GUIDE

TO THE

FIELD COLUMBIAN MUSEUM

With Diagrams and Descriptions

FOURTH EDITION.

CHICAGO:
1896.

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DEPARTMENT OF ORNITHOLOGY.

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DEPARTMENT OF COLUMBUS MEMORIAL.

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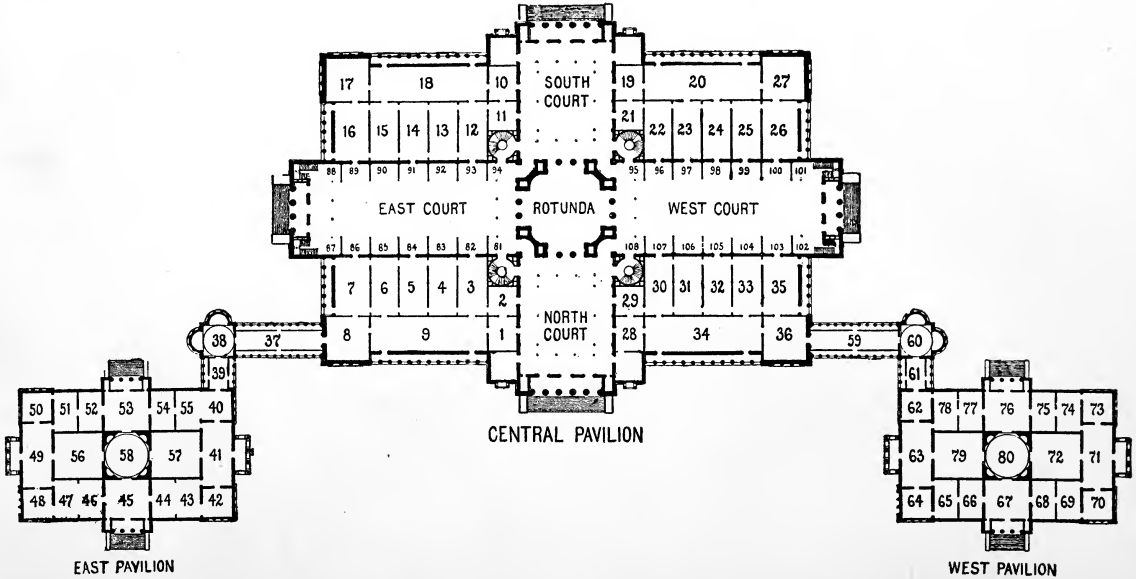
INTRODUCTION.

The Guide locates, by means of plans and a system of numbers, the principle objects of interest in the Halls, Courts, Alcoves, and Galleries. The diagrams are accompanied by brief descriptions. The Columbian Rotunda and the Columbus Memorial Halls are described first because of the historical significance attached to them. The Departments are then taken up separately in the order of their usual sequence, beginning with Natural History—Geology, Botany and Zoology—and concluding with the Departments relating to Man and his Works—Anthropology and Industrial Arts.

If a general view of the entire Museum is desired, it is suggested that the Departments be visited in the order above indicated. After viewing the Columbian Rotunda (see page 9) the visitor may proceed through the Reading Room and Lecture Hall to the West Pavilion, where are installed the collections of Geology (see page 23). The Halls should be visited in the following order: 35, 36, and 59—Paleontology; 60 and 61—Geographic Geology; 62, 63, and 64—Meteorites and Mineralogy; 65—Dynamic Geology; 66 Lithology; 67 to 80 inclusive—Economic Geology and Metallurgy.

Returning to the West Court through Hall 35 the Botanical Department may be reached by the stairway in Alcove 102. The circuit of the galleries should be made from the West to the North, then to the East and finally to the South Gallery. The Botanical collections are arranged on a geographical basis, and begin on the South Gallery with specimens from Asia, Europe, Africa, and follow with the South and North American Series. (See page 95.)

The Laboratory of Physical and Psychical Anthropology will be found on the gallery at the extreme end of the East Court. (See page 187.)



PLAN OF GROUND FLOOR.

After descending to the main floor the visitor may proceed to the south side of the West Court and should visit the Halls of the Zoological and Ornithological Departments in the following order: Hall 24, West Court, Halls 22, 23, 19, 20, 26, and 27. (See page 115.)

The Department of Anthropology (see page 143) can be entered upon in the South Court and may be further studied in Halls 10 and 11, devoted to the Eskimo; 12 and 13—the North Pacific Coast; 18—ethnology of North America; 14, 15, 16, and 17—South American collections; the alcoves of the East Court contain exhibits relating to the ethnology and archeology of America. Halls 2 to 7 inclusive, as well as the North Court, are devoted to collections illustrating the anthropology of Europe, Asia, and Africa.

The Columbus Memorial (see page 15) installed in Halls 9 and 8, may now be visited advantageously; they lead into the Division of Transportation (see page 215) located in Halls 37, 38, 39, 40, 54, and 55. Hall 54 contains the initial exhibits of Transportation by Steam (see page 231) which occupies the remainder of the East Pavilion.

Returning now to the center of the main building the visitor may examine the Monographic Collections—Musical Instruments in Hall 1 and Alcove 117 (see page 259) and Printing and Graphic Arts in Alcoves 118 and 119 (see page 261) near which are the remaining halls devoted to the Industrial Art Collections—Textiles, Halls 30 and 31; Gems and Jewels, Hall 32 and Ceramics, Hall 33. (See pages 193, 201 and 209 respectively.)

An account of the Library and Lecture Hall is added. (See page 263.)

The following indices are inserted for the use of those who desire to study a single Department or subject:

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INDEX TO SUBJECTS.

PLAN OF ROTUNDA.

THE EXPOSITION MEMORIAL.

COLUMBIAN ROTUNDA.

The Rotunda of the main building of the Museum is devoted to an artistic memorial of Columbus and of the Columbian Exposition. The center-piece—the statue of the Great Discoverer with uplifted sword consecrating the New World—at once attracts attention both as an historical study and as a masterpiece of art. The original models of the figures and groups of figures ornamenting the main Exposition buildings, and donated by the Exposition to the Museum, occupy the entire space around the statue. These models are invaluable as works of modern art, representing the genius of the most talented sculptors of the present day.

In the contracts entered into with the various prominent sculptors they were called upon to furnish what are called "Sketches" of the sculptural decorations, i. e., the models were to be about one-sixth of the full size; from these models the Exposition's force of sculptors prepared full-size work by enlarging the "Sketches" six times. All the models were first submitted to the architects of the buildings for their approval, in order to harmonize the sculptural decorations with the architecture. The models here shown are the original "Sketches."

No. 1.—Columbus. By Augustus St. Gaudens. This imposing full size statue stood overlooking the Court of Honor at the main portal of the Administration Building. Translation of Latin inscription on pedestal:

"In late years the centuries will come
"When the ocean will loose its fetters
"And the vast earth will lie open,
"And Tethis will disclose new countries,
"When Thule will no longer be the remotest of lands."

No. 2.—Statue of the Republic. By Daniel C. French.

Nos. 3 to 38.—Statuary on Administration Building. By Karl Bitter, Sculptor.

3. Water Controlled.
4. Water Uncontrolled.
5. Fire Controlled.
6. Fire Uncontrolled.
7. Earth Controlled.
8. Earth Uncontrolled.
9. Air Controlled.
10. Air Uncontrolled.
11. Goddess of Fire.
12. Fisher Maiden.
13. Bather.
14. Diana.
15. Air.
16. Harvest Girl.

17. Blacksmith.
18. Flower Girl.
19. Patriotism.
20. Tradition.
21. Education.
22. Truth.
23. Strength.
24. Liberty.
25. Charity.
26. Abundance.
27. Theology.
28. Diligence.
29. Joy.
30. Unity.
31. Strength.
32. Peace.
33. Religion.
34. Industry.
35. Art.
36. Commerce.
37. War.
38. Justice.

Nos. 39 to 45.—Sculpture Work on Agricultural Building. By Philip Martiny.

39. Four Nations.
40. Four Seasons.
41. Cattle Group.
42. Horse Group.
43. Ceres.
44. Zodaic.
45. Victory.

Nos. 46 to 51.—Figures of Inventors. Sculpture Work on Machinery Hall. By Robert Kraus.

46. Galvane.
47. Whitney.
48. Daguerre.
49. Ericsson.
50. James Watt.
51. Senfelder.

Nos. 52 to 57.—Six figures on Machinery Hall. By M A. Waagen.

52. Science.
53. Earth.
54. Water.
55. Fire.
56. Air.
57. Victory.

Nos. 58 and 59.—Sculpture on Colonnade, by M. A. Waagen.

58. Horse Group.
59. Cattle Group.

Nos. 60 and 61.—Electricity Building.

60. Electrition, by I. A. Blankinship.
61. Experimental Electricity, by N. A. McNeill.

No. 62.—Sculpture Work on Lagoons.

62. Lion at Base of Obelisk, by M. A. Waagen.

Nos. 63 to 66.—Sculpture Work on Boat Landings. By D. C. French and E. C. Potter.

63. Industry (Horse).
64. Sloth (Horse).
65. Wheat (Bull).
66. Indian Corn (Bull).

Nos. 67 to 69.—Sculpture Work on Bridges of Lagoons. By Edward Kemeys.

67. Buffalo—Male. 68. Buffalo—Female. 69. The Still Hunt

No. 70.—Glorification of Discovery. By Cratt.

No. 71.—The Columbus Quadriga. By French and Potter. This crowned the arch of the Peristyle.

THE COURTS.

From the Columbian Rotunda at the exact center of the building radiate to the four points of the compass the great central Courts. These Courts form a Greek cross, and are the most striking architectural feature of the interior of the building. In the alcoves and on the main floors of the Courts are found collections which are described under the Departments to which they belong For convenience, a comprehensive statement is here given of the pages in the Guide where detailed descriptions may be found.

THE NORTH COURT.

The collections of antiquities illustrating Greek, Roman, Etruscan, Phoenician and Celtic archeology, occupying the central floor space of this Court, are described in detail on page 147.

In this Court stands the handsome model of the Reichstag (the German Parliament House), presented by the Imperial German Commission. This model is complete in every detail of architecture and sculpture. It is 19 feet wide by 21 feet long, and stands 9 feet high.

EAST SIDE ALCOVES.

Alcove 121.—Pompeiian antiquities. (See page 148.)
Alcove 122.—Buddhistic idols. (See page 148.)
Alcoves 123 and 124.—Assyrian and Chaldean antiquities. (See page 148.)

WEST SIDE ALCOVES.

Alcove 117.—Musical instruments. (See page 259.)
Alcove 118.—Printing arts. (See page 261.)
Alcove 119.—Graphic arts. (See page 262.)
Alcove 120.—Bookbinding. (See page 262.)

THE SOUTH COURT.

In the South Court are installed full-sized reproductions of antiquities from Yucatan and Central America. These are described under the Department of Anthropology page 153.

EAST COURT.

The central floor space of this court is devoted to collections illustrating the archeology of North America, described under the Department of Anthropology, page 148.

NORTH SIDE ALCOVES.

Alcove 81 and 82.—Egyptian antiquities (See page 151.)
Alcove 83.—Southern California antiquities (See page 151.)
Alcove 84.—Cliff-dwellers collection. (See page 151.)
Alcoves 85 and 86.—Pueblo collection. (See page 151.)
Alcove 89.—Mexican archeology. (See page 151.)

SOUTH SIDE ALCOVES.

Alcoves 90, 91 and 92.—United States archeology. (See page 153.)

Alcoves 93 and 94.—Archeology of the Northwest Coast. (See page 153.)

WEST COURT.

This Court is occupied with collections belonging to the Departments of Zoology, Geology and Industrial Arts.

For descriptions of the collections of shells and groups of mammals in the central space of the Court see page 115.

SOUTH SIDE ALCOVES.

Alcoves 95 to 99.—These are described in full at the bottom of page 119.

NORTH SIDE ALCOVES.

Alcove 102.—Whaling and Arctic Relics. (See page 213.)
Alcove 103.—Paleontology, (See page 23.)
Alcove 104.—Ceramics. (See page 212.)
Alcove 105.—Numismatics. (See page 207.)
Alcove 106.—Agricultural Implements. (See page 213.)
Alcove 107.—Textiles. (See page 199.)

THE COLUMBUS MEMORIAL.

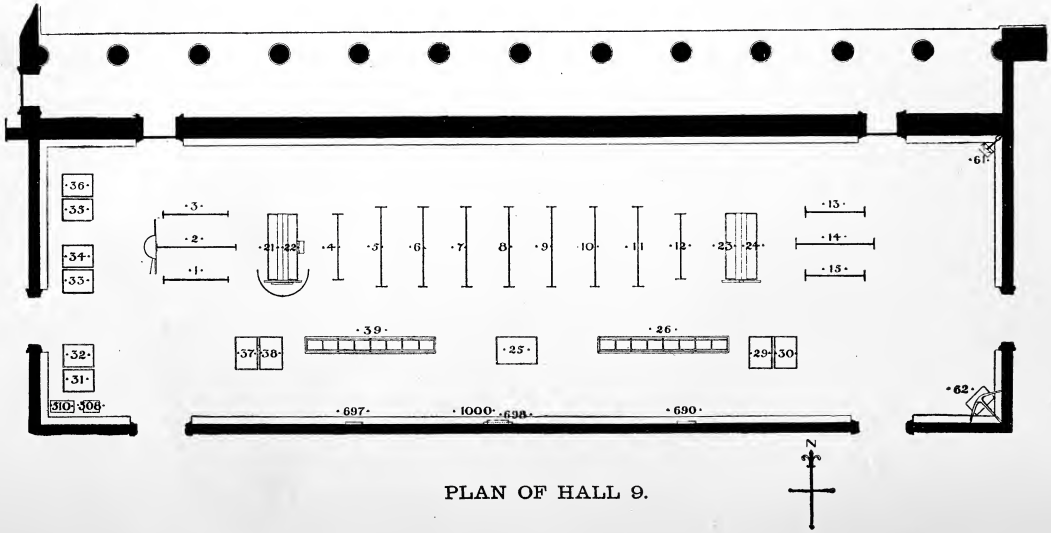
The Columbus Memorial Museum consists of relics collected for the World's Columbian Exposition under the supervision of Mr. Wm. Elroy Curtis, of Washington, and sheltered for exhibition during the Exposition in the reproduction of the Monastery of La Rabida.

The collections comprise original manuscripts of Columbus and his time, and documents from the Vatican that first saw light in America during the Exposition; maps and charts, showing the earliest works of cartographers; books and pictures illustrating the growth and development of geographical knowledge; portraits and busts, showing the different conceptions regarding the appearance of Columbus in life; monuments, inscriptions, tablets, referring to his remains; nothing has been omitted that would throw light upon the career and personality of the discoverer of America.

Every picture is here with a purpose; every map, chart, relic is a link in the chain connecting the history of the New World with the Old. The student, the historian, the antiquarian, will find in them material for months of study.

In Hall 9 the whole career of Columbus is fully represented. Here the interested visitor may read the story of the life and work of Columbus—his struggles to gain the confidence and support of the Spanish sovereigns; his apparent failure and ultimate success; his preparation for the voyage; his departure and his triumphant home-coming. These, together with his later discoveries and the sad scenes associated with his last days, are to be seen in the order of their sequence.

The three rooms situated in the northeast corner of the main building of the Museum Halls 1, 8, and 9 are devoted to this collection. Entering from the East Court, and passing through to the center and largest room of the three, the visitor will do well to inspect, first:



PLAN OF HALL 9.

HALL 9.

Screens 1 and 2.—Pictures, maps, and charts relating to the geographical knowledge, and the science of navigation at the time of Columbus.

Screen 3.—Is a continuation with additional pictures relating to the Court of Ferdinand and Isabella. On the walls of this hall, commencing at the northwest corner, and following around the room, things relating to, and scenes associated with, the early life of Columbus, his career in Spain, his voyages, discoveries, triumphant return, his last days, and his death are to be found.

In connection with the above, attention should be given to

Cases 21 and 22.—The doors and shutters of the house occupied by Columbus at Porto Santo, Madeira Islands.

Case 23.—Replica of the doors that guard the cell in which are held the alleged remains of Columbus, in the Cathedral of Santo Domingo.

No. 252 —Facsimile of a cross erected by Columbus in 1494 after a victory over the Indians, made from the beams of the castle in which Columbus was confined.

Case 24.—Original door and jamb from the monastery of La Rabida, near Palos, Spain.

No. 61.—The anchor of Columbus is in the northeast corner of the room.

No. 62.—Sixteenth century anchor; ancient anchor extremely old type, which had laid in the mud on the east bank of the Ozama river for centuries, and, according to tradition was the property of Don Diego Colon.

Case 25.—Facsimiles of the Casket and Lead Case in which the alleged remains of Columbus are contained. Key to the house at Porto Santo, Madeira Islands, where Columbus lived shortly after his marriage. Bricks and tiles from the original Monastery of La Rabida, near Palos, Spain. Some of them are supposed to be sixteen centuries old.

Case 26.—Various articles of interest from the first settlements founded by Columbus. No. 614.—Original and modern reprint of the Guiliano Dati poem. On the 25th of October, 1493, there was printed at Florence, a metrical translation of the San-

angel letter. The author was Guiliano Dati, Bishop of Saint Leone, born at Florence in 1445, and the author of several poems, which are among the rarest of bibliographical curiosities.

On a large pedestal (51), in the next hall beyond Hall 8, will be found one of the guns planted near the palace of Diego Columbus at Santo Domingo in the year 1509, being one of the largest guns that could be procured at that time, and placed there to destroy the palace at the first sign of insubordination on the part of Diego Columbus by the council sent over to restrain any attempt that might be made to establish an independent government. On pedestal (52) is a pile of stone, brick and tiles which represents all that remains of the town of Isabella, the first civilized settlement of the New World founded by Columbus on his second voyage in 1493.

Returning to the main hall (Hall 9),

Screens Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 should now be inspected in the order given. Here will be found facsimiles of letters written by Columbus, pictures, maps and charts relating to the publication of the discovery, the christening of the continent, the conquest of Mexico and Peru, and the settlement of other portions of America.

Cases 29 and 30.—Rare books in connection with the above. No. 417—First Biography of Columbus ever published. No. 415—The first published portrait of Columbus. No. 419—One of the first books published concerning the West Indies. No. 418—Life of Columbus, by his son, Fernando. No. 421—The 1511 edition of Ptolemy. No. 414—The book of Philopono; a curious description of the new world by a Benedictine monk. No. 405—Facsimile of the letter of Columbus to Rafael Sanchez. No. 416—Manuscript copy, in Latin, of Ptolemy's Cosmographiæ, 1504. No. 504—Illustrated Spanish Missal of the 15th century, from a Franciscan convent in the interior of Peru.

No. 441.—Also on the South wall. Portraits of Gautrin Lud, founder of the Gymnase Vosgien, which christened America.

No. 448.—Portrait of Jean Basin of Sandaucourt, the second member of the Gymnase.

No. 447.—Portrait of Matthias Ringman, Member of the Gymnase Vosgien, who carried the letter of Americus Vespucius, which, when translated, christened the New World.

No. 510.—Copy of the Borgian map of the World, made by Diego Ribero in 1529.

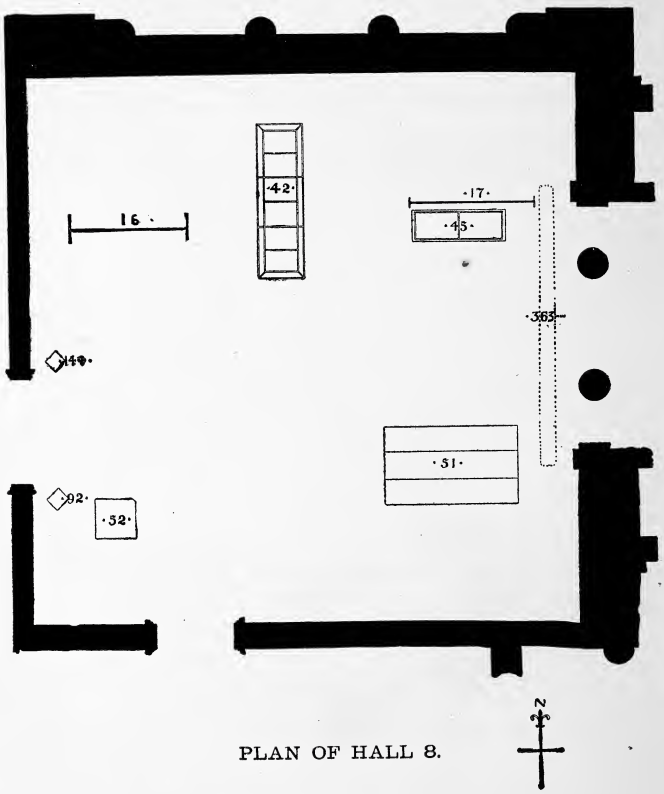
A beautiful and complete map of the Old and New World.

It was divided into two parts, in conformity with the terms of the compact between the Sovereigns of Spain and the King of Portugal at Tordesillas in 1494. On either side of the line of demarcation are the banners of Spain and Portugal reaching America on the coast of Brazil.

Case 33.—No. 1—The commission of Columbus as Viceroy and Governor General of the Indies, considered the most precious historical document in existence; original in the possession of the Duke of Veragua. No. 2—Certified copy of instructions given to Columbus by the catholic kings for the voyage to be made by him to the Indies. No. 3—Certified copy of agreement between catholic kings and Columbus, April 17, 1492. No. 4—Grant of a coat of arms to Columbus by the catholic kings. No. 5—Confirmation of the title of Admiral and Perpetual Viceroy of the Indies given to Columbus. No. 6—Original grant of ten thousand maravedis per year made to Columbus by the catholic kings.

Cases 31, 32, 33, 34, 35, 36, 37, and 38.—Photographs of the original papers and documents relating to Columbus, owned by the Duke of Veragua and the Duchess of Berwick and Alba.

Case 39.—A part of the Vatican exhibit, and contains facsimile of documents relating to the early history of America taken from the famous series of papal registers which are preserved in the secret archives of the Holy See at the Vatican Palace. The rest of the Vatican exhibit is to be seen in the adjoining smaller room to the west, and consists of valuable historical documents and objects of art in the archives of the Vatican, donated by His Holiness Pope Leo XIII.



PLAN OF HALL 8.

HALL 8.

Screens 16 and 17.—Early pictures of America from De Bry's voyages, and from Description de L' Univers, by Allain Mannesson Mallet, Paris, 1633; also other pictures of scenes associated with the voyages of Columbus, for which room could not be found in Hall 9.

Northeast Wall.—Portraits of descendants and the genealogy of Columbus.

Stands Nos. 51 and 52.—The large cannon and pile of stones already referred to in connection with Hall 9.

No. 857.—Buccaneer cannons from Tortola, West Indies. These cannons are supposed to have come from one of the pirate ships landed here in the 17th century.

Case 42.—Articles of historical interest from Costa Rica and the West Indies.

Case 45.—Collection of World's Columbian Exposition passes, blanks, relics and souvenirs.

South Wall.—Portraits of Columbus.

