice removal.

Shipping and service entrances well-screened to prevent confusing them with public entrances.

Benches for waiting.

Direct and planned paths around the building.

Consider show windows.

Consider use of the roof for terraces.

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Addenda

Occasional additions will be made of items overlooked in assembling the Check List.

Exhibition Space with High Ceilings. High ceilings are required for relatively few exhibited objects. These normally are displayed in halls with many more objects of moderate size. The smaller objects and the exhibits fixtures which contain them are often dwarfed by the high walls. The space over them is wasted. Halls with high centers and storage mezzanines over the sides overcome some of these objections. A sketch is attached.

The storage mezzanines are double the overhang in each hall. The mezzanines should be supported without columns within the halls.

The use of the mezzanines as storage eliminates the many objections to exhibition mezzanines.

The principal disadvantage is the division of the storage space into many small parts.

Children in the Museum. The architect must keep in mind the special requirements of children. Provide mechanical equipment such as drinking fountains, lavatories, etc., which they can reach. Avoid features which attract them to climb.

Guarding and Maintenance. The terrific consumption of manpower in the guarding and maintenance of museum buildings should be a top concern of the architects.

Air Conditioning. Details of air conditioning for preservation of collections must be provided for but little scientific information on the requirements is available now. An early decision will be made on the size and location of areas where special conditions will be maintained.