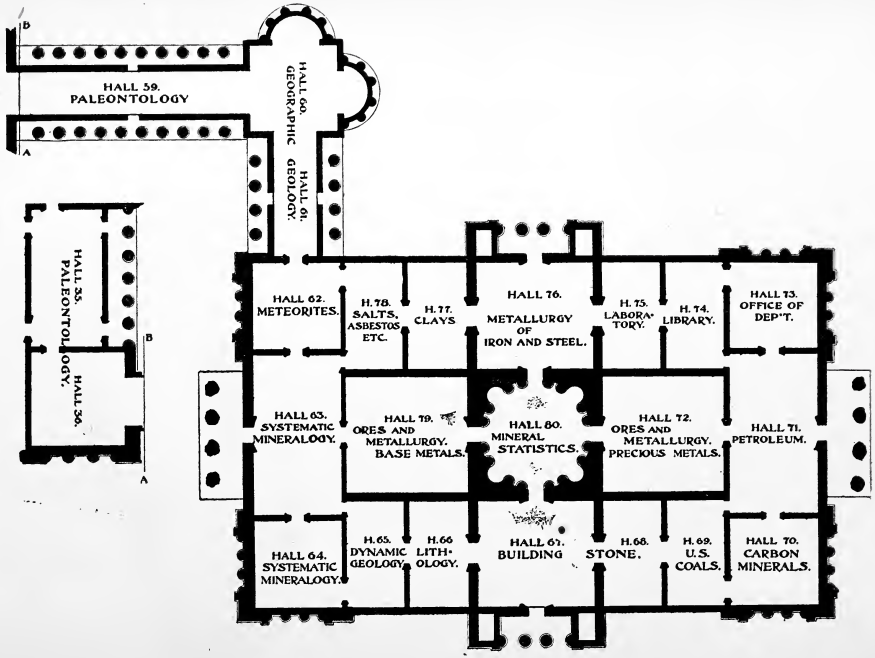
The several pictures which are intended to represent the real or ideal Columbus may be grouped into four classes, as follows:

1. Those of Giovio type—either copies of the portrait which hung in the gallery of the Archbishop of Como, or drawn from verbal descriptions given of the Admiral by his contemporaries.
2. The De Bry type, representing Columbus as a Dutchman.
3. The portraits with beards and costumes of the century subsequent to his death.
4. The fanciful pictures without pretense to authenticity.

North Wall. The monuments of Columbus.

There are twenty-nine statues and monuments to Columbus in America, six in Spain, seven in Italy.

No. 363.—Dug-out. Type of boat used by natives.



PLAN OF DEPARTMENT OF GEOLOGY.

DEPARTMENT OF GEOLOGY.

The collections gathered in the Department of Geology are designed to illustrate the history of the earth's development and the materials which form its crust.

Since, moreover, the science of geology has both a theoretical and a practical side, a division of the collections has been made in order to present these two phases of the subject. Those illustrating geology as a theoretical science are to be found in the Division of Systematic Geology; those showing it in its relations to human arts and industries, in the Division of Economic Geology.

DIVISION OF SYSTEMATIC GEOLOGY.

This division comprises six sections, located as follows:

Paleontology: Alcove 103, Halls 35, 36 and 59.

Geographic Geology: Halls 60 and 61.

Meteorites: Hall 62.

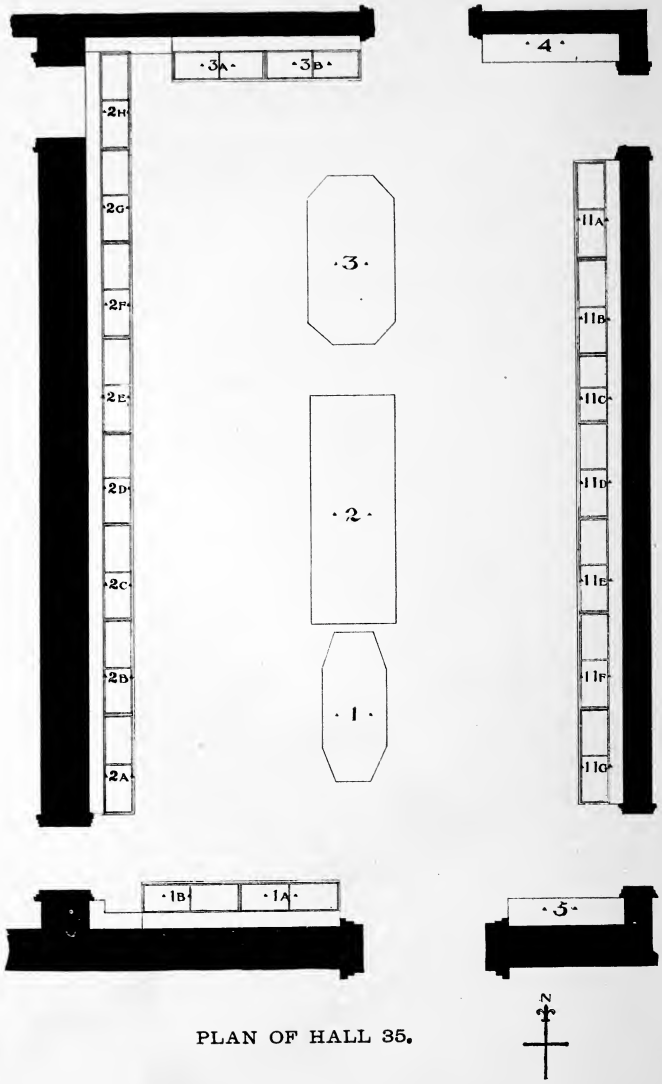
Systematic Mineralogy: Halls 63 and 64.

Structural and Dynamical Geology: Hall 65.

Lithology: Hall 66.

These sections illustrate in order, first, the life of the globe from its earliest beginnings to its latest and highest forms; second, the configuration and mode of formation of the surface of the earth; third, the bodies which come to us from regions outside the earth and which furnish the only material sources from which we can learn the composition and structure of the heavenly bodies; fourth, the component minerals of the earth's crust, classified according to their chemical composition; fifth, the aggregates of these into rocks, and sixth, the effects produced by physical forces in forming and shaping the materials of the crust.

The arrangement of specimens under each section follows that of some standard text-book on the subject, so that each section may be considered as illustrative of such text-books, or on the other hand these may be referred to for a fuller description of the specimens or discussions of the subjects presented.



PLAN OF HALL 35.

HALLS 35, 36, AND 59. ALCOVE 103.

PALEONTOLOGY.

In the Section of Paleontology it is sought to illustrate by fossils, casts, and models, the animal and vegetable forms which have characterized the life of the globe at the succeeding stages of its history. The arrangement is primarily chronological, and secondarily zoological, and the order to be followed in a study of the collection is indicated by the numbering of the cases. Passing from left to right, as one would do in reading a book, the collection may not improperly be regarded as a book describing the history of the earth from the dawn of life to the present time, though the characters in which it is written are rock specimens instead of printed letters. The series begins in Hall 35, at the left of the entrance from the West Court, passes along the west wall, the south wall of Halls 36 and 59, then to the other side of the same rooms, and back to the right of the entrance to Hall 35. The larger specimens in the center of the halls it was impracticable to place in chronological order, but the specimen labels show the period to which each belongs. All the specimen labels show: 1st, the name of the species, together with that of the authority by whom named; 2nd, the geological period or epoch to which each belongs; and 3rd, the locality. Wherever a cast is shown, the fact is indicated by the label, so that it may not be confounded with actual specimens.

Under each period the specimens will be found arranged in accordance with their zoological rank, beginning with the lowest. Plants are placed first; then in order, Protozoans, Radiates, Mollusks, Articulates and Vertebrates.

The visitor will find it interesting to note the characteristic forms of life of the different epochs, and the increase in number and variety of species as the earth's history advanced.

Alcove 103.—Two large blocks, one of limestone from Kelley's Island, Ohio, the other of sandstone from North Amherst, Ohio. These illustrate glacial scoring and polishing.

There are also shown sections of large specimens of *Arietites*, a mollusk allied to the modern Nautilus; tracks of reptiles of the Triassic period, on sandstone from Turner's Falls, Mass.; fossil

fishes of the Tertiary era, from the Green River, Wyoming beds, and miscellaneous specimens of exceptional size and beauty.

Case 1A, Hall 35.—Fossils of the Laurentian period. The existence of life at this period has not been definitely proved by any remains found as yet. A supposed fossil, *Eozöon Canadense*, is illustrated by several specimens.

The specimens are made up of alternate layers of calcite and serpentine, which are thought by some to represent the shell and body cavity of an ancient, huge Rhizopod. Others regard the masses as of wholly inorganic origin.

The remainder of Case 1 and Cases 2A-F.—Fossils of the Silurian age or age of Invertebrates. The life of this age is almost wholly marine and made up chiefly of corals, crinoids, brachiopods and mollusks. It is illustrated in the collection according to periods as follows:

Case 1, A and B.—Cambrian and early Silurian fossils. *Oldhamia*—probably a plant of the order of marine algæ; *Brachiospongia*—a representative of the class of sponges; *Monticulipora*—of corals.

Diplograptus, Tetragraptus—Hydroids known as graptolites, abundant fossils of this era. The name is derived from the Greek word meaning "to write," and refers to the plume-like nature of their remains. *Scolithus*—supposed to represent the borings and tracks of worms.

Tentaculites—minute mollusks of the class of Pteropods. *Conularia*—perhaps also Pteropods.

Paradoxides, Asaphus, Olenellus, Agnostus—Trilobites, the most common and characteristic fossils of early Silurian times. They were crustaceans, allied to the horse-shoe or king crabs of the present day. Two models illustrate the various parts of their structure, and tracks of a trilobite, genus *Climatichnites*, are shown on a large slab of sandstone from Wisconsin. The number of important animal types having existence in even the earliest geological periods is worthy of note.

Between Cases 1 and 2, a cast of an *Orthoceras*, nine feet in length. This shows the size which these Cephalopods, represented at the present time by the nautilus, attained in early times. They were a striking feature of the Palæozoic era.

Case 2A.—Trenton and Cincinnati epochs. *Receptaculites, Selenoides*—probably calcareous sponges. *Favistella*—Corals be-

longing to the family Favositidae or honey-comb corals, so called because made up of hexagonal, parallel columns. *Orthis*—a genus of the class of Brachiopods, characteristic of this epoch.

Brachiopods are sometimes called lamp shells, on account of their resemblance to a Roman lamp; the two valves of the shell are unequal in size, and the beak of the larger curls over on that of the smaller. Though found only in small numbers at the present day, they were in Silurian times the most abundant and characteristic form of marine life. In structure they have points of alliance with the Worms on the one hand and with Mollusks on the other. *Pleurotomaria, Murchisonia*—Gasteropod or univalve Mollusks common in the Trenton epoch.

Case 2B.—Hudson river and Medina epochs. Brachiopods are represented by large slabs containing *Leptoena*, also many species of *Lingullela, Lingula* and *Rhynchonella*. Species of the two latter genera exist at the present day. They afford a remarkable example of the power of a genus to survive the vicissitudes of time. *Glyptocrinus, Iocrinus*—Crinoids, the class of Echinoderms most abundant in early times. Attached by a jointed stem and bearing many-branching arms, they have been appropriately termed sea-lilies.

Arthrophycus—supposed to represent the leathery stems of seaweeds. Some authorities, however, regard this fossil as representing the markings of worms.

Case 2C.—Hudson River and Niagara epochs. *Eridophyllum*—Corals of the Cyathophylloidæ or cup-coral family. *Halysites*—Corals of the Halysitidæ or chain-coral family. Nearly all Silurian corals belong to these two or the Favositid family.

Streptorhynchus—A representative Brachiopod. *Orthoceras*—many specimens illustrating the size and distribution of this Silurian Cephalopod.

The several sections show that its shell was divided by cross partitions into chambers. The animal occupied only the end chamber, but a long tube or siphuncle connected the others to its body.

Cases 2D and E.—Niagara and Lower Helderberg periods. *Favosites, Halysites*—Corals. *Eucalyptocrinus*—Crinoids. *Illænus*—Trilobites. *Bythotrephis*—probably marine Algæ. *Pentamerus*—a large and abundant Brachiopod, characteristic of the Niagara beds of the Mississippi Basin. *Spirifer, Rhynchonella*

—other common Brachiopods. *Eurypterus*—Crustaceans closely allied in structure to modern Scorpions, but being water breathers are classed with the Crustacea. A large number of specimens from the Water-lime group of New York.

Case 2F.—Foreign Silurian fossils. From the Wenlock limestone of England, several specimens of *Periechocrinus*, *Cyathophyllum* and others. From the Bohemian beds, several species of Graptolites, the genera *Phacops* and *Dalmanites* among Trilobites, and many specimens of the *Orthoceras* family.

Cases 2G, H and 3.—Fossils of the Devonian Age or age of fishes. The fishes which by their size and abundance characterized this age, belonged to two orders—Ganoids, represented at the present day by the garfish and sturgeon, and Placoids, the order which includes sharks, skates and rays. They differed in many respects from the fishes of the present day, however. The Ganoids were covered with thick, bony scales, had teeth of reptilian character and jointed, paired fins. The Placoids had cartilaginous skeletons, no scales, no gill covers, and many of their characters were embryonic.

Case 2G.—Lower Devonian fossils of the Corniferous period. *Favosites*—Honey-comb corals. *Heliophyllum*—Cup corals.

Ophiura, Loriolaster—Asteroids similar to modern starfishes. Being free-moving Echinoderms, they mark the introduction of a higher type than the attached Crinoids. *Macropetalichthys*—a Ganoid fish.

Case 2H—Lower Devonian fossils. *Syringopora*—Chain corals. *Zaphrentis*—common and characteristic cup corals. *Orthis, Atrypa, Spirifer*—Brachiopods. *Coccosteus*—a typical Ganoid from the Old Red Sandstone of Scotland.

Case 3A.—Middle Devonian fossils. *Psilophyton, Sphenopteris*, etc.,—early land plants from the Devonian beds of St. John, N. B. They were of low orders, chiefly mosses and ferns. *Holoptychius, Glyptolepis, Diplopterus*—fishes from the Old Red Sandstone of Scotland. These are nearly all Ganoids, as may be seen from the large, bony scales with which they are covered. *Cyathophyllum, Cystiphyllum, Zaphrentis*—Cup corals.

Case 3B.—Upper Devonian fossils. Large, polished masses of *Acervularia* from Iowa, a honey-comb coral. *Dictyophyton*—

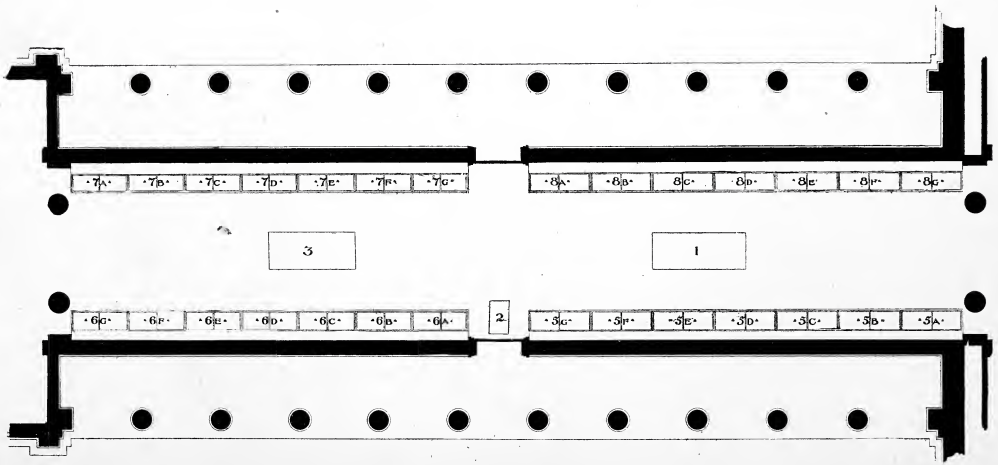
belongs to the class of sponges. *Aspidosoma, Furcaster*—Asteroids. *Spirifer, Orthis*—Brachiopods. *Goniatites*—represent the Cephalopods. They are of the same type as *Orthoceras*, but are coiled and the junction of the septa and shell (suture) is zigzag instead of straight. *Bothriolepis*—Ganoid fish. Note the thick, bony plates or armor.

Cases 4A, 4B, 4C, 4D, and 5A.—Fossils of the Carboniferous Age, or age of coal plants. Naturally, land plants are the striking features of this age. They belong to five great families: Conifers, Ferns, Lepidodendrids, Sigillarids, and Calamites.

Cases 3A, 4B, 4C, 4D, Hall 36.—*Cordaites*. This tree is allied to the Conifers, and had, probably, a straight trunk 60 or 70 feet in height. *Trigonocarpum*, in the same case, is supposed to represent its fruit. Ferns are represented by *Pecopteris*, *Neuropteris* and others, many imprints of sections of the fronds being shown. These frequently form the center of clay concretions, as may be seen in some which have been broken open. Sections of trunks of *Lepidodendrids* and *Sigillarids*. One of the latter shows by its size that the trunk of the original tree must have been many feet in diameter, and perhaps 80 to 100 feet high. *Stigmaria*, probably represent the under-water stems of the Sigillarids.

The animal life of this period is characterized by the abundance of Crinoids. These reached their highest development at this time. Many specimens are shown in this case, including *Platycrinus*, *Scaphycrinus* and *Pentremites*, the latter a Blastid or bud crinoid. Corals were also abundant, as represented by the columnar *Lithostrotion*, a true polyp coral, and *Dibunophyllum*, a cup coral. The cork-screw-like Bryozoan *Archimedes* is illustrated by several specimens. *Spirifer* and *Productus* are the leading genera among the Brachiopods. The Gasteropods, univalve mollusks, are represented by *Bellerophon* and *Pleurotomaria*. *Melonites*, in the upper part of Case 4, was an Echinoid allied to the sea-urchin of the present day; it differs from the latter, however, in having large plates and small spines. A cast on the wall shows the foot-prints of one of the first reptiles, *Sauropus*. It was a four-footed, crawling animal, with thick, fleshy feet about four inches long.

Case 5A, Hall 59.—Permian, or closing age of the Car-



PLAN OF HALL 59.

boniferous. Fishes are represented by the *Palæoniscus*. Reptiles by the *Archegosaurus*, an animal which combined the characters of reptile and fish, having both lungs and gills, and being covered with scales. Plants are represented by leaves of the *Walchia*, a Lycopod.

South and West Walls of Hall 36.—Large slabs and casts showing tracks of reptiles of the Triassic period. Little is known about these animals, except so much as can be learned from their foot-prints. The *Brontozoum* was a three-toed animal, probably at least 14 feet in height, with a stride of over 3 feet. *Cheirotherium* (South Wall, Hall 59), was so named from the resemblance of the foot-print to the human hand. It was a four- or five-toed reptile, probably of the order of the Labyrinthodonts. A cast showing the shape of the skull of the latter animal may be seen at the right.

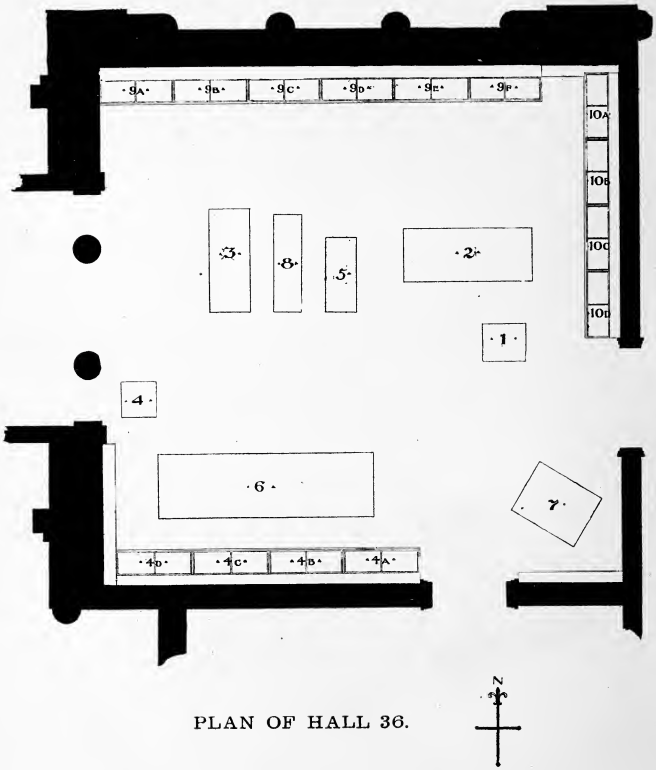
Cases 5, 6, 7, part of 8, and Walls of Hall 59.—Fossils of Mesozoic time, the age of reptiles. This age is characterized by the number and size of its reptiles, especially Amphibians. Here, too, are introduced the first mammals, birds and fishes of the modern type, and among plants the *angiosperms*.

Cases 5A and B.—Triassic fossils. Many types of the Carboniferous Age continue to be prominent. *Equisetum*, belonging to the family of Equisetæ, or " Horsetails " of the present day, and *Pterophyllum*, of the order of Cycads, were most prominent among the land plants, and are illustrated by many specimens. Among the Lamellibranchs, the modern genus of *Modiola* is introduced. *Ceratites* represents the Orthoceras of early times, from which it will be seen to differ in being coiled, and in having a more complex suture.

Cases 5C, D, E, F, G, 6, 7, 8A, B, C, D and Walls of Hall 59.—Jurassic fossils.

This is the period when the class of reptiles reached its greatest development. Other interesting fossils which are found, may, however, be first noticed.

Cases 5D, E, F, G.—Among plants, Cycads are illustrated by several specimens of *Cycadoidea*. Among Invertebrates the beautiful Crinoid *Pentacrinus*, illustrated by three specimens on the south wall, is especially notable. Other Echinoderms are



PLAN OF HALL 36.

Cidaris, Hemicidaris, Pygaster and *Clypeaster*, the two latter being allied to *Clypeus* or "sand dollar" of the present day.

Brachiopods, mostly of the sloping shoulder type, are illustrated by the genera *Terebratula* and *Rhynchonella*. Among bivalve mollusks the introduction of the modern genus of *Ostrea*, or oyster, is notable. A large number of beautifully preserved remains from the lithographic slate beds of Solenhofen are shown. They include some of the earlier Insects, and Crustacea resembling the modern lobster and king crab, *Limulus, Æger*.

Case 6.—Ammonites, remarkable for size and complexity of suture. Many specimens are shown, including the genera *Cardioceras, Arietites, Grammoceras*. Some of the *Arietites* are 3 feet in diameter. The sutures of some specimens have been painted to bring out the markings. Many specimens of *Nautilus* and allied Cephalopods.

Case 7.—*Belemnites*. These are allied to modern Cuttlefishes and Squids. The only part of the animal usually preserved is the internal bone, or pen. Two restorations of the original animal are shown.

Cases 8A, B, C, D.—The *Dinosaurs*, or land reptiles, are illustrated by bones and vertebræ of the *Teleosaur* and casts showing various parts of the *Megalosaur*. *Pterosaurs*, or flying reptiles, are illustrated by imprints of wings of the *Rhamphorhynchus*, an animal not unlike the bat in appearance, and by casts showing remains of *Pterodactyls*.

Walls of Hall 59 and Pedestals 1, 2 and 3.—Remains and restorations of *Ichthyosaur, Pliosaur* and *Plesiosaur*, great marine reptiles of the age. The two former often reached a length of 40 feet, had stout bodies, short necks, enormous eyes, long teeth and fin-like tails and paddles. The latter were their organs of locomotion. The huge eyes and teeth indicate that they were predatory and voracious animals, their food being probably fishes and other reptiles.

The Plesiosaur was a smaller and more graceful animal, with long neck, small head and powerful paddles, but in habits similar to the preceding. All had many fish-like characters.

Cases 8E, F, G and 9.—Fossils of the Cretaceous period.

Case 8E.—Here we find the first of modern plants, or *Angiosperms*. Imprints of leaves are shown, many being modern genera,

such as *Sassafras*, *Populites*, or poplar, *Betulites*, or birch, and *Viburnum*.

Cases 8F and G.—Among bivalve mollusks the order of *Rudistes* is unique, and characteristic of this period. In shells of this order one valve is enormously enlarged, and somewhat funnel-shaped; the other valve is small and acts as a lid—*Hippurites*, *Sphærulites*, *Radiolites*. *Inoceramus* also belongs to this order, and sometimes reaches enormous size.

Casts, much enlarged from the original, illustrating the forms of *Foraminifera*, whose shells make up the vast deposits of chalk which characterize this period.

Case 9, Hall 36.—Among Echinoids, the free moving forms are vastly in excess of the stemmed—*Ananchytes*, *Holaster*, and *Toxaster*. Among Cephalopods are specimens of *Nautilus* of modern type; also members of the *Ammonite* family, which take on various and intricate forms. Many varieties of shape are found, from straight-shelled to hook-shape, partly uncoiled spirals, spirals, etc. The genera are named from their characteristic forms, some of them being as follows: *Baculites*, rod-shaped; *Hamites*, hook-shaped; *Helicoceras*, an open spiral; *Scaphites*, boat-shaped; *Turrilites*, tower-shaped.

Agassiz describes these forms as representing the death contortions of this remarkable family. The term is an appropriate one, since with this age the group, which had so long been one of the dominant types of marine life, became extinct.

Lamellibranchs and *Gasteropods*, illustrated by many specimens, mostly of modern types—*Ostrea*, or oyster, of many and curious shapes; *Pecten*, *Vola*, *Exogyra*, *Gryphæa*, etc.

A fine series of fossil leaves from the Upper Laramie, Golden, Colo., is placed here.

North Wall of Hall 36.—Cast of head of *Mosasaurus*, the sea serpent of ancient times. This was a swimming, snake-like reptile, probably eighty feet in length.

Cases 9F, 10, and 11.—Fossils of Cenozoic time, or age of mammals, divided into the Tertiary and Quaternary periods.

Cases 9F, 10 and 11A and B.—Tertiary fossils.

Case 9F.—*Flabellaria*, leaves of a palm which grew in the Eocene epoch near Green river, Wyoming. Also, leaves of *Acer*, or maple, and other trees of modern species.

Such remains, with others that are found, indicate that a subtropical climate, like that of Florida, prevailed at this period over the Northern United States. Even as far north as Greenland, the climate was so mild that cypress and cedar trees grew in profusion.

Nummulites.— These are abundant and characteristic fossils of this period. They are shells of a Rhizopod, which in Europe and Africa form limestones many thousand feet in thickness.

Case 10.— Among univalve mollusks many modern types will be recognized— *Turritella*, *Natica*, *Cerithium*, *Strombus*, etc.

Fishes belonging to the order of *Teleosts*, or osseous fishes, are illustrated by many specimens from the Green river beds— *Priscarara*, *Diplomystus*, etc. These are of modern types and related to the perch, herring and the like.

Sharks of enormous size also existed. Teeth of the *Carcharodon* are common fossils, and specimens may be seen in this case.

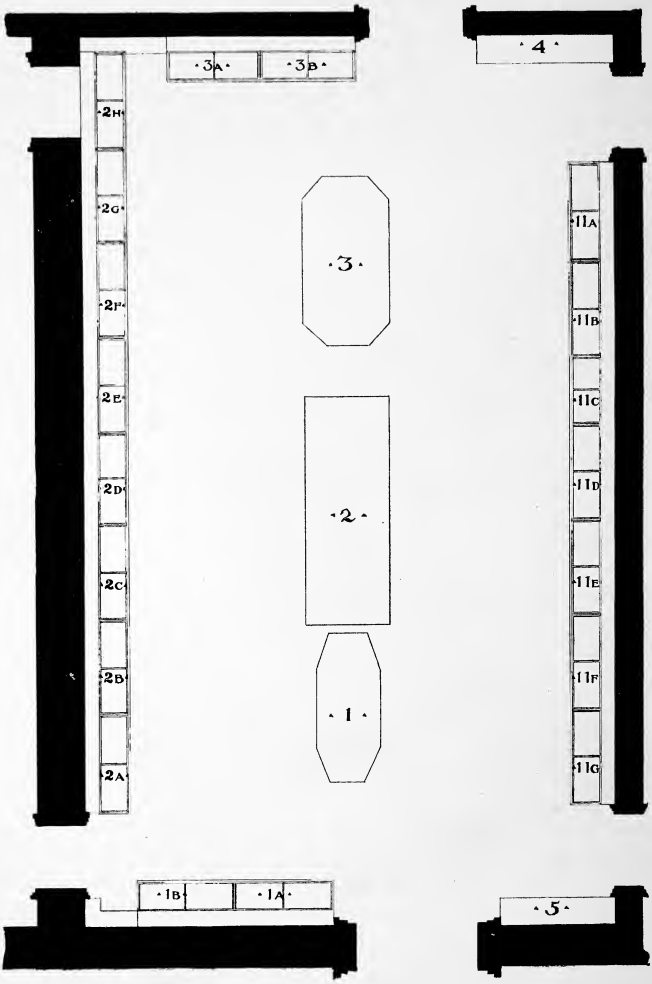
Floor of Hall 36, Pedestal 1.—A restoration showing the jaws of *Carcharodon*, and within these, for comparison, the jaws of a modern shark. The ancient *Carcharodon* was probably 50 to 70 feet in length.

Pedestal 2.— Restoration of *Hadrosaurus* from the Upper Cretaceous of New Jersey. This was a huge land reptile, 28 feet in length, allied to the *Iguanodon*. It was probably a vegetable feeder, and able to stand and walk after the manner of birds.

Pedestal 3.— Restoration of a skeleton of *Dinoceras*. This was a five-toed Ungulate of elephantine size, but had no proboscis, and was probably like the rhinoceros in its habits. It is marked by three pairs of protuberances on its skull which probably bore horns. In spite of the size of the animal its brain capacity was very small— only one-eighth that of a modern horse, as shown by a cast, Case 11D.

Pedestal 4.— Head of *Dinotherium* (cast). This was a huge animal with a skull three feet long, herbivorous, and remarkable for two long tusk-like teeth, projecting downwards. It combined the characteristics of the elephant, hippopotamus, tapir and dugong. A cast of its femur may be seen near by.

Pedestal 5.— A restoration of the skull of *Elephas ganesa*, one of seven species of elephants existing during the Miocene



PLAN OF HALL 35.

epoch in India. This species is remarkable for the length of its tusks, in this specimen ten feet long.

Pedestal 6.—Complete skeleton of *Mastodon* from Southern Michigan. This was the earliest of elephant-like mammals, differing from the elephant in having a more elongated body, shorter and stronger limbs, flatter cranium and less complex molars. The grinding surfaces of the molars were more or less tubercular, in contrast to the ridges which characterize the teeth of the elephant. Hence comes the name, mastodon—*nipple tooth*. The animal probably had no hairy covering to enable it to endure a rigorous climate as did the mammoth. It inhabited chiefly the temperate regions of the United States, where its remains are found in abundance.

Pedestal 7.—Cast of the skull of *Mastodon* from the Pleistocene beds, Orange County, New York. Behind it, casts of its femur and of the head and femur of *Diprotodon*, an ancient kangaroo of the size of a hippopotamus.

Pedestal 8.—Skeleton of the *Irish Deer*, from Limerick, Ireland—a Post-Pliocene deer of great size, the bones of which are found in marl beneath peat beds in Ireland and England. The antlers of this animal have a spread of seven feet, and its height was nearly eight feet.

Case 11, Hall 35.—Tertiary and Quaternary fossils.

Case 11A.—Fossil turtles of the Tertiary period, including carapaces of *Stylemys* from Nebraska and of *Testudo* from South Carolina; also turtle eggs from France.

Cases 11B and C.—The Cetacea, or whales of this period, are illustrated by vertebræ of the *Zeuglodon*. These animals were probably seventy feet in length. Their bones are so common in many places in the South as to be used by farmers for building fences.

There are also shown many remains of mammals from the Green river, Wyoming, beds, including skulls of the *Oreodon*, an animal which has been described as "a ruminating hog," and jaws, vertebræ, and limb bones of the *Titanotherium*, an animal allied to the *Dinoceras*. Also skulls of *Mesohippus*, which was a three-toed mammal about the size of a sheep, believed to be one of the ancestors of the modern horse.

Cases 11D and E.—Quaternary fossils. Leg bones of

Eurypteryx, *Mesopteryx*, and other birds. These were post-glacial birds living in New Zealand. Large shells of *Ostrea*, or oyster, from the marl beds of North Carolina. Other invertebrates of this age.

Case 11F.—Bones of the post-glacial hippopotamus, which lived at this time in England. Leg bones of bison from the same region.

Case 11G.—Teeth of ancient elephants—*Mammoth* and *Mastodon*.

Note the great number of cross ridges in the teeth of the mammoth and the tubercular surface of the teeth of the mastodon. The latter indicate that the movement of the jaw of the mastodon was vertical like that of carnivores, rather than lateral, like that of herbivores in general.

Teeth and bones of the mammoth found in Alaska are shown here, indicating that it once inhabited the regions near the pole.

Carnivores, illustrated by skull of *Ursus spelæus* or cave bear. This was a bear of great size, frequently not less than nine feet in length, the remains of which are found in Europe in caves with human bones. It was evidently contemporaneous with early man, but has been extinct since historical times. Remains of *Homo sapiens*, or man, found in a cave on the island of Crete—probably very ancient. Casts of the Neanderthal and Engis skulls, the former of which has given rise to much discussion because of its flattened form. This has been held by some to prove that early man was a being intermediate between man and the ape. The skull has, however, about the average human brain capacity.

Floor of Hall 35, Pedestal 1.—Restoration of *Glyptodon clavipes*. This was a giant Edentate, allied to the Armadillo. It existed during Quaternary times in South America. The specimen is 10 feet in length, its carapace having a length of 5 feet.

Pedestal 2.—Restoration of *Megatherium Cuvieri*. This was another South American Edentate of the Quaternary epoch, which had one hundred times the bulk of any living species of this order. The genus had a wide range during this period, as shown by its bones being found as far north as South Carolina. It was a huge, clumsy beast, its enormous femur, three times as thick as an elephant's, being used for supporting the animal while with its fore limbs it tore down branches of trees for food.

Pedestal 3.—Restoration of *Colossochelys atlas*, one of the huge turtles of the Tertiary period.

North Wall of Hall 35, Pedestal 4.— Leg bones and complete skeleton of *Dinornis*, a huge, wingless bird which inhabited New Zealand. The tibia of some species is nearly a yard long and as large as that of a horse. Also casts of limbs of *Sivatherium*, a four-horned antelope or giraffe of elephantine size.

East Wall.—Casts showing heads of several species of *Bos*, ancestors of the modern cow; also casts of the remains of a human skeleton found in limestone in Guadaloupe.

South Wall, Pedestal 5.— Casts of skulls of several species of elephants of this time. Casts of skulls of *Toxodon*, *Sivatherium*, *Nototherium*, and other large mammals.

The Toxodon was a quadruped of huge size, which combined characters of rodents, elephants and whales. Its teeth show it to have been an herbivorous animal and its habits were probably like those of the Manatee or sea cow.

The Nototherium was an Australian mammal, of the wombat type, though as large as the rhinoceros. It probably had some of the characters of the elephant, and was closely allied to the Diprotodon. The humerus indicates that it was a burrowing animal, but it is hard to understand how an animal of so great size could have been of such habit.

PLAN OF HALLS 60 AND 61.

HALLS 60 AND 61.

GEOGRAPHIC GEOLOGY.

The purpose of the exhibit of this Division is to illustrate in a vivid and realistic way the surface configuration of the earth. The chief feature of the exhibit is a series of relief maps which reproduce on as natural and representative scales as practicable, the topography and structure of selected portions of the earth's surface. A part of the series show only topography and sculpture, while another part shows geological structure as well as topography. To some extent, the topography is shown on one map and the geological structure on another, so that both elements are represented with the greatest distinctness. The portions of the surface selected to be represented are usually such as to portray some typical form of surface sculpturing or of volcanic accumulation. Some, however, represent natural or political divisions.

In addition to the relief maps, there are models showing geological structure or illustrating methods of development. Some of these are dissected so as to show the more intimate structure of the formations. The exhibit also contains a collection of globes, wall maps, portfolios, and other geographic material. The following is a list of the principal features:

Relief maps showing topography only.

No. 1.—Relief map of the World on Mercator's Projection. Horizontal scale 630 miles to 1 inch. Vertical scale 78 times the horizontal.

No. 2.—Relief map of Europe. Horizontal scale 85 miles to 1 inch. Vertical scale 45 times the horizontal.

No. 3.—Relief map of Asia. Horizontal scale 216 miles to 1 inch. Vertical scale 39 times the horizontal.

No. 4.—Relief map of Africa. Horizontal scale 184 miles to 1 inch. Vertical scale 53 times the horizontal.

No. 5.—Relief map of North America. Horizontal scale 140 miles to 1 inch. Vertical scale 39 times the horizontal.

No. 6.—Relief map of South America. Horizontal scale 147 miles to 1 inch. Vertical scale 30 times the horizontal.

The foregoing maps enable one to study to advantage the great features of continental relief. Among those that may be noted are—that the continents in general have elevated mountain borders and a low or basin-like interior; that the highest border faces the larger ocean; that the lines of greatest elevation are placed outside the center; that all the gentle slopes descend toward the Atlantic and the Frozen Ocean, all the steep ones toward the Pacific and Indian Oceans; that the elevations go on increasing from the poles to the tropics.

No. 7.—Relief map of the United States. Horizontal scale 85 miles to 1 inch. Vertical scale 36 times the horizontal.

No. 8.—Relief map of the United States and the Gulf of Mexico, modeled on a section of a globe 16½ feet in diameter. Horizontal scale, 1 inch equals 4 miles. Vertical scale, 1 inch equals 8 miles.

Note that the true outlines of the continent extend much beyond the present coast line and properly include the West Indies.

No. 9.—Relief map of Massachusetts, from maps of the United States Geological Survey and the Topographic Survey of Massachusetts. Horizontal scale, 1 inch equals 4 miles. Vertical scale, 1 inch equals 4,000 feet.

No. 10.—Relief map of Connecticut from maps of the United States Geological Survey and the Topographic Survey of Connecticut.

No. 11.—Relief map of Northwestern Illinois including Cook, Du Page, Will and eighteen adjoining counties. The course of the Chicago Drainage Canal is shown.

No. 12.—Relief map of the Yosemite Valley from surveys made by C. King and J. T. Gardner. Scale, 1 mile equals 4 inches.

No. 13.—Relief map of Yosemite Valley from surveys made by Captain of Engineers, George M. Wheeler, U. S. A. Scale, 1 inch equals 1,000 feet.

No. 14.—Relief map of Yellowstone National Park, showing Cañons of the Yellowstone and Madison rivers, etc. Horizontal and vertical scale, 1 inch equals 1 mile, or 1. 63360.

No. 15.—Relief map of a part of Mount Desert Island. Maine. Scale, 1 to 40000.

No. 16.—Relief map of Carmel Bay, California, showing a submarine valley.

No. 17.—Relief map of France with detail of post roads and towns. Horizontal scale 1: 640,000. Vertical scale 1:5.

No. 18.—Relief map of the Caucasus Mountains.

No. 19.—Elementary relief map of England and Wales.

No. 20.—Elementary relief map of Scotland.

No. 21.—Elementary relief map of Europe.

No. 22.—Relief map of Palestine.

Relief Maps Showing Topography and Geological Structure.

No. 23.—Model of Henry Mountains and vicinity, Utah, showing geological formations and the effects of erosion.

No. 24.—Model showing Henry Mountains and vicinity ideally restored before erosion took place.

No. 25.—Geological and relief map of the Henry Mountains showing the effects of erosion.

No. 26.—Same as the above, ideally restored before erosion took place.

The foregoing illustrate the formation of laccoliths or dome-like mountains produced by the intrusion of lava.

No. 27.—Relief map of the Uinta and Wasatch Mountains, colored to show geological formation. Horizontal scale, 1 in. equals 4 miles, or 1.253440. Vertical scale, 1.126720.

No. 28.—Relief map of the Grand Cañon of the Colorado and the cliffs of Southern Utah, colored to show geological formations. Horizontal scale, 1 in. equals 2 miles. Vertical scale, 1 in. equals 5,000 feet.

No. 29.—Relief map of Eureka District, Nevada, colored to show geological formations. Scale, 1 in. equals 1,600 feet.

No. 30.—Relief map of Mount Blanc. Horizontal scale, ¾ in. equals 1 mile. Vertical scale, 1¾ in. equal 1 mile.

No. 31.—Relief map of Mount Taylor, New Mexico, showing geological formations. Scale, 1 in. equals 1 mile.

No. 32.—Relief model of Leadville and vicinity, dissected to show geological structure. Scale, 1 in. equals 800 feet, or 1.9600.

No. 33.—Same as above, undissected.

No. 34.—Contour map, in relief, of Washoe mining region, 50 foot contours. Scale, 1.20000.

No. 35.—Geological relief map of Blair, Bedford and Huntingdon counties, Pennsylvania. A portion dissected to show geological structure.

No. 36.—Profile relief map of the Sentis Mountains, N. W. Switzerland, showing mountain contour and geological structure.

No. 37.—Relief map of the high plateaus of Utah, colored to show geological structure. Scale, 1.1680000.

No. 38.—Relief map of the Drainage basin of the Arkansas river in Colorado, showing the relations of the catchment basins to the reservoir sites and irrigable lands.

No. 39.—Model showing irrigation by ditches and furrows on steeply sloping fields.

Nos. 40 and 41.—Relief maps of Mount Shasta showing topographical and geological features.

Nos. 42 and 43.—Relief maps of the Chattanooga District showing topographical and geological features. Note how, by folding and erosion, the formations originally overlying one another have been exposed so as to succeed one another laterally.

No. 44.—Relief map of New Jersey showing topographical and geological features.

No. 45.—Relief map of Kentucky showing topographical and geological features and location of principal coal fields.

No. 46.—Relief map of Missouri showing topographical and geological features and principal mining districts.

No. 47.—Relief map of the United States showing limits and theoretical curvature of the ancient ice sheet at the stage of the Glacial Period following the main silt epoch. Modelled on a section of a globe 16½ feet in diameter. Scale, 1 inch equals 40 miles.

Relief Maps of Volcanoes and Volcanic Regions.

No. 51.—Relief map of the region of extinct volcanoes in Auvergne, Central France; geological and topographical. Henri Le Coq and G. P. Scrope.

No. 52.—Relief map of the Ice Spring craters, a group of extinct volcanoes near Fillmore, Utah, illustrating the successive

formation and partial obliteration of craters and lava fields. Horizontal and vertical scales, 1.1200.

No. 53.—Geological relief map of Mount Ætna.

No. 54.—Geological relief map of Vesuvius and Monte Somma.

No. 55.—Geological relief map of the Island of Palma.

No. 56.—Geological relief map of the Island of Teneriffe.

Maps of Ideal Reliefs.

No. 61.—Relief of a volcanic island.

No. 62.—Relief of a steep coast and dune coast, showing the two principal types of sea coast as they appear at ebb tide.

No. 63.—Relief of a complete glacier.

No. 64.—Relief illustrating the formation of valleys by erosion.

Several globes are exhibited, one being four feet in diameter.

Among the wall maps shown may be mentioned:

No. 70.—Topographic wall map of a portion of the west of Scotland, hatchured. Scale, 1 in. equals 1 mile.

No. 71.—Same as above, without hatchures.

No. 72.—Bacon's library wall map of London and suburbs.

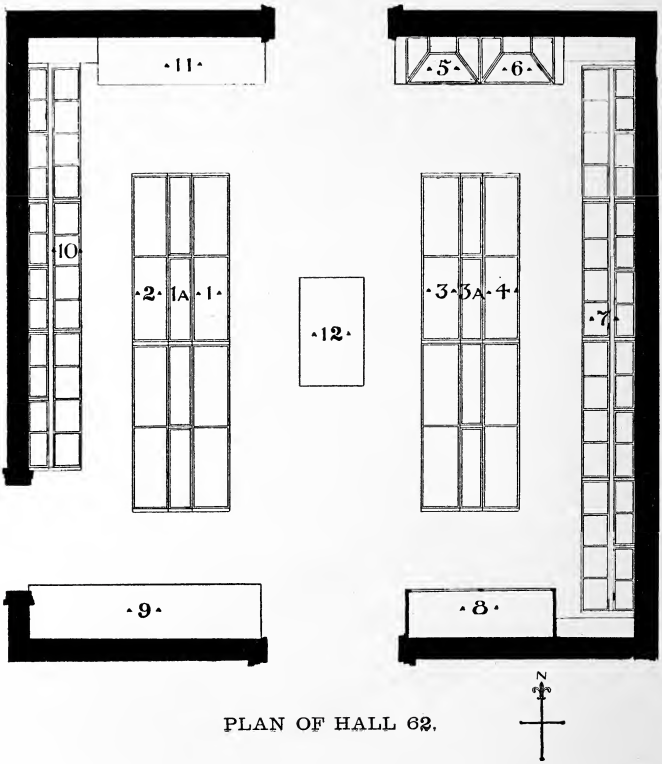
No. 73.—Geological wall map of England and Wales. Scale, 1 in. equals 15 miles.

No. 74.—Hotchkiss' geological wall map of Virginia and West Virginia.

No. 75.—Geological map of Russia.

No 76.—Map and profiles of the main drainage channel of the Sanitary District of Chicago, from Chicago to Joliet.

A complete series of the topographical maps issued by the U. S. Geological Survey is deposited in the Departmental Library, and can be examined on application to the Curator.



PLAN OF HALL 62.

HALL 62.

METEORITES.

The collection of Meteorites includes 180 distinct "falls" or "finds" represented by 4,077 specimens, and having an aggregate weight of 4,720.6 pounds; 2,140.4 kilograms.

These are grouped in three classes, viz.:—Aerosiderites or Siderites, Aerosiderolites or Siderolites and Aerolites. Under each of these divisions the specimens are placed in chronological order, and labels show the locality, date of fall or find, and weight of specimen.

Cases 1, 1A, and 2.—*Siderites.* These are meteorites composed chiefly of iron, with varying percentages of nickel, cobalt, manganese, etc. Combined sulphur and phosphorus are usually present. The surface of the siderites is smooth, as if fused, and more or less indented or pitted. Polished slabs, upon etching with nitric acid, usually show octahedral markings called *Widmannstätten* figures.

Case 1.—Among specimens of earliest fall are irons from Toluca, Mexico, a meteorite found in 1784. Over twenty masses of this are shown, including polished slabs bearing the characteristic etching figures.

Other interesting specimens of meteorites are those from Magura, Szlanicza, Hungary; Coney Fork, Tenn.; Braunau, Bohemia; Seneca Falls, N. Y.; and Lion River, South Africa.

The Widmannstätten figures are beautifully shown on the latter, and many other specimens in this case.

Case 1A.—Large masses of the Toluca, Mexico, iron; nearly 2,000 grams of the Bendego, Bahia, Brazil, siderite; 1,396 grams of the Brazos River, Texas, siderite; specimens of the Butcher Iron, Coahuila, Mexico; natural and etched specimens of the Glorietta Mountain, New Mexico, iron. Large masses of the peculiar meteorite from Santa Catharina, Brazil. These

masses have the form of rusty, porous nodules, and owing to alteration, much resemble certain varieties of limonite. Group of Cañon Diablo, Arizona, siderites, the largest piece weighing 198.5 pounds. Polished and etched specimens of the same. 100 pounds of the Kenton county, Kentucky, siderite.

Case 2.—A large number of specimens of the Santa Catharina iron; etched specimens of the Joe Wright Mountain siderite; 23 grams of the Lea iron, Tennessee; the Floyd Mountain, Virginia, iron. Specimens of the Butler, Mo., Dalton, Ga., Jenny's Creek, Va., Welland, Canada, and many other siderites.

Cases 3, 3A and part of 4.—*Aerolites.* These are meteorites made up largely of stony matter. The surface is usually black, smooth as if fused, and somewhat pitted. On breaking the thin, black crust which covers the exterior, the interior is generally found to be of a grayish color, with scattered metalliferous particles. Analysis shows these meteorites to be made up largely of the silicates olivine, feldspar, augite and other minerals of the pyroxene group, and sulphides and phosphides of iron.

Case 3 and part of 4.—The aerolite of earliest date is that from Ensisheim, Germany, which fell in 1492; 26 grams are shown. Other interesting specimens are 200 grams of the stone from L'Aigle, France; 7 grams of the Bishopville, South Carolina, aerolite, remarkable for its light color and its composition of nearly pure enstatite; about fifty stones of the Pultusk, Poland, fall; fragments of the carbonaceous meteorite from Entre Rios, Argentine Republic; and two fragments of the recently discovered Beaver Creek, British Columbia, aerolite.

Case 3A.—Six hundred and nine aerolites of the Winnebago county, Iowa, fall, varying in weight from a few grams to ten pounds each. These stones fell over an area nine miles in extent at 5:30 P. M., May 2, 1890. They are each individually perfect aerolites.

Case 3A (West Side).—Large slabs of the Farmington, Kansas, aerolite, which fell June 25, 1890. Several masses of the Homestead, Iowa, aerolite.

Case 3A (East Side) and part of Case 4.—*Siderolites.* These contain iron and stony matter in about equal proportions. Olivine is frequently found filling the cavities of the iron.

They are illustrated by specimens of the Pallas iron, of the Rittersgrün, Hainholz, Estherville, Rockwood, and many other siderolites.

Cases 5 and 6.—Siderolite, or Pallasite, from Kiowa county, Kansas, found in 1889; nine pieces. The mass in Case 5 weighs 465 pounds; the largest in Case 6, 344.5 pounds. There are also three smaller masses, and three or four slabs cut to show the structure of the iron, the cavities of which will be seen to be filled with olivine.

Case 8.—Aerolite from Phillips county, Kansas. One large mass broken into 2,934 pieces. The aggregate weight of these is 1184.5 pounds, making the largest weight of any single aerolite known. The broken condition is due to the fact that the stone fell upon a ledge. The pits characteristic of meteoric stones are well shown upon the surface of the principal mass. The white coating was formed subsequent to the fall of the stone.

Cases 7 and 10.—Casts of notable meteorites. Collection showing terrestrial minerals which approximate in composition to those found in meteorites.

Pedestals 9 and 11.—Models showing the form and size of the huge, iron meteorites found in the State of Chihuahua, Mexico.

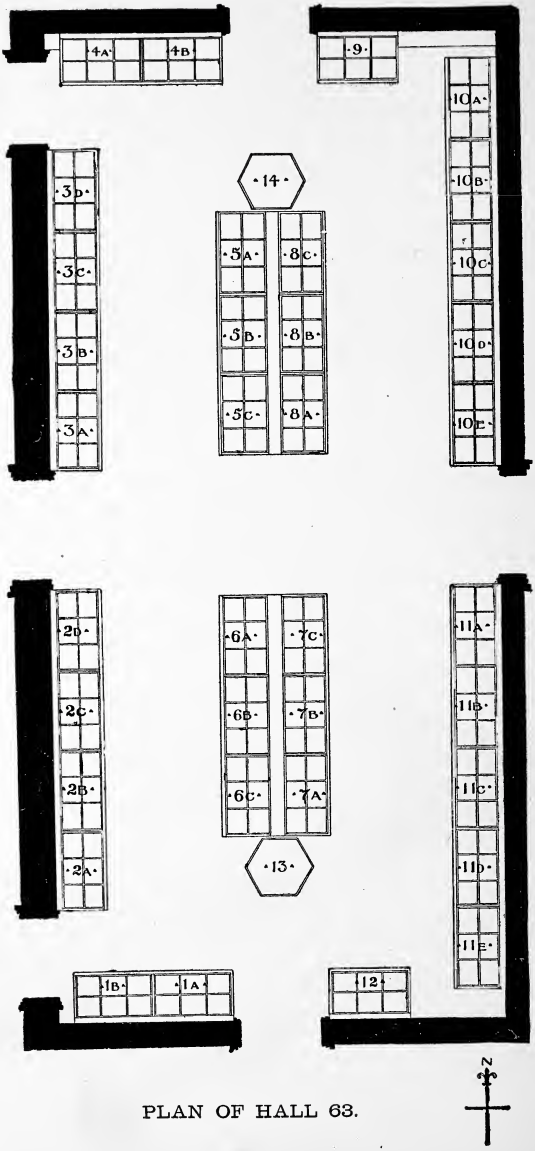
The original masses are exhibited at the School of Mines of the City of Mexico.

Pedestal 12.—Two large masses of Cañon Diablo, Arizona, meteorites, weight 1013 and 265 pounds.

Note the natural perforation through which the chain passes by which the smaller one is hung. It well illustrates the auger-like action of the air to which a meteorite is exposed during its passage to the earth. These meteorites are also remarkable as containing minute diamonds.

East Wall.—Map showing distribution of meteorite falls in the United States.

For detailed information regarding the specimens and meteorites in general, the Guide and Handbook of the collection, a copy of which will be found in the Hall, may be consulted.



PLAN OF HALL 63.

HALLS 63 AND 64.

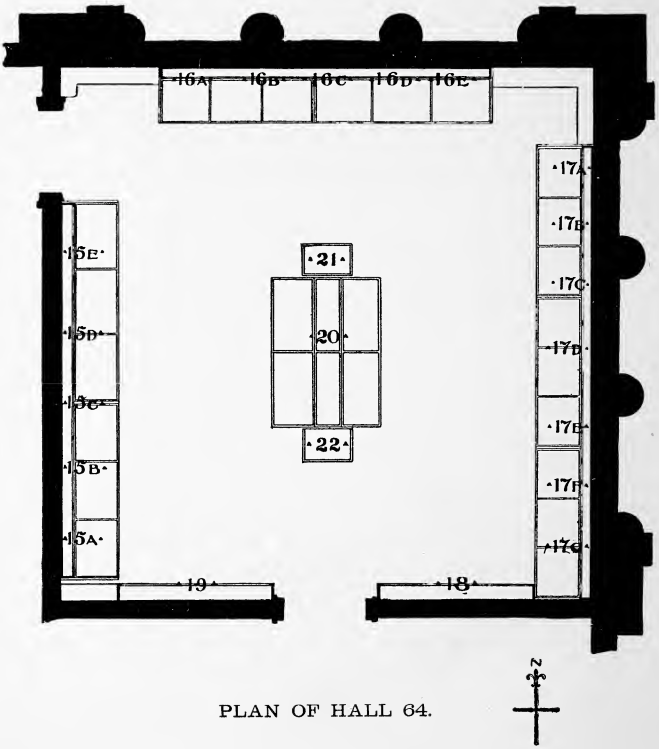
SYSTEMATIC MINERALOGY.

The systematic collection of minerals numbers about 5,000 specimens. The arrangement of the collection is based upon that given in Dana's New System of Mineralogy, and so far as possible the purpose has been to illustrate the different species there described. A copy of this work may be found in the library. The order which is to be followed in a study of the collection is shown by the numbering of the cases. Thus, entering Hall 63 from the south, the visitor finds case No. 1 at his or her left, and the order then follows along the west wall through the oxides in Case 4, back on the western side of the center aisle, down the eastern side, and back along the east wall; then passing to Hall 64, the the order continues with the phosphates in Case 15 on the western side and ends with Case 17 on the eastern side.

The large headings above each case indicate the groups to which the specimens beneath belong, and in each division corresponding to these are tables showing the chemical composition and system of crystallization of these minerals. The specimen labels show the name of the species, and the locality.*

Cases 1A, 3A, 4, 6B, 8A, 10B, 15, 16.—As specimens worthy of especial notice may be mentioned, among the sulphides, Case 1A, the large crystals of stibnite from Japan; among the haloids, Case 3A, the beautiful green and purple fluorites from English and American localities; among the oxides, Case 4, the extensive collection of natural and artificially colored agates from South America; among the carbonates, Case 6B, the curiously distorted calcite crystals, sometimes called "butterfly twins," from Egremont, England, and the brilliant groups of the same mineral from the Big Rig Mine, Cumberland, England; Case 7A, the Flos Ferri aragonites, which look like triumphs of the confectioners' art, and the delicately tinged stalac-

*Owing to the lighting of the hall from above, a good observation of the specimens is somewhat hindered by the reflection from the cases. In order to avoid this the observer is advised to view the specimens from the side rather than from the front.



PLAN OF HALL 64.

tites of the same mineral from the Copper Queen Mine, Arizona; among the silicates, Case 8A, the large crystals of Amazon stone from Pike's Peak, Colorado, and, Case 10B, the transparent and perfect crystals of topaz from Siberia; among the phosphates, Case 15, the richly colored vanadinites from Arizona, and among the sulphates, Case 16, the brilliant groups of celestite from Sicily.

Case 13.—A collection of natural and polished specimens of agatized wood from Arizona.

Case 14.—A large display of the beautiful rubellite in lepidolite from San Diego County, California, and some massive gypsum crystals from the cave in Wayne County, Utah, which was recently opened by Prof. J. E. Talmage, of Salt Lake City. These crystals are of remarkable size, some being nearly four feet in length, and are nearly transparent.

Case 17A.—Following the end of the systematic collection in Room 64 is a small collection of pseudomorphs, which illustrates the way in which one mineral may imitate or replace another.

Cases 17B and C.—A series illustrating the physical properties of minerals, such as form, structure, diaphaneity, lustre, hardness, and specific gravity.

Cases 17 D, E, and F.—A series of crystal models, representing the typical forms and position of the axes in the six systems of crystallization. Together with these are a number of models of crystals of the more common mineral species, and some of the crystals themselves. The models are mounted in their true crystallographic position, and are intended to illustrate not only the proper position, but also the distinctive crystal forms which characterize the common minerals.

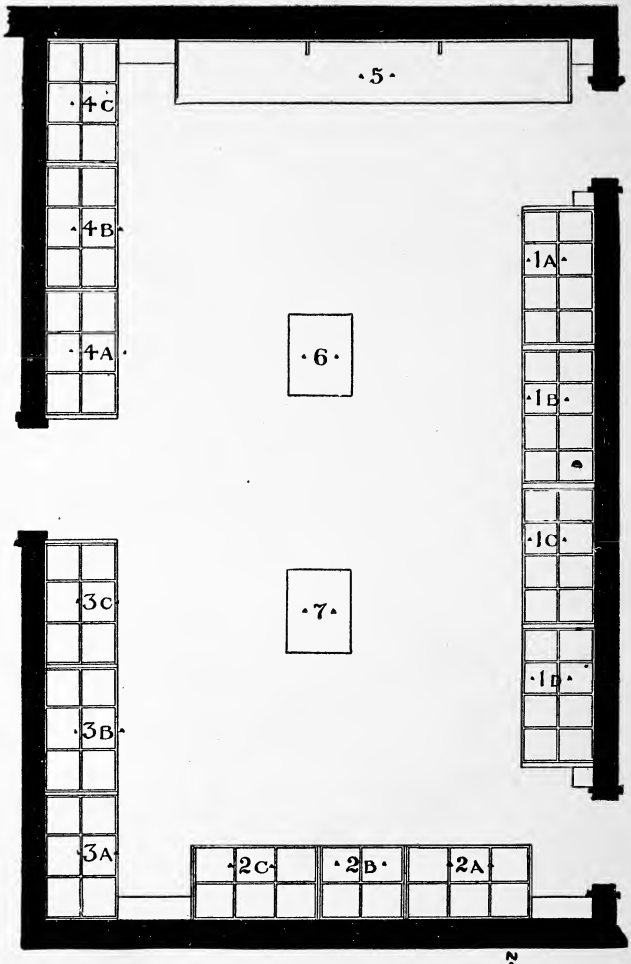
Case 17G.—A series of models of famous gold nuggets.

Cases 18 and 19.—Gem minerals, showing in the native state the minerals which are the source of gems and ornamental stones.

Case 20.—A small collection of cut stones is contained in this case. Others may be seen in Hall 32 of the Department of Industrial Arts.

Case 21.—Slab of lapis lazuli from Peru, said to be the largest single block ever quarried.

Case 22.—Group of amethyst crystals from Thunder Bay, Lake Superior.



PLAN OF HALL 65.

HALL 65.

STRUCTURAL AND DYNAMICAL GEOLOGY.

Case 1A.—Dendrites.

Case 1B.—Volcanic products, illustrated by lavas, volcanic bombs, etc.

Case 1C.—Cave products, represented by stalactites and stalagmites. (See foot note, p. 47.)

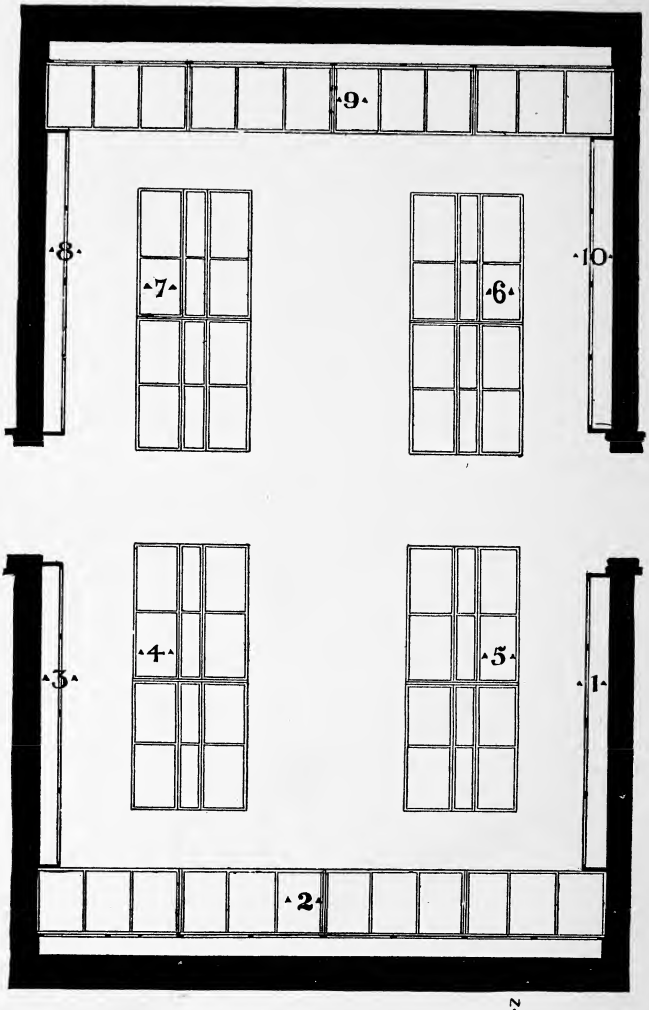
Cases 2 and 3.—Specimens representing varieties of rock structure. The specimen labels here show; first, the kind of structure; second, the name of the object; third, the locality. Among the specimens representing concretionary structure, the clay concretions are worthy of note, since they assume curious forms which are often mistaken by unscientific observers for fossil turtles, eggs, or fruits.

Cases 2C and 3.—Septaria, geodes, specimens illustrating nodular, öolitic, pisolitic, and spherulitic—which are really varieties of concretionary—structure, cellular, porphyritic, and stratified structure.

The septaria are produced from concretions by drying and subsequent filling of the cracks with calcareous matter. The resemblance of these to a turtle shell is often very striking, and their handsome appearance when cut and polished is shown by several specimens.

Case 4.—Specimens illustrating rock texture; veins; the effects of erosion by water, sands, and other agencies; ripple-marks, which are the preservation in stone of lines once made by ripples on a mud-flat; striation and polishing produced by glacial action; faulting; and metamorphism.

Case 5.—Various large specimens of types already mentioned, including a large septarium from Perry, New York; a large slab showing mud cracks from Holyoke, Mass.; two slabs showing fluting and polishing due to glacial action, from Kelly Island, Ohio. In the middle of the room will be found a large slab showing ripple marks, and a collection of basaltic columns from the Giant's Causeway and the Rhine Valley. The grouping of the latter is intended to illustrate the stair-like arrangement which is usually seen in basaltic cliffs that have been exposed to erosion. Further description and explanation of any of the types of structure represented may be obtained from Geikie's Text Book of Geology, Dana's Manual of Geology, or Le Conte's Elements of Geology, to be found in the Museum Library.



PLAN OF HALL 66.

HALL 66.

LITHOLOGY.

The collection shown in this Hall is one which aims to illustrate the different varieties of rocks as they are known to petrographers.

The characteristics of these rocks as they appear in different localities and their succession in certain regions is also exhibited.

About 2,000 specimens are shown, most of them being of the uniform size adopted by petrographers—3 x 4 x 1 inch.

The specimens are classified under three heads: Eruptive, Aqueous, and Metamorphic. The Eruptive rocks are those which have been formed at great depths, and were once in a state of igneous fusion. Being most deeply seated they may be considered to be the primary rocks of the earth's crust, so far as it is known. From these, aqueous agencies form the Aqueous rocks by erosion and deposit, or by chemical precipitation. The latter in turn may be changed to Metamorphic rocks by dynamical and chemical agencies, which, however, do not usually destroy the lines of stratification.

Cases 1, 4, 5, and part of 6.—Eruptive rocks. The classification which has been adopted for these is based upon the following plan:

First, an arrangement according to percentages of silica. The highest in silica, or acidic rocks, are placed at the beginning of the series, then those having lower percentages and, last, the lowest, or basic rocks.

Thus, beginning with the granites, which have from 80 to 65 per cent. of silica, we pass among the coarse-grained rocks to the diorites, which have between 65 and 55 per cent., then to the gabbros and diabases, having usually more than 45 per cent. and end with the peridotites, having below 45 per cent. A corresponding series begins with the syenites, and ends with the nepheline rocks.

Second, under the divisions representing different percentages of silica, a vertical arrangement is adopted by which the coarse-grained or holocrystalline rocks are placed first, then those of

finer grain or those having a porphyritic structure and, last, the amorphous rocks. Thus among rocks having from 80 to 65 per cent. of silica, the granites, being coarse-grained, are placed first in the vertical order, the granite porphyries second, and rhyolite, nevadite, obsidian, which are amorphous, last.

Case 1.—First row, *granite* and its varieties, such as *granitite, graphic-granite*, etc. These are rocks having quartz, alkaline feldspar, and one or more minerals of the mica, amphibole, or pyroxene groups as essential constituents.

Second row, *granite-porphyry, quartz-porphyry, vitrophyre, felsophyre*, etc. Like the preceding in composition, but more or less porphyritically developed.

Third row, *rhyolite, nevadite, pumice, obsidian*, etc. These are amorphous volcanic rocks, having high percentages of silica, usually more than 70 per cent.

Case 2.—Polished granites and marbles.

Cases 2 and 3.—Series illustrating the rocks of Manhattan Island. These have chiefly been obtained by taking specimens from excavations made in and about New York City.

They are crystalline, metamorphic rocks, and illustrate well the great variations possible in kinds of rock in a small region.

Series illustrating the rocks of the Green Mountain Range, passing eastward from Pittsfield, Mass.

These include a variety of schists, limestones and other metamorphic rocks ranging in geological time from the Archaean into the Devonian. They illustrate the different formations distinguished by geologists in that region.

Case 4 and part of 5.—*Syenite-nephelinite* series.

First Group.—First row. *Syenite, minette*, etc. Holocrystalline rocks, having orthoclase and biotite as essential constituents.

Second row. *Trachytes.* Tertiary eruptive rocks, characterized by the predominance of an alkaline feldspar, usually sanidine, and freedom from quartz. An iron-bearing mineral is also usually present.

Second Group.—First row. *Nepheline or elaeolite syenites.* Rocks comprised of nepheline, orthoclase, and usually a pyroxenic mineral and plagioclase feldspar.

Second row. *Phonolites*, rocks consisting of an alkaline feld-

spar, with minerals of the nepheline and leucite groups, and usually a monoclinic augite.

THIRD GROUP.—*Tephrites* and *basanites*, rocks having nepheline or leucite and lime-soda feldspar as essential constituents. They are usually porphyritic in structure, with a more or less amorphous ground mass.

FOURTH GROUP.—*Kersantite*, *leucite basalt*, *leucitite*, *nepheline basalt*, and *nephelinite*. Rocks containing leucite or nepheline in place of feldspar, and these usually associated with augite.

Case 5 and part of Case 6.—FIRST GROUP. *Diorite* and *varieties*—holocrystalline rocks, having plagioclase feldspar and hornblende or black mica as essential constituents.

Second row, *andesites* and *dacites*, amorphous or porphyritic rocks composed of soda-lime feldspar, black mica, hornblende, and in the case of the *dacites*, quartz.

Third row. *Porphyrites* of various kinds.

SECOND GROUP.—First row, *gabbros* and *norites*. Rocks consisting of a basic soda-lime feldspar, with diallage or other pyroxene.

Second row. *Diabases*, rocks having plagioclase feldspar and augite as essential constituents.

Third row. *Basalts*, *dolerites* and *melaphyres*. The former are common rocks widely distributed in the form of dikes and intrusive sheets. They are popularly known as trap rocks. Their composition is like that of the preceding.

THIRD GROUP.—First row, *pyroxene rocks*, *diallagite*, etc. Basic rocks, composed largely of pyroxene.

Second row, *peridotite* and varieties, including *lherzolite*, *picrite* and *dunite*. These are highly basic rocks, composed chiefly of olivine, but having chromite and other iron oxides usually present.

Remainder of Case 6 and Case 7.—Aqueous rocks. Rocks formed as chemical precipitates are placed first. These include *hematite*, *limonite*, *calcareous tufa*, *oölitic and pisolitic limestones*, *onyx*, *serpentine* and its varieties, *talc* or *steatite*, including *verd-antique marble* and *ophite*, *gypsum*, *alabaster*, etc.

Then follow rocks formed as sedimentary deposits, and fragmental in structure. The principal varieties of these are arranged

in this order: *sandstone*, *conglomerate*, *breccia*, *quartzite*, *shale*, *clays*, *tufas* or *tuffs*, *coquina*, *chalk* and *limestones*.

Cases 8, 9 and 10.—Metamorphic rocks.

These are divided into the stratified or bedded, and foliated or schistose.

The first class includes *crystalline limestones*, *marble* and *dolomites*. These are made up chiefly of the mineral calcite, and are formed from remains of mollusks, corals and other animals. These produced limestone first and this was changed by the action of heat to the crystalline condition. In some cases the original fossils remain intact, as is illustrated in many of the polished slabs.

Upper part of Case 9.—A large and complete collection of varieties of *marble*, the different colorings being produced largely by iron oxides, micaceous minerals, or finely distributed sediment.

Lower part of Case 9 and Case 10.—Following the *marbles* are placed the *crystalline schists*, which are rocks of variable composition, but characterized by a pronounced schistose structure, especially where mica is the prevailing constituent. Here are included *argillite*, *clay-slate*, *eclogite*, *quartzite*, *phyllite*, *paragonite schist*, *chlorite schist*, *mica schist*, and others.

Last in the series appear the *gneisses*, a class of rocks essentially like the granites in composition, but differing from them in structure, in that the constituents are arranged in approximately parallel bands or layers. These are the oldest of crystalline rocks, and are considered by many to represent portions of the primeval crust. Others, however, regard granites as the last term in the metamorphism of such rocks, and for that reason the gneisses have been placed in juxtaposition to them. *Varieties* of *gneiss*, based upon the prevailing mineral, whether *biotite*, *muscovite*, *hornblende*, or others, are included here.

DIVISION OF ECONOMIC GEOLOGY.

It is the purpose of the collections shown in this Division to illustrate modes of occurrence in Nature of the minerals and ores which have economic importance, to show the localities from which they are obtained, the processes used in their extraction and treatment, and their application to human arts and industries.

The specimens have for the most part been gathered from exhibits made in the Department of Mines and Mining of the Columbian Exposition, and were secured to the Museum by the Chief of that Department.

They may be conveniently classified into five groups, which can be most readily inspected in the order named:

Building stones and quarry products, Halls 67 and 68.

Carbon minerals, including coals, petroleum, etc., Halls 69, 70 and 71.

Ores and products of the precious metals and lead, Hall 72.

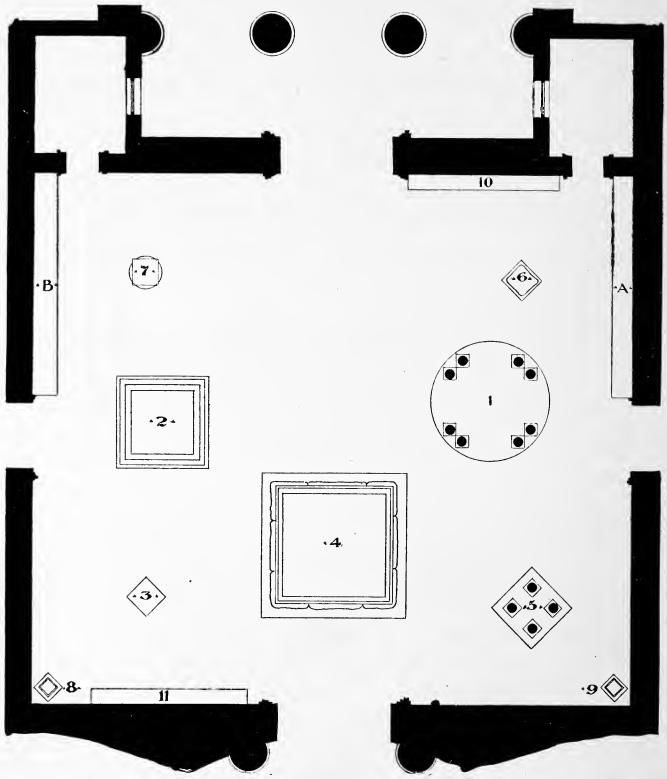
Ores and products of the useful metals, Halls 76 and 79.

Fictile materials and non-metallic minerals of use in the arts, Halls 77 and 78.

There are also included in this Division, a Departmental Library and Laboratory, and the office of the Curators.

In the arrangement of the collections a series of type specimens of each group of minerals is placed first. Then follow specimens illustrating different localities, arranged in geographical order, passing eastward from California. Then are illustrated, so far as the material at hand permits, methods of mining, processes of reduction or manufacture, and finished products showing the uses of the metal or mineral.

The collections include, among other unique features, the Kunz collection of platinum ores and concentrates, the large and complete collection of mineral oils and their products made by the Standard Oil Company, the statistical column prepared by the United States Geological Survey, and a unique series of transparencies enlarged from wood engravings in *De Re Metallica*, showing processes of mining and metallurgy in the sixteenth century.



PLAN OF HALL 67.

HALL 67.

MARBLES AND SANDSTONES.

No. 1.—Column of sandstone pillars capped with grindstones. There are placed in the openings, currier's blocks and grindstones for pocket cutlery and edged tools. All are from northern Ohio from strata of the Carboniferous Age.

No. 2.—A pyramid of various marbles from Greece.

No. 3.—An anvil, hammer, and cog-wheel chiseled from Bedford, (Ind.) limestone.

No. 4.—Four mantel-pieces, surrounding an obelisk. All made of varieties of marble, Norway. From the Norway section of the Manufactures building, World's Columbian Exposition.

No. 5.—Eight Costa Rica vases, cut from diabase and sandstone.

No. 6.—Building stones, Indiana.

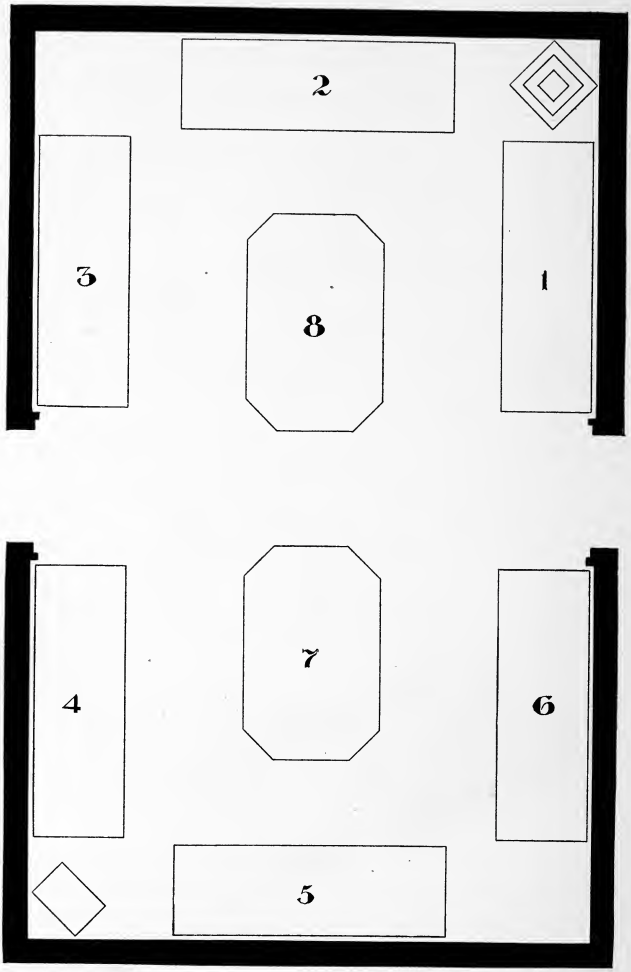
No. 7.—Pyramid of building stones, including sandstones from Ohio and Connecticut, granites from Maine, etc.

Nos. 8 and 9.—Sandstone column, New South Wales, capped with vases of sandstone from Costa Rica.

Platforms A and B.—Various granite and sandstone columns. Blocks of polished marble—Greece.

Cases 10 and 11.—Ornamental marbles.

Many of the best ornamental marbles in the form of polished slabs and with the names by which they are commonly known. These names in general refer to the color and markings of the stones rather than to the composition or the locality where they are quarried.



PLAN OF HALL 68.

HALL 68.

BUILDING STONES.

This Hall contains a systematic collection of building stones.

Case 1.—Ornamental stones.—The stones in this case consist of marble, travertine or "Mexican onyx," serpentine, usually called verde antique, though the term was originally applied to its green varieties, and alabaster, a pure form of gypsum. These are all easily worked, take a good polish and are stones of great beauty. They are abundant enough to allow of their general use for decorative purposes.

Case 2.—Sandstones and limestones. Four-inch cubes of many of the sandstones and limestones of the United States used for building purposes.

Case 3.—Marbles and granites. Four-inch cubes of many of the marbles and granites of the United States used for building purposes. These four kinds of rock constitute nearly all the valuable building stones used in temperate climates.

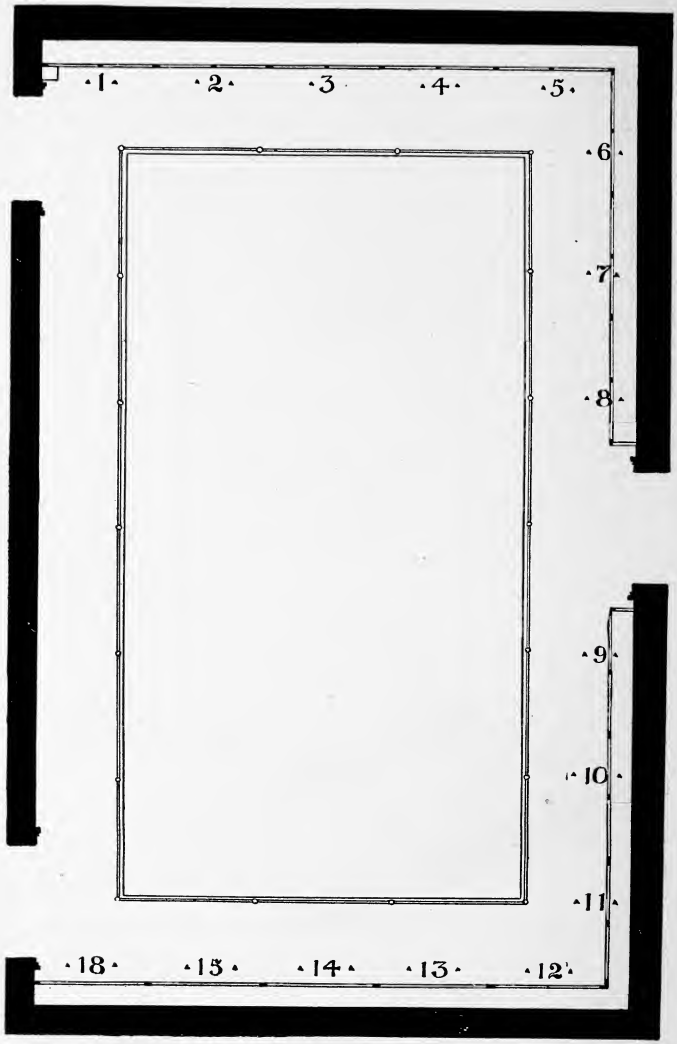
Case 4.—Building stones, United States.

Case 5.—Building stones of Mexico and Ecuador. These are mostly volcanic rocks, lavas and tuffs, which are sufficiently durable for mild climates and yet soft enough to be easily worked with simple tools. The building stones from Ecuador are the ordinary pumice-stone.

Case 6.—Artificial stones for building. These are moulded like terra cotta. See also cement artificial stones in Hall 77.

Platforms 7 and 8.—Large cubes of building stones of various kinds. These are dressed to show the following kinds of rock finish: rock face, pointed face, patent hammered, square drove, tooth chiseled and sawed face.

Upon the walls are illustrations showing the appearance of the more common building stones as they are seen by the microscope.



PLAN OF HALL 69.

CARBON MINERALS.

The minerals of which carbon is the chief or only constituent, afford a vast variety of products useful to man.

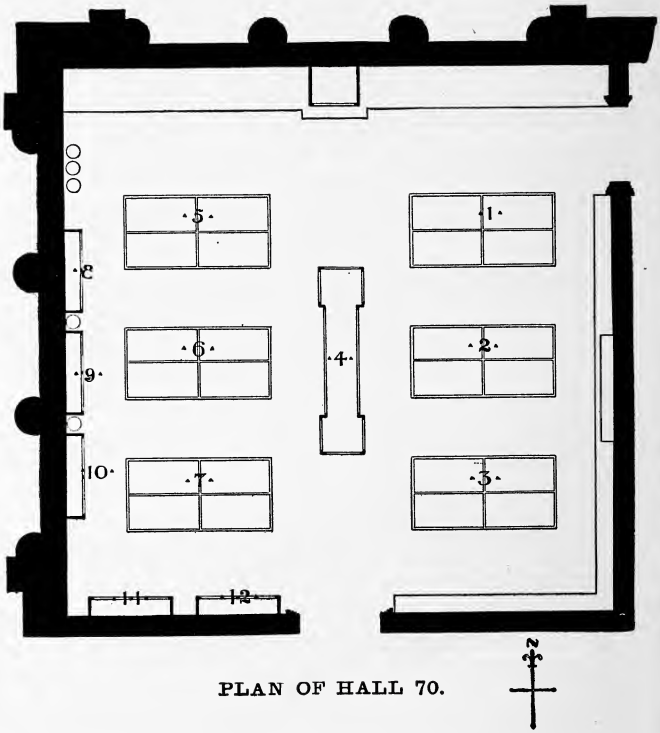
In the group are included the diamond, hard, transparent, lustrous and graphite, soft, black and dull; with them the great variety of mineral coals, petroleum, bitumens, asphaltum, etc. They furnish gems, fuels, sources of illumination, dyes, medicines, lubricants, paving and roofing materials, etc. A knowledge, therefore, of their characteristics and modes of occurrence in nature, is of great importance. They are illustrated by the collections in Halls 69, 70 and 71.

HALL 69.

Here one may study the distribution and extent of the coal fields of the United States, also the kinds of coal produced by each and the available means of transportation.

On a large plate-glass map in the center of the hall, scale ten miles to one inch, the coal fields of the United States as at present developed are indicated by areas in black, and the principal railroads connecting them are also represented.

Cases 1-18 contain specimens taken from these different fields, the exact locality of each being shown by red figures on the labels corresponding to those on the map. The order of numbers is the same as the alphabetical order of the States. The specimen labels show the uses of the coal, the name of the operators of the mine, the means of transportation and the markets. Analyses have been made of all the specimens and these data will be given to any one desiring to obtain them, on application to the Curator.



PLAN OF HALL 70.

HALL 70.

CARBON MINERALS.

This hall contains a series of the carbon minerals, beginning with the diamond, and passing through graphite, the coals (anthracite, semi-anthracite, semi-bituminous, bituminous and lignite) to bitumen and asphalt.

Case 1A.—Diamonds from Kimberly Mines, South Africa. "Blue ground" or matrix in which diamonds occur, from DeBeers mines, Cape Colony, South Africa.

Case 1B.—Graphite and manufactured articles in which graphite is an important constituent.

Case 2A.—Varieties of anthracite coal.

Case 2B.—Semi-anthracite coal; semi-bituminous coal; Bituminous coal.

Case 3A.—Cannel coal; bituminous coal.

Case 3B.—Lignite; peat.

Case 4.—Crude and refined petroleum.

Case 4B.—Eggette and block coal, manufactured from slack.

Case 5A.—Coal slack; American, German and French briquettes manufactured from pressed coal; Coal shales.

Case 5B.—Varieties of coke.

Case 6.—Asphaltum minerals. Petroleum shale.

Case 7.—Applications of asphaltum.

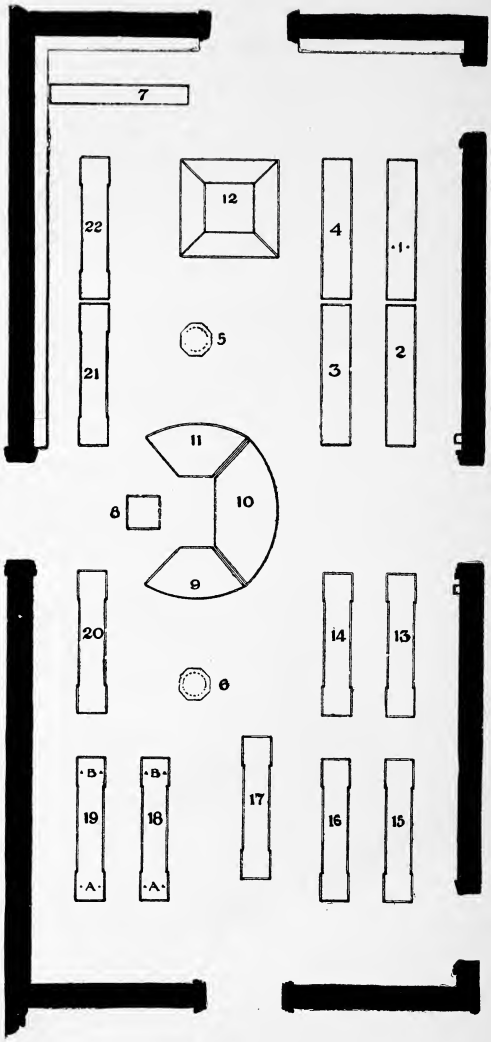
North Platform.—Section of coal seam five feet in thickness, from Duckenfield and Merthyr collieries, New South Wales. Blocks of anthracite coal from Pennsylvania, Washington and West Virginia. Kerosene shale and cannel coal, New South Wales. Block of asphaltum weighing one ton, California.

Case 8.—Coal from various localities in the United States.

Case 9.—Coal, England.

Case 10.—Coal, Saarbrücken fields, Germany; substances produced from the bye products of coke ovens; petroleum, Russia.

Cases 11 and 12.—Coal, Westphalia coal fields, Germany.



PLAN OF HALL 71.

HALL 71.

PETROLEUM AND ITS DERIVATIVES.

This hall contains the very complete collection made by the Standard Oil Company to illustrate modes of occurrence in nature of the mineral oils of the United States, the methods used for distilling and refining them and the products obtained. It contains a specimen of crude oil from every pool in the United States; specimens of various oil bearing sands and minerals of the oil strata; models of oil refineries and a complete series of the products of petroleum. Being so complete in all its details, it is believed that it will be found well worthy of careful study. By following the order given below, the visitor will find illustrated: (1), the natural history of petroleum; (2), its manufactured products, and (3), the uses or applications of these.

Cases 1, 2, 3 and 4.—Crude petroleum, one specimen from every pool in the United States. The States represented are Pennsylvania, New York, West Virginia, Ohio, Indiana, Illinois, Kentucky, Louisiana, Texas, New Mexico, Kansas, Colorado, Wyoming and California.

The specimens are arranged to show gradations of color, this being seen to vary from black, through shades of dark green and brown, to amber, the greenish brown being most common. The light colored oils, though more attractive in appearance, do not have the value for economic purposes, of the black, thick oils.

East Wall.—Tubes filled with drillings from the successive strata passed through in search for oil. One of these represents a huge producer in the MacDonald field. A piece of the sandstone from which the oil was obtained is placed at the bottom.

West Wall.—Chart showing a geological section between Olean, N. Y., and Fort Wayne, Ind. Note the position of the oil bearing sands in these and the comparatively undisturbed condition of the strata. Such conditions have been favorable to the storage of vast quantities of petroleum and gas.

South Wall.—Chart showing a geological section between Olean, N. Y., and Massillon, Ohio.

Cases 5 and 6.—Specimens of oil-bearing rocks from a large number of localities. Besides sands will be seen limestones and sandstones, which show that compact rocks bear petroleum as well as loose sands.

Case 7.—Minerals and fossils of the oil bearing strata.

Case 8.—A large bottle—the largest ever blown—representing one barrel of petroleum. This is about the amount produced in the United States every two-thirds of a second of the year, day and night.

Cases 9, 10 and 11.—The products of the barrel of petroleum represented in Case 8, arranged according to the order in which they are obtained. These are (1), naphtha; (2), burning oils, and (3) residuum or petroleum tar. The processes and products of further distillation of the latter will also be seen.

Case 12.—Model of a modern oil refinery. The crude oil from the pipe lines is received in storage tank No. 1, and pumped from this tank to the crude oil still No. 2, where it is gradually heated until the naphtha and burning oils are driven off by distillation and passing through the condenser and receiving house are collected in tanks 3, 4 and 5. The burning oil distillates are pumped to the large agitator where they undergo chemical treatment to render them fit for consumption. The crude naphtha is then redistilled in naphtha still No. 3, giving the various grades of gasolines and naphthas. The tar left after the first distillation is transferred to the tar still No. 6, where it is separated into light paraffine oil, heavy paraffine oil and still coke which remains in the still. The light distillate is used for fuel oil. The heavy oil is sent to the paraffine wax press house, where it is chilled and pressed to remove the paraffine oil, leaving the wax. The coke remaining in the still as a final residue is used for the manufacture of electric light and battery carbons. The reduced oil still is used for the production of lubricating oils.

Above this model will be seen one of the original refinery, built in Cleveland, O., in 1863.

The cases following show various finished products ready for sale, these being chiefly illuminating and lubricating oils with, however, a large variety of other useful articles.

Cases 13 and 14.—Fifty-six varieties of burning oils, showing the standards of each required by the laws of different States.

Case 15.—Cylinder oils of different grades. These are the heavier, more sluggish lubricating oils.

Case 16.—Special grades of lubricating oils. These include spindle, sewing machine, screw cutting and engine oils. They are light bodied and quick feeding as compared with the cylinder oils.

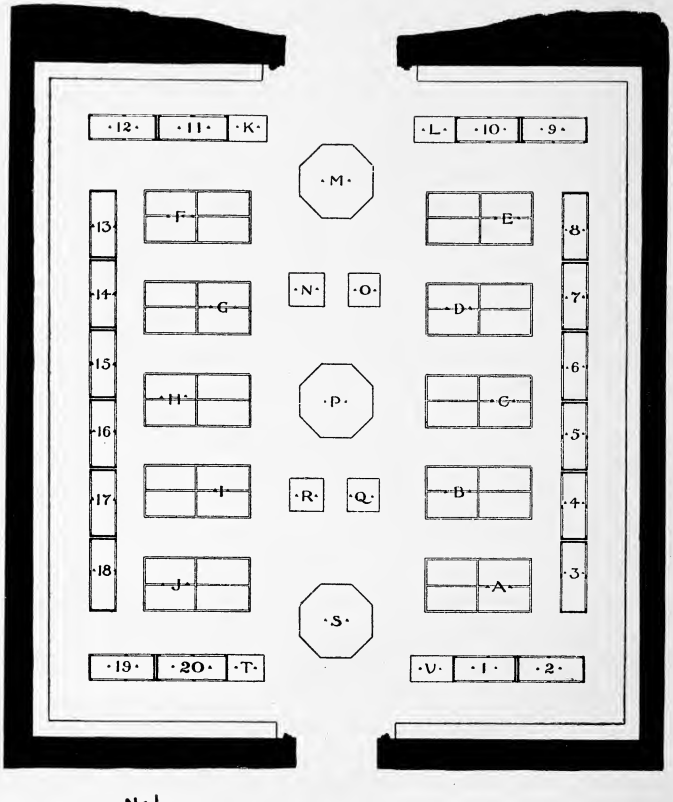
Case 17.—General lubricating oils, including miners' oil, leather oil and various engine oils.

Cases 18 and 19. — By-products of petroleum. These include paraffine wax, crude, semi-refined and refined, with illustrations of its uses for candles, matches, tapers, etc ; axle grease, lantern oil, harness oil, "miners' sunshine," the safest material for burning in miners' lamps; vaseline products, such as cerates, pomades, soaps and face paints.

Case 20.—Special grades of illuminating oils. These oils are designed to give the best light obtainable under the laws of each State. They are liquids of remarkable purity and brilliancy, the two finest—Pratt's Astral and Eocene—being hardly distinguishable from distilled water in color.

Case 21.—High test illuminating oils.

Case 22.—Illustrations of some of the varied uses to which petroleum products can be put. These include waxed paper for wrapping purposes, water proof coating for explosives, varnishes, wood stains and fillers, rubber cements, electric light carbons, etc.



PLAN OF HALL 72.

HALL 72.

PLATINUM, GOLD, SILVER, AND LEAD.

The collections in this Hall comprise the typical platinum, gold, silver, and lead ores, and the minerals of economic value that commonly enter into the composition of these. In the examination of these, as well as ores of other metals, it should be remembered that the mineral or metal is frequently present in such minute quantities that it cannot be seen by the naked eye or even with the aid of an ordinary magnifying glass. The ores usually possess, however, characteristics of appearance or of association with other minerals, known as gangue minerals, which enable a skillful observer to recognize them as being metalliferous.

There are also to be seen here products resulting from the milling and metallurgical treatment of the ores.

PLATINUM.

Case A.—Specimens illustrating modes of occurence of platinum in nature, from over twenty different localities, including the States of Washington, Oregon and California, U. S. A., New Granada, S. A., and the Ural Mountains. In all of these the metal will be seen to be present in the form of flattened grains associated with iridium, osmium, palladium, gold, copper and chromite. The grains are usually found in river beds or placer deposits. A complete series of rocks and soils bearing platinum, from the Demidoff Platinum Mines, Nizhni Tagilisk, Ural Mountains is shown; a series of concentrates produced by washing these in order to separate the metal, and photographs of the mines and methods of working them. Some other uses of platinum are illustrated as follows: Russian platinum coin for a time used as money; coins struck in platinum and gilded, passed for gold in Portugal and Spain during the past century; bogus gold dust made of platinum grains plated with gold.

GOLD.

Case 1. Type specimens showing modes of occurrence of gold in nature. These are—*crystallized gold; free gold* in the vein-stuff; *iron-pyrite* containing gold disseminated through its substance in invisible particles; *gold in slate* (the gold in the specimen is invisible); *combined with tellurium* in sylvanite, petzite, etc., (*telluride* ores); *sea sand* containing minute grains of gold. A more extensive exhibit of placer gold may be found in Hall 32.

Remainder of Case 1, Front.—Gold ores, California. These are chiefly quartz, or quartz and pyrite. They are distinguished in general from ores of this class of other localities by a cleaner appearance, the absence of rust and disintegration, and by the smaller proportion of pyrite present.

Cases 2, 3, Front.—Gold ores, Colorado. The ores of Cripple Creek, Col., which occupy the front of Case 2, should receive especial attention on account of their remarkable richness. Gold, which almost universally occurs free, is in these ores combined with tellurium (a substance related to sulphur) in the form of *telluride ore*.

Case 3, Rear.—Gold ores, New Mexico and Arizona. The gold of New Mexico occurs chiefly associated with large quantities of silver and lead. The ores, worked chiefly for the latter metals, may be found in another part of the hall. The ores in this case are those in which gold is the principal metal sought.

Case 4, Front.—Gold-silver ores, Colorado. Ores valuable both for silver and gold. The mixtures vary by imperceptible degrees from the silver ores on one hand to the gold ores on the other. Gold and silver are very generally mingled to some degree in nature.

Case 4, Rear.—Gold ores, British Columbia.

Case 5.—Gold ores, Mexico and South America. Note the large quartz vein on the upper shelf as exhibiting the structure of the veins in which so many metalliferous deposits occur.

The front of the case is occupied with ores from New Granada and Brazil; the rear, with ores from Ecuador and Mexico. The

ores from New Granada are more quartzose than most of those exhibited, and in this respect resemble those of California.

Case 6.—Gold ores, Great Britain and Australia. The collection from the New Morgan Mine, Dolgelly, Wales, is worthy of special attention both on account of its completeness and on account of the character of the ore. The gold is nearly all free, and much of it is visible to the eye. Specimens of ore from various parts of the mine are shown, also specimens of the country rock.

Case B.—Collection of nearly all the known alloys of gold and silver with copper, tin, zinc, lead, arsenic, and other metals. Collection illustrating methods of saving gold and silver practiced by Messrs. Tiffany & Co., New York. Here are shown wash water, concentrates from an exhaust blower that collects the dust of the shops, pieces of flooring of the shops, and shoes worn by workmen, and beside each of these are placed buttons of gold and silver obtained from articles of size similar to those shown.

Case C.—Large specimens of gold ores, Colorado.

SILVER.

Case 7, Front.—Type specimens of silver-bearing minerals. These are, in the order of their richness: *native, or wire silver; argentite*, 87 per cent. silver; *cerargyrite*, 75 per cent. silver; *pyrargyrite*, 65 per cent. silver; *proustite*, 65 per cent. silver; *stephanite*, 68 per cent. silver. *Galena* and *cerussite* may also be regarded as ores of silver, for, though they contain but small percentages of silver, they are so abundant as to constitute very important ores. With these should be mentioned, *Tetrahedrite*, which may contain as high as 17 per cent. of silver. There are a number of rarer silver-bearing minerals.

Cases 8, D, and E.—Silver ores, Colorado. The silver ores of Colorado pass by insensible gradation into silver-lead ores, so that these two classes should be studied in connection. Note the great variety of the Leadville ores. On the upper shelf of Case 8 there is a small quartz vein in which many particles of native silver may be seen.

Case 7, Rear.—Silver ores, Utah and Nevada. Here are included specimens from the mines of the celebrated Comstock lode.

The specimens from Utah illustrate an unusual occurrence. They are from the Silver Reef, and consist of sandstone impregnated with argentite and cerargyrite. In one specimen these minerals may be seen replacing organic remains.

Case 9.—Silver ores, Mexico and New Granada.

Case 10.—Silver ores, Guatemala and New South Wales.

Cases 11, 12, 13 and 14, Rear.—Silver-lead ores, Colorado. These ores are especially abundant in Colorado. They occur in two forms: the sulphide ores, in which the silver is chiefly contained in galena, and the "carbonate" ore, a mixture of cerussite and anglesite. This "carbonate" ore comes from the decomposition of the sulphide ore. Pyrite often accompanies the galena in the sulphide ore, as is well shown in the series from the A. Y. and Minnie Mine.

Cases 14 Front, 15 Rear, and 16 Rear.—Silver-lead ore, New Mexico. The principal ores of this class come from the Magdalena Mountains. They run very low in silver, averaging only about 8 oz. per ton, and the percentage of lead is also low. Here may be seen specimens of the "sand carbonate" ore, which crumbles to powder when handled.

Cases F, G, and H.—Collections illustrating the concentration and smelting of gold, silver and lead ores. The processes are very complicated and varied, so that they can be illustrated here only in a general way.

Case 15, Front.—Lead Ores.

Type specimens of lead-bearing minerals. These are—*galena*, 86 per cent. lead, the most abundant lead mineral and fundamental lead ore; and the following minerals formed from it by oxidation: *Cerussite*, 77 per cent. lead, and *anglesite*, 68 per cent lead.

There are other minerals which contain lead, but they are not of sufficient abundance to be important as ores. The case contains also lead ores from Illinois, Wisconsin, and Missouri. These contain very little silver, and are mined for lead only. On the lower shelves are silver-lead ores from Utah, Arizona and Washington.

Case 16, Front.—Silver-lead ores, Mexico. Note the collection of carbonate ore from Minas Viejas, Villaldma, as showing how widely ores of this class may vary in appearance.

Case 17, Front.—Silver-lead ores, British Columbia. The localities represented lie just north of the State of Washington, between the Cascade and Rocky Mountains, at the latitude of Vancouver Island.

Case 18, Front.—Lead ores, Great Britain. The specimens illustrate well some of the common associations of galena. While in the Colorado ores the galena is commonly associated with pyrite, here we find it mixed with blende, a zinc ore which is very troublesome to the lead smelters. Specimens from the Welsh mines which contain much blende are marked "Poor Ground." A good specimen of fluorite shown here, illustrates another common associate of galena in the English mines, as do also the specimens of calcite and galena. Some of these ores, as for example, that from Snail Beach, are from mines formerly worked by the Romans.

Note the general absence of "carbonates" and the fresh undecomposed appearance of the specimens. This is also true of the Spanish and German ores. Carbonate and disintegrated ores occur near the surface where air and atmospheric waters have acted and formed them from the sulphides. These mines having been long worked, most of the superficial ores have been removed, so that now only the sulphide ores occurring at great depths are mined.

Cases 19, Front, and 20, Front.—Lead ores from Germany. Some of the specimens here are especially instructive as showing the characteristic structure of veins. The different minerals are arranged in bands or layers, the metalliferous layers alternating with those of quartz, barite or fluor spar.

Case 19, Rear.—Lead ores, Greece. Unique among these are the slags of Laurium, which are worked by the Greek Metallurgical Company. The mines of this locality had been operated by the Greeks from the time of Themistocles up to the first century, A. D. Owing to the imperfect methods which they used, however, the slags produced retained appreciable quantities of metal. The

modern company, collecting these slags and using them as ores, extracts sufficient lead and silver to yield a good profit.

Case I.—Treatment of the copper-bearing lead ores of the Unterharz, Germany. A collection of specimens illustrating all steps in the process of extracting lead, copper, silver and gold from these ores.

Case J.—Uses of lead. Alloys of lead with other metals, sheet lead, shot, red lead, white lead. Parke's process of de-silverizing base bullion.

The visitor should now pass to the eastern end of the hall and note the following special groups in the center.

K.—Silver, lead and copper ore, Cordillera Hill silver mine, Peelwood, New South Wales.

L.—Gold and silver ore, British Columbia.

M.—Gold and silver ore from the State of Washington and other American localities.

N.—Zinc-lead ore, Laurium, Greece.

O.—Copper-silver ore, Leadville, Colorado. Assays gold, $6 per ton; silver, 41 oz. per ton; copper, 18 per cent.

P.—Silver-lead ores, Barrier Range, New South Wales. Assays silver, 58 oz. per ton; lead, 72 per cent.

Q.—Gold-copper silver ore, Ouray County, Colorado. Assays copper, 28 per cent.; silver, 160 oz. per ton.

R.—Auriferous quartz, San Miguel County, Colorado. Assays average $6 to $8 gold per ton.

S.—Silver and gold ore from the State of Washington, and other specimens from American localities.

T.—Block of ore from 40 foot level of the Back Creek Silver and Gold Mine, New South Wales, 36 tons yielded 3,406 oz. silver, and gold at the rate of 15 dwt. per ton.

U.—Auriferous Pyrite, Park County, Colo. Assays $25 worth of gold per ton.

Around the walls of the room will be found, arranged in order, large blocks of gold, silver and lead ores, giving an excellent opportunity to study the characteristic appearances of such ores and the minerals most commonly associated together in them. The latter are quartz, fluorite and barite, copper and iron pyrites and galena. The rusty looking ores are simply more or less decomposed forms of the above.

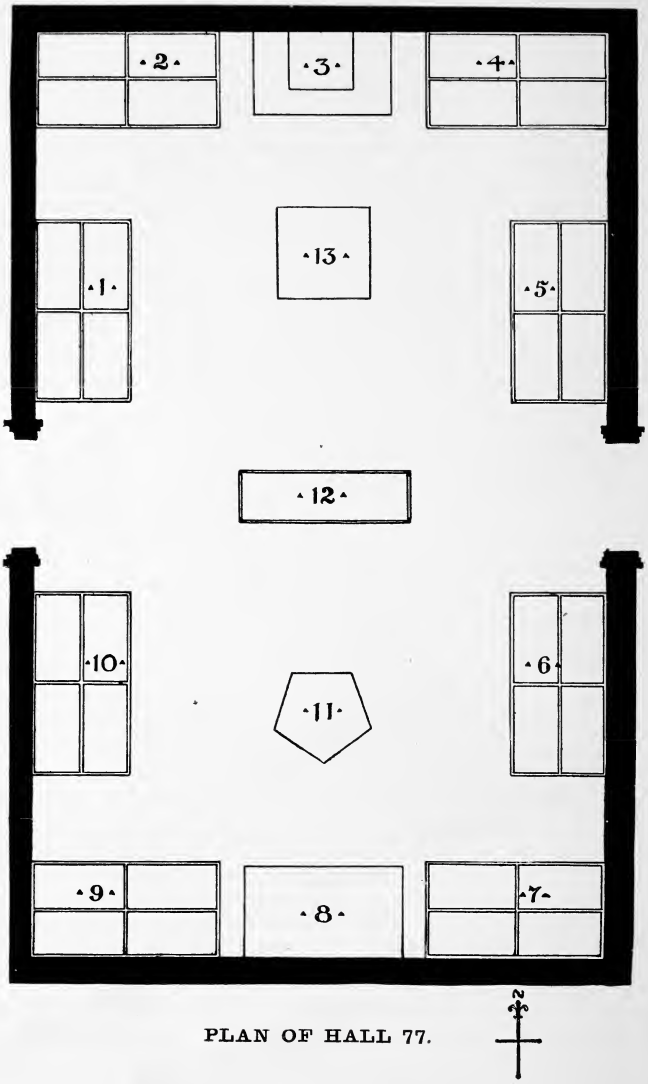
HALLS 73, 74 AND 75.

Hall 73.--Office of the Department of Geology.

Hall 74.—Library of the Department of Geology. The works in this library treat of geology and kindred subjects, and are intended primarily for the use of officers of the Department. On application to the Curator, however, opportunity will be given to visitors to consult any special work. The collection of photographs and autographs of leading geologists and mineralogists of the world, made by Mr. Geo. F. Kunz, is exhibited here.

Hall 75.—Laboratory of the Department of Geology. Here are contained over fifty sketches enlarged from wood-cuts in *De Re Metallica*, showing methods of mining and metal working appliances used in the sixteenth century, and twenty-five photographs of the works at Playa Blanca, Chile, showing furnaces and apparatus used in the treatment of ores of that locality.

Permission to examine these can be obtained from the Curator.



PLAN OF HALL 77.

HALL 77.

FICTILE MATERIALS, PIGMENTS, ETC.

Kaolin or Clay is the basis of most of the specimens shown in this hall.

Case 1.—Clays, England. These are porcelain, pottery, pipe and fire clays. Note that many of the dark-colored, raw clays burn white. Fuller's earth. Meerschaum. This is not a clay, but is put with the pipe clays on account of its use for pipes. Application of blast-furnace slag to the manufacture of porcelain.

Case 2.—Uses of fire clay. Collection of assayers' and metallurgists' apparatus, made to withstand intense heat.

Platform 3.—Stoneware utensils from Sweden and the United States.

Case 4.—Native fire and brick clays. The fire clays are those which contain no impurities which would render them fusible. Common among such impurities are sand, alkalies and iron. The brick clays are impure clays which will bake to brick without deforming or cracking. They often contain much sand.

Case 5.—Foreign clays.

Cases 6 and 10.—Structural uses of clay. Bricks, tiles and terra cotta.

Case 7.—Sand and cement. A collection showing all stages in the manufacture of Portland cement. A collection showing varieties of sand adapted to different uses, such as molding sand for molds for metal castings; pure sand for infusible furnace hearths and furnace bricks; sand for the manufacture of glass, etc.

Platform 8.—Fire clay muffle. Drain pipes from clay and from cement.

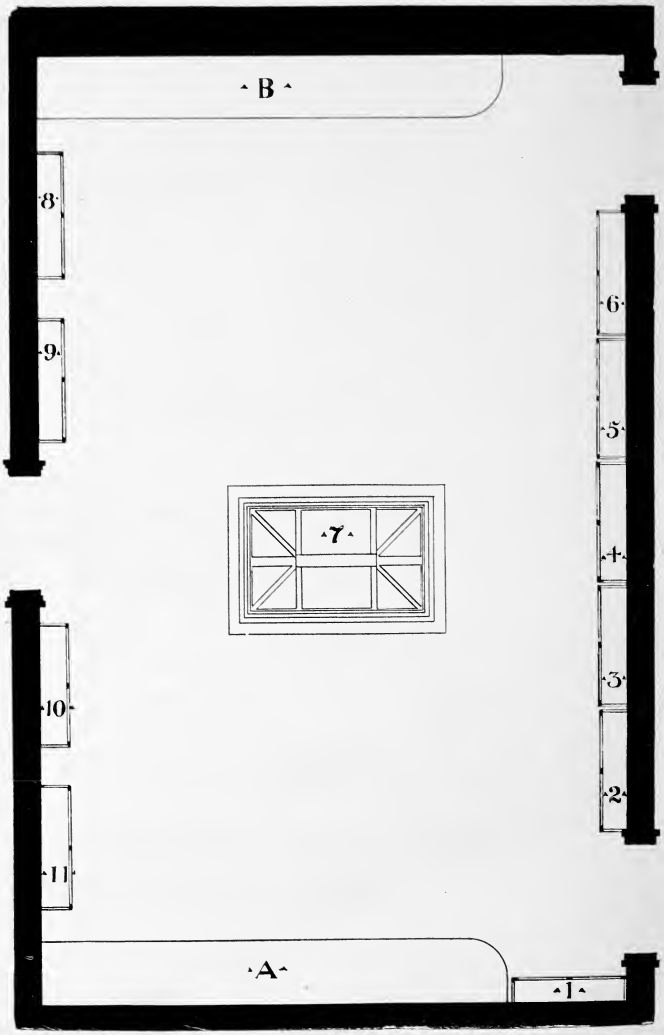
Case 9.—A collection illustrating native tripoli and its uses, as obtained at Seneca, Mo.

Platform 11.—Artificial stone made from Portland cement.

Case 12.—Natural pigments used for paints and coloring matters.

Platform 13.—Varieties of terra cotta.

About the walls of the room are specimens of ornamental tiles, illustrating uses of clay.



PLAN OF HALL 78.

HALL 78.

NON-METALLIC MINERALS USED IN CHEMICAL MANUFACTURE AND FOR OTHER INDUSTRIAL PURPOSES.

Case 1.—"The Stassfurt Salts." These salts are rich in potash and magnesia, and furnish nearly the whole of the world's supply of potash.

Case 2.—Cryolite and its uses. Salt. The process of making soda and alumina from the mineral cryolite is fully illustrated.

Case 3.—Borates. The minerals from which borax is obtained and their products.

Case 4.—Gypsum. This is a hydrated sulphate of lime, from which plaster-of-paris and the fertilizer land-plaster are made.

Case 5.—Sulphur. Native sulphur from many localities. Examples of metallic sulphides from which sulphur compounds are obtained. Forms in which sulphur comes to market.

Cases 6 and 7.—Asbestos. Crude and manufactured. Asbestos from all the localities where it is obtained for commercial purposes, together with many other specimens from nearly all American localities. Examples of all kinds of manufactured asbestos, as packing, ropes, gloves, etc.

Case 8.—Mica. Thin plates from American and Russian quarries of commercial importance. Mica prepared for the market.

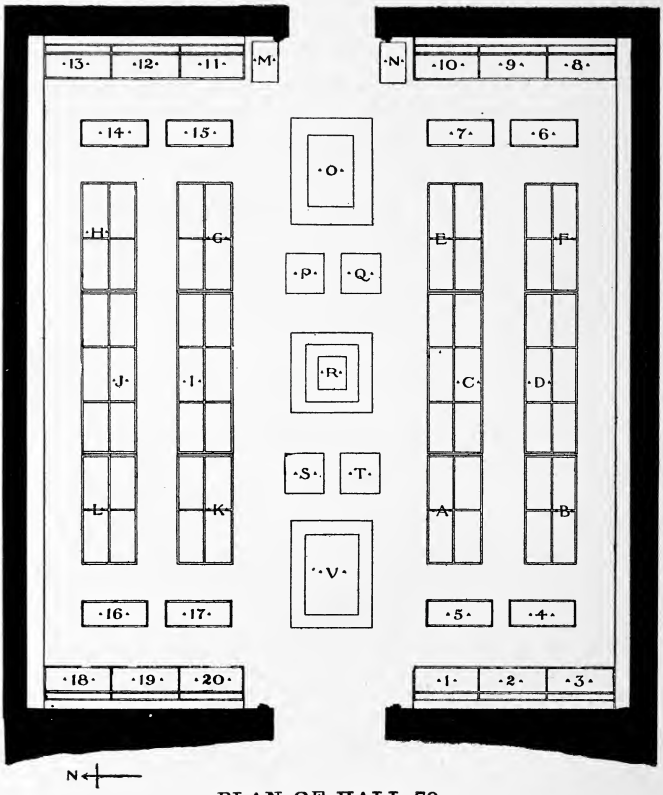
Case 9.—Mineral wool, crude, and made into non-conducting coverings for pipe, etc. Magnesite from Greece and California, crude and calcined for use.

Case 11.—Phosphates.

Mineral and rock phosphates from well-known localities in England, Spain, Canada, Carolina and Florida. Guano from Venezuela and Cuba.

Platform A.—Apatite, Canada. Phosphates, Spain and South Carolina. Fluorite, Mineral City, Ill.

Platform B.—Gypsum. Natural Soda. Natural Sulphate of Magnesia (Epsom Salts). Alunite, a basic sulphate of potash and alumina, and alum made from it.



PLAN OF HALL 79.

HALL 79.

COPPER, ZINC, TIN, ANTIMONY, MERCURY, NICKEL, IRON AND MANGANESE,

The collections in this hall comprise the typical copper, zinc, tin, antimony, mercury, nickel, iron, and manganese ores, and the minerals of economic value that commonly enter into the composition of these. There are also to be seen products resulting from the treatment of some of the ores, maps illustrating localities where they are obtained and charts showing processes of extraction of the metals.

Under each group are placed first, type specimens of the different ores of the metal arranged in order of their richness; then specimens of ores which illustrate the different localities producing them, these being arranged in geographical order, passing from California eastward. Specimen labels show the mineral of the ore and the amount of metal produced from them, where this is known. It should be remembered that many of the ores produce more than one metal, in which case the specimen is placed in the group of the predominating metal.

COPPER.

Case 1.—The copper bearing minerals, arranged in order of their richness; the *native metal*, this being the character of most of the ore from the Lake Superior mines; the red oxide, *cuprite*, 88 per cent. of copper; the black oxide, *tenorite*, 80 per cent.; the black sulphide, *chalcocite*, 80 per cent.; the green carbonate, *malachite*, 57 per cent; the blue carbonate, *azurite*, 55 per cent.; the purple sulphide, *bornite*, 55 per cent.; the gray sulphide, *tetrahedrite*, about 50 per cent., the bluish green silicate, *chrysocolla*, 36 per cent.; and the brass yellow sulphide, *chalcopyrite*, 34 per cent.

Cases 2, 3, 4 and 5.—Copper ores from different mines of the world arranged in geographical order. Notable among them are a series from the Rammelsberg mines, Germany, showing the change in character of the ores in different parts of the

mines and the number of different metals that can be obtained from them; and a number of beautiful specimens of malachite and azurite from Arizona.

Case A.—Specimens illustrating successive stages in the process of copper smelting and separation.

Case B.—A special series showing the rocks and ores from different levels of the Copper Queen Mine, Bisbee, Arizona, presented by the Copper Queen Mining Co. Appended analyses show the metallurgical value of the different specimens.

Case C.—Uses of copper shown by sheet metal, wire, copper vessels, tubing, anodes for batteries, etc.

On the adjacent walls are charts showing courses of treatment of copper ores practiced by different smelters. Below them are large masses of copper ores.

ZINC.

Case D.—Zinc ores, New Jersey and Wisconsin.

The ores from New Jersey are unique. They consist chiefly of the oxides *franklinite* and *zincite* and the silicate *willemite.* This is a combination of ores that occurs nowhere else.

Case E.—Zinc ores of Missouri. The zinc-bearing minerals of these ores are chiefly the black, resinous sulphide, *sphalerite,* containing 67 per cent. of zinc, and the white amorphous silicate, *calamine,* 54 per cent. of zinc.

Case F.—Zinc ores, northwest Arkansas. The zinc is largely in the form of the white carbonate, *smithsonite,* which bears 52 per cent. of zinc.

Case 6.—Zinc ores, Great Britain; chiefly sphalerite. Though the sphalerite varies much in color in these specimens, it may always be distinguished from the associated minerals by its resinous appearance. The very dark specimens are the "black jack" of the Cornish miners.

Case 7.—Zinc ores from Spain and Germany. Note the parallel arrangement of the minerals in the latter, this being a characteristic of vein deposits. The chief mineral, sphalerite, is associated with quartz, galena, pyrites, etc.

Cases 8, 9 and 10.—Zinc ores chiefly from Laurium, Greece and New South Wales. The former have long been famous

for their varieties of color and richness of luster, making them very attractive to the eye. They are made up chiefly of the carbonate, smithsonite.

Specimens illustrating the process of extraction of zinc, are shown in Case 10.

TIN.

Case 11.—Tin ore from South Dakota. The tin is in the form of *cassiterite*, a black oxide which can be seen scattered through the granite. This is the universal ore of tin, containing about 78 per cent. of the metal. Some specimens of stream tin are also shown. This is formed by disintegration of the rocks containing the ore, and removal of the lighter minerals by running water. The cassiterite being very heavy stays behind and is found in the bed of the stream.

Case 12.—Tin ore, New South Wales. See also the pyramid of this ore in the West Dome.

Case 13.—Tin ore from the famous Cornwall Mines of Great Britain, which have been in operation many centuries.

Process of reduction of tin ores illustrated by specimens from the Redruth Smelting Co.

ANTIMONY.

Case 14.—Specimens of *stibnite*, the universal antimony ore, from various localities in Japan, California, New South Wales and Greece. That from Greece bears an appreciable percentage of gold.

MERCURY.

Case 15.—A series of ores containing *mercury* and *cinnabar* and the rocks associated with them, from the New Almaden mines, California. Cinnabar is the red sulphide and the mineral from which mercury is chiefly obtained. Stages in the process of roasting the ore for extraction of the metal are shown, and a chart near by illustrates the kind of furnaces used. Mercury ores from Spain and New Granada, S. A., are also shown.

NICKEL.

Cases G and I.—A complete series showing ores of nickel, processes of extraction and applications of the metal, presented by the American Nickel Works of Camden, N. J. Note as the principal ores, the bronze colored sulphide, *pyrrhotite*, the brass colored sulphide, frequently in capillary forms, *millerite* and the apple green silicate, *garnierite*.

Nickel ores from Canada, Oregon and New Granada. A chart near by gives the process of extraction of nickel from the Canadian pyrrhotite. As uses of the metal, are shown specimens of plating, nickel steel alloy for armor, salts of use in the arts, etc.

ALUMINUM.

Case I.—Ores and products of aluminum. Though aluminum is the metal contained in common clay, efforts to extract it cheaply from this substance have so far failed.

The ores from which it is obtained—bauxite and cryolite—are shown in the case, together with sheets of the metal and specimens of its alloys.

Case K.—Type specimens of iron ores. These are:—the black oxide, *magnetite* 72 per cent. iron; the red oxide, *hematite*, 70 per cent. iron; the hydrous oxides, *turgite*, 66 per cent. iron; *göthite*, 64 per cent. iron; and *limonite*, 60 per cent. iron; the carbonate, *siderite*, 48 per cent. iron. Many varieties of these ores are shown, which are known by the names of *yellow ochre*, *bog ore*, *pipe ore* and *brown hematite*, forms of limonite, *red ochre*, *specular*, *micaceous*, *needle* and *kidney ores*, forms of hematite; *clay iron stone*, *black band*, and *spathic ores*, forms of siderite. The rest of this case is occupied by ores from the western states.

Case 16.—A series of limonites from the eastern states that illustrate the transition from a porous, impure bog-iron ore, to a compact brown limonite and through göthite and turgite to hematite.

Case L.—Iron ores, Virginia. These are arranged in the order of their ages—from the archaean magnetites of the Blue Ridge to the siderite concretions of the coal measures.

Case J.—Iron ores, England, France and Germany. Conspicuous among the English ores are the ochres, which are mixtures of limonite or hematite with clay; the soft, bright, red hematites which occur in limestone, and the compact, spathic ore of the coal measures. The German irons show the more fibrous hematites and limonites and the well crystallized "sparry" siderite.

Case H.—Iron ores, Greece and Russia.

A map on the wall shows localities of the United States producing iron ore. Several charts show types of blast furnaces used in the reduction of iron.

MANGANESE.

Cases 18 and 19.—Ores of manganese, Colorado, Virginia, Brazil and Great Britain; chiefly the black oxides, *pyrolusite* and *psilomelane.* These minerals are used for the liberation of chlorine for bleaching, for staining glass and pottery, and in the manufacture of steel.

Case 20.—Alloys illustrating uses of iron and manganese.

CENTER OF THE HALL.

M. Gossan (iron ore), from Virginia.

N. Limonite (oxide of iron), from Virginia.

O. Mass of copper-nickel ore, from the Stobie mine, Sudbury, Ontario, Canada, taken from the third level at a depth of 175 feet, and weighing about 12,000 pounds.

P. Limonite (brown oxide of iron), from Russia.

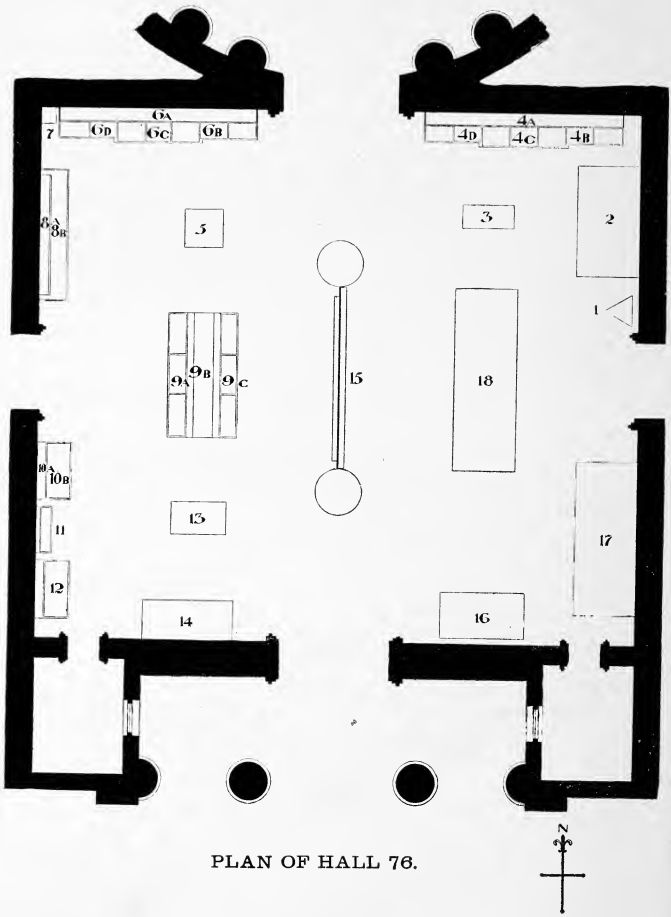
Q. Zinc-lead ore, France.

R. Statue of Vulcan, the Roman god of fire and metal working, of hammered copper on a pedestal of iron beams, from the exhibit of Gebrüder Stumm at the World's Columbian Exposition. It typifies strength and skill in utilizing the products of the mineral kingdom.

S. Hematite (red oxide of iron), Wyoming.

T. Copper ore (bornite) Cape Colony, South Africa.

U. Large mass of Smithsonite (zinc carbonate), Arkansas. The weight of this mass is about 10,000 pounds.



PLAN OF HALL 76.

HALL 76.

METALLURGY OF IRON AND STEEL.

This hall contains a series of the intermediate and final products of the iron-working industry, intended to lead the visitor gradually from a view of the mining of the ore to some of the higher products of the iron-workers art.

No. 1.—Electric rock drill, for use in mines where steam drills are inconvenient or costly.

No. 2.—Model of the Chandler iron mine, Ely, Minnesota. At the rear of the model two shafts descend at levels 60 feet apart, and horizontal galleries run from the shaft and connect at intervals with other passages. Figures of miners at work may be seen by looking through these cross-ways from the ends of the model. From the two main galleries, sloping ways, not shown in the model, lead upward to passages at higher levels which do not connect with the shaft. Here as the ore is excavated it is thrown through chutes to the tramways of the main galleries, and there taken by ore cars (see No. 3) to the shafts and raised to the surface. The timbering is to prevent the top and sides from caving.

No. 3.—Ore car used in iron mines. (See No. 2.)

Cases No. 4 A and 6A.—A collection illustrating the methods of testing structural iron and steel. In general a piece of steel is broken and the strain at which it yields is noted. Other pieces are bent hot and cold and their behavior in respect to cracking is noted. At the ends of the cases are specimens showing the successive stages of rolling an ingot into a rail or beam, also the method of crushing a number of bars or "*pile*" of iron into one solid beam.

Case 4 B.—The extraction of iron from its ores by the blast furnace. The material fed to the furnace and given out by it is shown, also a series of pig irons showing the characteristic fractures of the different grades.

Cases 4 C and D.—Alloys of iron used in iron working.

No. 5.—Model of a Gordon-Whitwell-Cowper hot blast stove used for heating the air for the blast furnace.

Case 6 B.—Direct process wrought iron. The example

shown is over 2000 years old, and was made directly from the ore without passing through the stage of pig iron.

Case 6 C.—Fibrous fracture of wrought iron.

Case 6 D.—"Crystalline" fracture of wrought iron. Malleable cast iron. This is a cast iron the surface of which has been decarbonized and thus transformed into wrought iron by the action of oxide of iron at a high temperature.

No. 7.—A bar of open hearth steel in which a knot has been tied cold, as a test of the quality of the material.

Case 8.—Sections of steel bars, rails and structural beams, from Spain, donated by Sociedad de Altos Hornos y Fábricas de Hierro y Acerro de Bilbao. (The Bilbao Iron and Steel Manufacturing and Blast Furnace Co.)

Upon the wall near by are sections of similar bars, rails, etc., from Sweden, and test pieces showing the conduct of the Swedish open-hearth steel under tension.

Case 8 A.—Explosives. Fac-similes (non-explosive)of gunpowders of various kinds; the materials of which they are made; dynamite of various strengths.

Case 9 A.—Examples of steel made by each of the standard processes. Crucible-steel fractures showing the relation of composition, hardness and appearance of fracture. Special steels.

Case 9 B and C.—English saw plates, gear wheels, wrenches, cutters, and bars of tool-steel, from Jessop and Sons. These are examples of "Sheffield steel."

In the lower part of the case are large pigs of iron from Norway and Sweden, also crushed wheels and twisted bars of iron and steel.

Case 10 A.—Bars of mild, open-hearth steel tied cold into knots as a test of quality.

Case 10 B.—Welds of brass and bronze to steel. The ends to be welded are heated in a gas furnace until nearly molten and then are pressed together.

No. 11.—Wires for various purposes. On the wall are specimens showing the process of drawing wire.

Case 12.—A collection of all grades of scrap-iron, steel and metal. It contains samples of different grades of iron and metal as it is sorted on leaving the scrap-iron dealer's yard.

No. 13.—Rims for locomotive wheels; a solid steel shaft

eight feet long, and twisted tram-car axles and bars.

No. 14.—Model of a rolling mill for rolling structural iron and steel. This mill rolls the largest beams of any in Germany.

No. 15.—Purvis ribbed-steel furnace flues—as used in marine boilers. A boiler front intended for use with such flues.

These flues were forged by hydraulic power and are a good example of the large objects which iron workers can readily make.

No. 16.—Model of machinery and annealing furnaces used in preparing molds for cast iron pipe.

No. 17.—Model of a rolling mill. The three models, Nos. 14, 16 and 17 show portions of the iron works of Gebruder Stumm, Germany.

No. 18.—"Specimens of rolled wrought-iron and steel worked cold." These are from the factory of Stumm & Co.

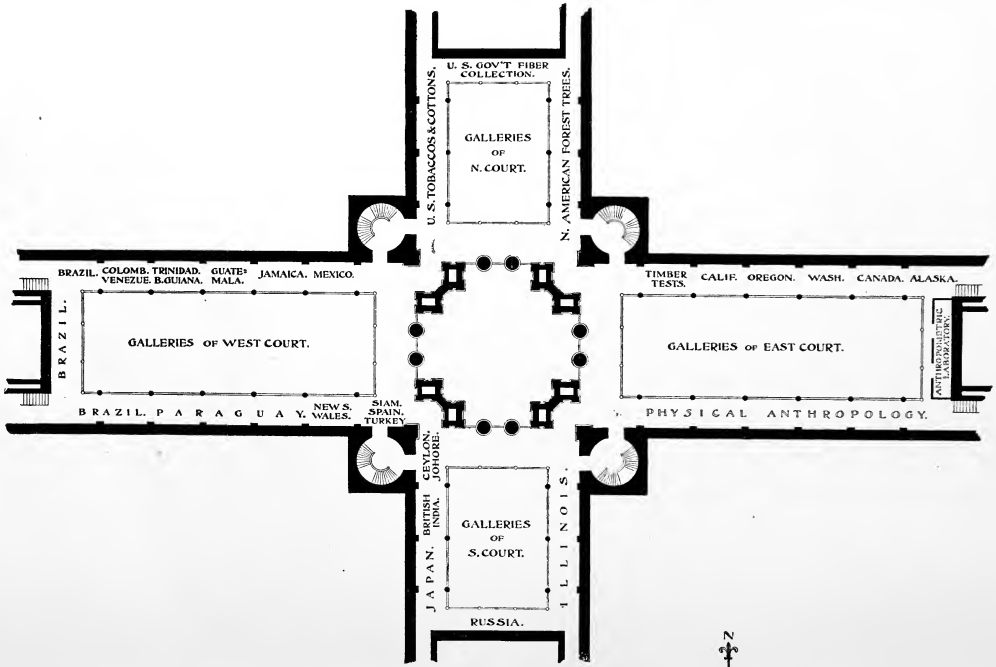
Upon the walls there is a series of charts illustrating the kinds of furnaces used in the manufacture of iron.

HALL 80.

WEST DOME.

Beneath the center of the dome stands a statistical column, giving the bulk of each product of the mines of the United States in 1892, for one second of time. Multiplying this by the number of seconds in the year (3,536,000) will give the annual product. This column was built according to data given by the United States Geological Survey. In the four niches are pyramids of ore, containg: No. 1—Gold and Silver Ores: No. 2—Tin Ore: No. 3—Iron Ore: No. 4—Copper Ores.

The four large specimens surrounding the column are respectively: No. 5—Smithsonite (carbonate of zinc): No. 6—Silver Ore: No. 7—Iron ore (red hematite): No. 8—Iron Pyrite (sulphide of iron).



PLAN OF DEPARTMENT OF BOTANY.

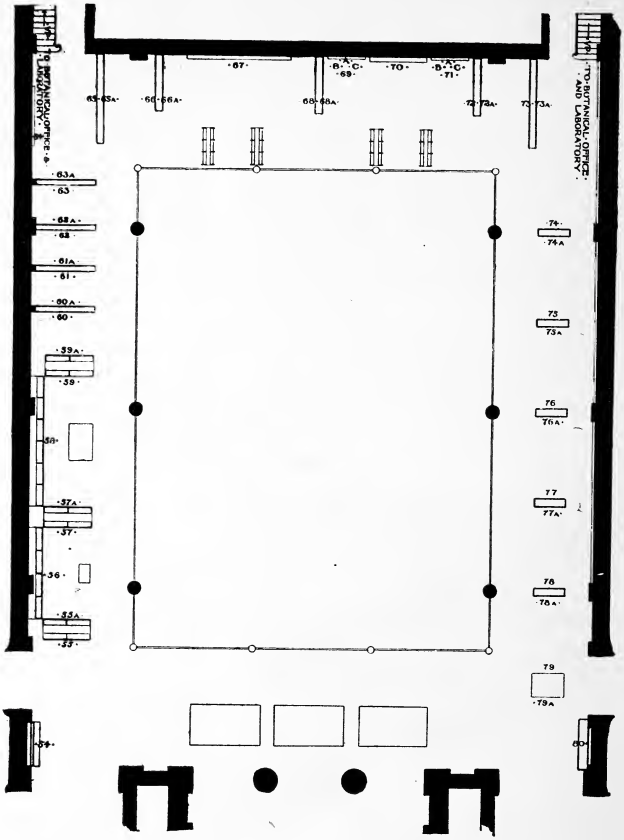
DEPARTMENT
OF
BOTANY AND PLANT ECONOMICS.

This department occupies the galleries of the North, South, East (in part) and West Courts of the main building, and may be reached by any of the four flights of stairs in the central rotunda, or by the stairways at either side of the east and west main doors.

The collections of this department comprise, in the main, those of the foreign governments in forestry, as exhibited in their Government Buildings, and in the Forestry Building at the World's Columbian Exposition; the major portion of the gums, oils, medicinal plants, tan barks, dye woods, seeds and fibers exhibited by the foreign countries in the Agricultural and Manufactures Buildings; the Economic Plant Exhibit of the U. S. Government as exhibited in the Government Building, and portions of many American exhibits in this important branch of natural science.

The general arrangement of the department is as nearly geographic in character as is possible. Beginning at the southeast corner of the South Court the visitor travels westward through Russia, Corea, Japan, India, Ceylon, Johore, Siam, Turkey, Spain, and Australia; thence, beginning at the Straits of Magellan, northward through Argentine, Paraguay, Brazil, Venezuela, Trinidad, British Guiana, Ecuador, Colombia, Guatemala, and Mexico, to the United States as far as Alaska, meeting there the starting point, Russia.

The special aim in the installation of the objects in this department has been to insure scientific arrangement although enough display has been made to attract and please the general visitor; especially has this been done when possible without detriment to the natural sequence of species. Sufficient time has not yet elapsed to study into the correctness of the identification labels attached to the specimens when received, and



PLAN OF NORTH GALLERY.

which have so far been principally retained. This should be borne in mind by those who desire to enter into discriminative study of the collections. All the identifications are being determined by the head of this department as rapidly as is consistent with careful and systematic results.

GALLERIES OF THE SOUTH COURT.

Cases 1 and 1A.—The Cork Oak (*Quercus suber*) and its utilization.

Among the specimens exhibited is a very fine and costly decortication of a tree with three branches. This specimen is considered to be the best example of dextrous cork-peeling ever procured.

Cases 2A, 2B, 2C, 2D, and the wall space accompanying same, are devoted to the indigenous trees of Illinois.

Notable in this collection is a complete set of the oaks of Illinois, accompanied by water-color representations of the leaves and fruits.

Cases 2E, 2F, 2G, and the accompanying wall space, are devoted to the cultivated trees of Illinois.

Fine examples of Honey Locust, White Ash, and several species of Oak.

Case 2H.—Grains of Illinois.

RUSSIA.

Case 3.—Russian Tobacco. The first tier in this case comprises the original natural species (*Nicotiana rustica*), from which most of the finer cultivated forms have sprung. The balance of the specimens are of the variety known as Turkish leaf, from different sections of the country.

Case 3A.—Russian Flax. In this case may be found excellent specimens of dressed and undressed flax, together with the plants from which this useful fiber is obtained.

Case 3B.—Lime Tree Products. Probably the most useful tree to the Russian peasant is the Lime or Linden (*Tilia parvifiora*), from the bast layers of which many households gain the major portion of their useful appurtenances, even the structure of the dwelling itself, its floor covering and its furniture. Among the specimens will be found the natural bark, the inner layers, the fiber, both crude and macerated, matting, bags, ropes, harness, shoes, trunks, etc.

South Wall.—On the south wall platforms extending through this section will be found the principal commercial timbers of Russia, both in log and plank.

Cases 4, 5, 6, 7, 8, 9, and 10.—These cases contain the cereals and legumes of Russia.

This is probably as complete a collection of the species and varieties of the agricultural seeds of that country as can be found in any Museum in the world.

Case 11.—Turpentine industry of Russia.

This case contains the commercial products of the distillation of pine.

COREA.

Cases 11A and 11 B.—A collection of the woods, cereals, nuts, and dried fruits of this peninsula.

A comparison of the woods of this country with those of Japan, near by, will prove interesting.

JAPAN.

Cases 11C, 11D, and 11E.—The fibers, tobaccos, and teas of Japan.

Case 12.—Specimens of insects injurious to useful plants of Japan.

This beautiful and highly scientific collection showing the successive phases of insect development, as well as the injury caused by them to the plants upon which they feed, was prepared

for exhibit in the Japanese section at the Exposition, but on account of lack of space was not unpacked.

Cases 13A, 13B, and 13C.—The construction timbers of Japan.

This set of specimens is particularly interesting to the student, as each wood is accompanied by a portion of the bark, and by illustrations of the foliage and fruit.

Wall.—Among the specimens here exhibited is a comprehensive series of the commercial timbers of the country in plank, square, bark, and panel. Each species is accompanied by an illustration of the foliage characteristics similar to those in connection with the construction timbers. Many specimens representing their utilization may be seen. At the south end are three native paintings showing timber operations in Japan; these are particularly interesting on account of their similarity to those carried on in this country.

Case 14.—Standard mounted with the various species of bamboo cultivated in Japan.

Originally no bamboos grew on the islands of the Japanese archipelago, where they are now cultivated to a large extent, and rendered, by husbandry processes, very straight, firm, and useful. The red and brown colorations, spots, ridges, blotches, and other beautifying marks upon these bamboos are also the result of careful and studied cultivation.

Cases 15A, 15B, and 15C.—The Cabinet Woods of Japan.

Case 16.—Minor Forest Products: Starches, Pyroligneous Acid, Fossil Boards, and Charcoal, accompanied by explanatory labels and water-color drawings.

Cases 17A, 17B, and 17C.—Minor Forest Products: Edible Mushrooms, Waxes, Lacquer, and Camphor.

In this case probably the greatest interest lies in the careful consideration of the lacquer industry, which is well represented by water-color drawings and the product itself. The same may be said of the camphor industry, which is similarly and as carefully shown.

Case 18.—Standard of Toko Posts.

The *Toko* is the ornamental place of honor in the Japanese parlor. It is here that ceremonial tea is served. This place

is dear to the heart of the Japanese hostess, and is generally furnished in the height of Japanese neatness and artistic taste. These posts are placed to support a canopy overhead, and are always of some natural unhewn wood, often decorticated, or partially so. The woods chosen for *toko* posts are generally those of high commercial value and especial rarity.

Cases 19A, 19B, and 19C.—Grains and Minor Forest Products.

In this case will be found most of the species of rice of Japan, both natural and whitened; tan barks, dyes, and fibrous barks; also the woods used in the manufacture of paper, together with paper pulp from same.

BRITISH INDIA.

Cases 20, 20A, and 20B.—The Fibers and Minor Forest Products of India.

Wall.—The wall in this section is wainscoted with various species of the commercial timbers of the country, in the center of which is a beautiful *padouk* doorway, and carved blackwood stands for jardinieres. Along this wall may also be seen blocks of Teakwood, famous as ship building material.

Case 21.—Minor Forest Products, lacs and dyes.

Stand 22.—A single circular piece of *padouk* board, six feet eight inches in diameter, suitable for a table top.

Stands 23 and 23A.—Logs of Commercial Woods.

Notable among which are satin-wood and sandal-wood. Photographs of teak plantations and the cutch industry.

CEYLON.

Cases 24A and 24B.—The Commercial Woods of Ceylon.

This case also contains many Ceylon products, both of forest and field. Starches, oils, gums, etc.

JOHORE.

Cases 24C, 24D, 24E, 24F, 24G, and 24H. — The woods of Johore, commercial and non-commercial, together with the minor forest products of the country.

Notable in this case is anatto seed, oil and paste, so extensively used in the United States in the coloration of butter and cheese.

Case 15.—The Rattans and Medicinal Plants of Johore.

Standard 25A.—The Commercial Rattans of Johore.

GALLERIES OF THE WEST COURT.

SIAM.

Case 16. — Siamese Plant Economics. Many curious and noteworthy products are represented, among which will be found gamboge, spiral and zig-zag bamboo, and edible birds-nests.

Products of the black sugar-palm of Java, and various seeds and cereals of Turkestan are also shown in this case.

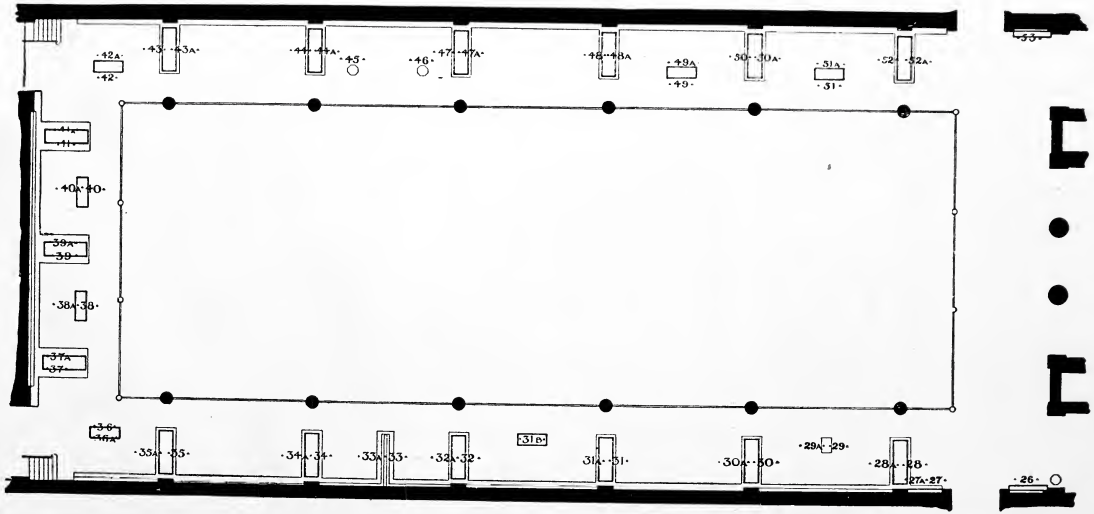
TURKEY.

Case 17.—The Woods of Turkey. Even the casual observer will note here the striking resemblance between these woods and those of our own country; particularly is this true of the pine, cedar, oak, ash, cherry, and sycamore.

SPAIN AND CUBA.

Case 17A. — The Woods of Cuba, principally cultivated species.

Case 18.—Economic Plant Products. Especially interesting is the large comparative collection of olive oils, representing the product of various provinces and years.



PLAN OF WEST GALLERY.

LIBERIA.

Case 28A.—Minor Forest Products, Oils, Calabar Beans, etc.

NEW SOUTH WALES.

Wall and Standard 29 and 29A.—The principal timbers of the country, exhibiting excellent specimens of their cedar rosewood, beech, and several species of Eucalyptus or gum.

Tan Barks and Paving Blocks of New South Wales.

SOUTH SEA ISLANDS.

Case 30.—Sea Fruits.

This designation is given to various odd and curiously shaped fruits cast by the waves upon the beaches of the Pacific Islands, where they are gathered principally by sailors attached to whaling vessels. The most notable among these fruits is the "Coca de Mer," the largest known fruit tree, curious both on account of its shape and size.

PARAGUAY.

Case 30A.—*Maté* or *Yerba.* Paraguay Tea.

The source of *Maté*, the principal drink of South America, is the roasted and powdered younger leaves and twigs of a forest tree belonging to the Holly family.

The beverage is prepared in the same manner as tea is "drawn," and is drunk in hot infusion. Great care is taken, however, to thoroughly strain the liquor, in order that no portion of the powder shall be swallowed. Properly prepared *Maté* forms a pleasant and slightly stimulating morning drink, which may be taken clear, or with sugar or milk, or both.

Platforms.—Upon the platforms of the three Sections devoted to this country may be found an excellent collection of its principal timbers, the largest and most complete in existence; notable species

are *Lignum Vitæ*, *Incense Cedar*, *Quebracho*, and a particularly fine specimen of *Orange Mulberry*.

A complete collection of dyeing and tanning barks, fiber plants, charcoals, and curious llanos may be seen upon the shelves and walls.

Cases 31 and 31A.—Medicinal Plants of Paraguay.

Cases 31B and 31C.—Fiber Plants. This collection is particularly rich in *Bromeliads*.

Cases 32 and 32A.—Economic and Medicinal Plants.

Cases 34.—Paraguayan Seeds, Cereals, and Oils.

BRAZIL.

Case 34A.—The Woods of Santa Catharina and Espiritu Santo.

Though the specimens in these collections are small they represent a very complete and highly valuable series, and are especially useful for study, and comparison with the other states of Brazil.

Walls and Center-piece.—Commercial woods of Brazil. The color forms of the Brazilian "Pine" (*Araucaria*) here exhibited compare well with the useful forms of *Cryptomeria* of Japan—forms, it is true, that are due to diseased conditions, but highly ornamental and useful. The beautiful *Pao Amaillo* cannot fail to attract and please. This species will doubtless be largely exported in the future, as it has attracted very favorable notice here.

Case 35.—The woods of Pernambuco.

Case 35A.—Woods of Ceará.

Wall.—The woods of Paraná.

This set is one of the most complete and uniform wood collections sent here from Brazil, and represents a large outlay of time and money.

Cases 36 and 36A.—Bast fibers.

Notable in this case is the wonderful "natural oakum," a bast that requires but slight preparation to fit it for the calking iron.

West Wall.—The Woods of Minas Geraes and Para.

A large and valuable set of trunk specimens, notable among which are rosewood, snakewood, violet, and the indispensable Brazilian cedar.

Cases 37 and 37A.—Medicinal Plants.

Brazil is especially rich in medicinal plants. It is from this country that many of our most useful plant medicines are derived; notably, sarsaparilla and copaiva.

Cases 38 and 38A.—Rubber.

The principal product of Brazil, next to coffee and sugar, is the so-called India Rubber, for which the Amazon and its tributaries are famous. Seventy-five per cent. of the product is exported to the United States. Nearly all forms of the raw material may be seen in the collection.

Cases 39 and 39A.—Medicinal plants, and oils.

Cases 40 and 40A.—Textile Fibers.

This collection is particulary rich in Palm products.

Cases 41 and 41A.—Gums, Resins, Seeds, and Cereals.

North Wall.—The Woods of Maranhao.

ECUADOR.

Cases 42 and 42A.—Ecuador Products.

Case 43.—Seeds, gums and Medical Plants.

Two cases containing specimen woods of Ecuador may be found on the transept of the North Gallery.

COLOMBIA.

Case 43A.—Minor Forest Products.

Wall—A series of Colombian Woods.

VENEZUELA.

Wall.—Woods.

This collection, though composed mostly of small specimens, is particularly valuable in that nearly all of the species are authentically identified. It is also a quite complete series, and one of great scientific value.

Case 44.—Fibers, cottons, cereals, and barks.

BRITISH GUIANA.

Case 44A.—Gums, oils, starches, and *Cassava* bread.

Wall.—The Woods of British Guiana.

This collection contains many richly colored and valuable timbers, among which the *wallaba* green heart, purple heart, and mahogany are especially deserving of careful comparison with the cabinet timbers of any country.

TRINIDAD.

Wall.—The woods of Trinidad excited the most favorable notice of any displayed at the Exposition, both for their beautiful markings, and high permanent color. The magnificent *Saman*, or leopard mahogany, was by far the finest specimen in the Forestry Building, while the *angelin* and purple heart were wonderful examples of high color in wood. This collection forms one of the brightest color spots in the galleries.

CURAÇAO.

Case 47.—Economic Plants, Fruits and Woods.

GUATEMALA.

Case 47A.—Cereals, and legumes.

Wall.—The Woods of Guatemala.

Cases 47B and 47C.—Fibers and Cottons.

Case 48.—Guatemalan Forest Products.

Case 48A.—Cereals, legumes, gums and resins. *Chicle* from the juice of the *sapoté* tree, the base of most modern chewing gums, may be seen here and in Case 52.

JAMAICA.

This collection is particularly rich in starches — arrow-root, mandioca, and banana meal being excellently represented.

Wall.—The Woods of Jamaica.

An excellent and very complete collection of the principal woods of the island.

MEXICO.

Cases 50 and 51A.—Mexican seeds, cereals, gums and oils.

Wall.—This space is designed for the timbers of Mexico, of which the Museum secured a large and complete set, now in preparation for installation.

Cases 52 and 53A.—Mexican textiles.

Cases 54 and 55A.—Medicinal plants of Mexico.

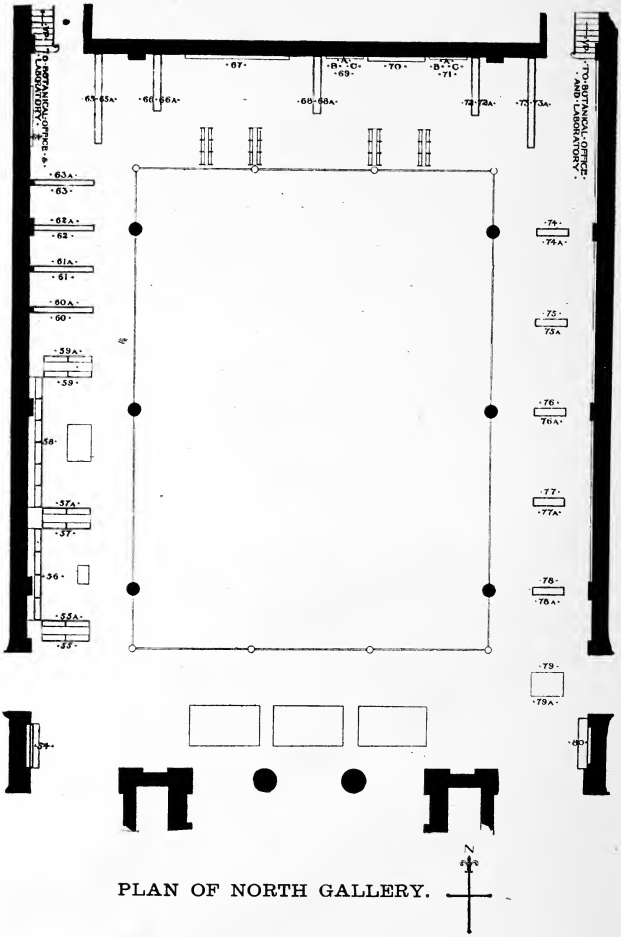
DESTRUCTIVE DISTILLATION OF WOOD.

Case 53.—Monographic set. This set includes almost all of the products of the destructive distillation of the beech and birch; notable among which are creosote, acetic acid, methyl alcohol, benzol, benzine, and oil of birch.

GALLERIES OF THE NORTH COURT.

Case 54.—Insects injurious to the paper pulp tree. A complete and very interesting monographic collection of the insect enemies of the spruce tree of Europe, showing the mutations of each species, and examples of the injury wrought by them.

On the two lower shelves are arranged the various forms of carbolic acid and its compounds with different metals.



PLAN OF NORTH GALLERY.

ECONOMIC PLANTS.

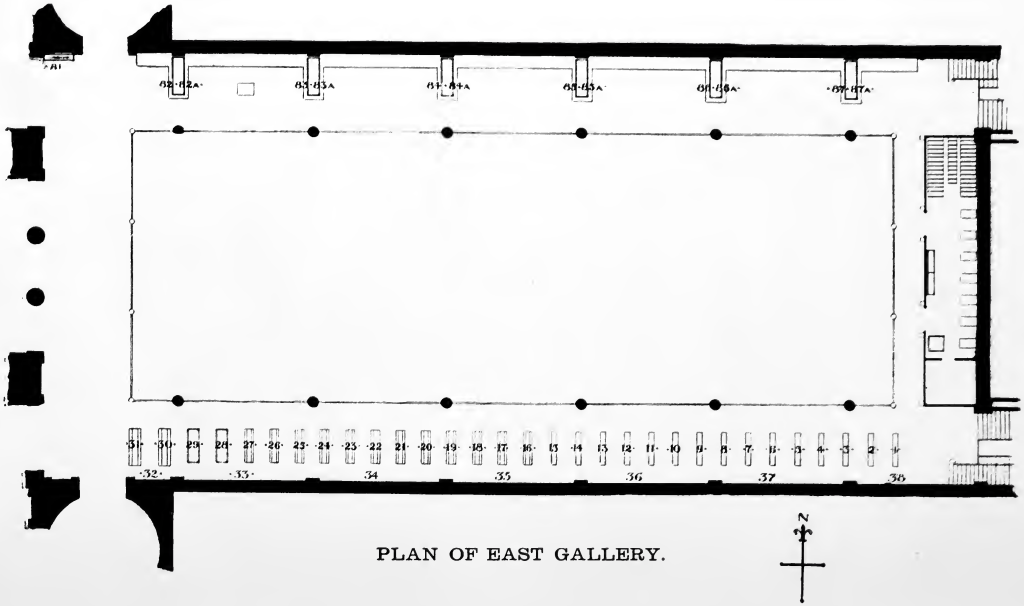
Cases 55 to 59A.—Tobacco. These cases contain nearly four hundred samples of American grown tobaccos, from almost every producing district of the United States. A very complete and highly important comparative collection, both from the standpoint of the student and the merchant.

COTTONS.

Case 60.—Texas and Arkansas cottons.
Case 60A.—Arkansas and Tennessee cottons.
Case 61.—Mississippi and Louisiana cottons.
Case 61A.—Louisiana and Texas cottons.
Case 62.—Virginia and North Carolina cottons.
Case 62A.—Georgia and South Carolina cottons.
Case 63.—Georgia cottons.
Case 63A.—Alabama and Mississippi cottons.
Case 64.—Georgia, Florida, Oklahoma, Tennessee and Missouri cottons.

FIBERS.

Case 65.—Ramie.
Case 65A.—*Abutilon*, Okra, *Asclepias*, and Indian hemp.
Case 66.—Manila Hemp, Ixtle and *Yuca*.
Case 66A.—Bow String Hemp, Saw and Cabbage Palmetto.
Case 67.—Flax plants.
Case 68.—Florida Sisal.
Case 68A—Mexican Sisal, False Sisal.
Case 69A.—New Zealand Flax.
Case 69B.—Louisiana Cane Fiber.
Case 69C.—Pineapple Fiber.
Case 70.—Spanish Moss, Cypress Bark, Raphia, and Grass.
Case 71A.—Intermixed Ramie and Silk.
Case 71B.—Dressed Flax.
Case 71C.—Ramie Yarns, natural and dyed.
Case 72.—Saw Palmetto and African Fiber.
Case 72A.—Cocoanut and Pine-Needle Fibers.
Case 73 and 73A.—Dressed and undressed Flax.



PLAN OF EAST GALLERY.

SYLVA OF THE UNITED STATES.

West Wall.—A nearly complete collection of the Leaves, Fruits, and Woods of the trees of our country, accompanied by graphic maps showing the distribution of each species. This fine collection is arranged systematically, and affords an excellent opportunity for comparison between allied woods. The richness of our sylva in oaks and conifers is strikingly exemplified.

Cases 74 to 78A.—A set of twenty monographs of North American trees. Each species in this set is illustrated by a large distribution map; photo-micrographs of three sections of the wood, horizontal, tangential, and radial; a branch in full leaf and fruit; macroscopic sections of the wood in three planes, and a section of trunk showing the bark.

Standards 79 and 79A.—Specimens of pine, showing the method of tapping for turpentine.

Case 80.—Indurated fiber ware. Examples, crude and finished, of the method of converting spruce wood into various household articles.

GALLERIES OF THE EAST COURT.

These galleries, now temporarily occupied by a miscellaneous collection in forestry, and a portion of the anthropological collection, are reserved for a complete forestry and economic plant collection of North America, to be specially made by this department. The various home forestry collections exhibited at the Exposition that were obtainable by the Museum were mostly of a more or less heterogeneous character as to shape and size, and of an ephemeral nature, as they were gathered while the sap was in the pores of the wood, and had commenced to decay in large part before the end of the Fair. For these reasons a few especially fine or rare specimens only were retained, which will be found upon the platforms along the North wall.

Case 81.—Paper pulp. Crude and partially manufactured specimens, showing the utilization of spruce wood, in the manufacture of all grades of paper.

Cases 81 and 83 and Walls.—Timber tests. Standards representing the results of strain upon various species of American timbers.

Between **Cases 83 and 84** may be seen the two broadest boards ever sawn, both being specimens of the sugar pine of California. Here also are exhibited several fine examples of plain and curly yellow poplar from Kentucky.

Between **Cases 84 and 85,** various species of trees from Kentucky, Washington, Oregon, and California may be seen. Notable among these are particularly large sections of madroña, beech, pecan, and sweet gum.

Between **Cases 85 and 86** are several excellent specimens of the commercial woods of Canada, notable among them the paper birch.

Between **Cases 86 and 87,** British Columbia woods, represented by several specially fine sections. Beyond Case 87, at the end of the Section, may be seen four excellent examples of the principal timber trees of Alaska.

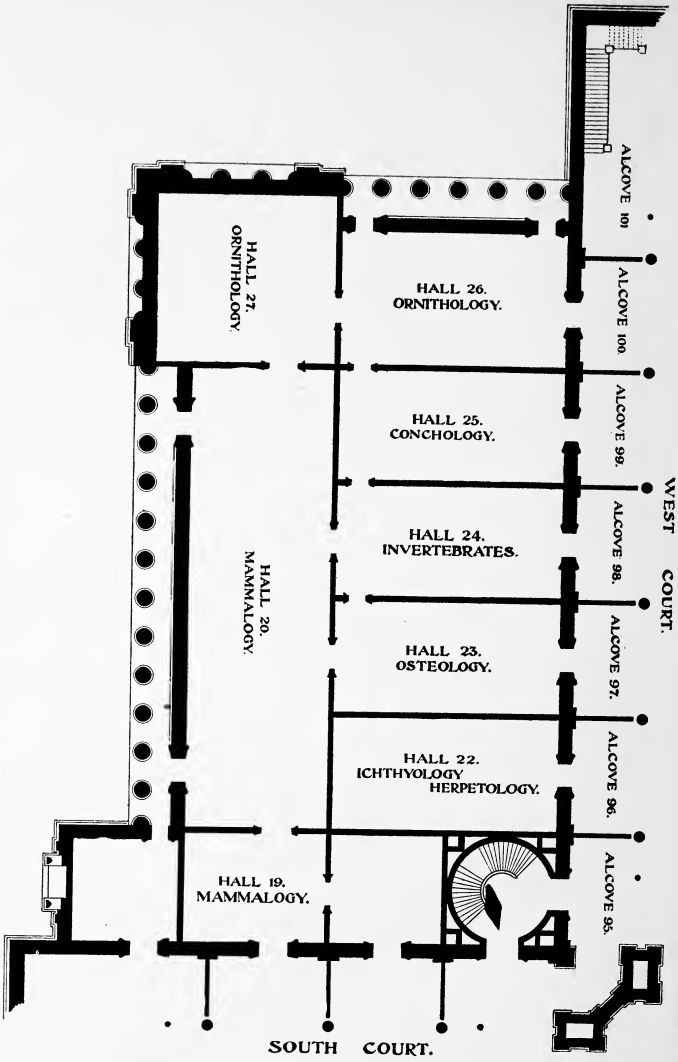
Case 88.—Cereals of the United States, with milling products illustrating their uses.

WALLS OF THE ROTUNDA.

On the walls of the Rotunda will be found a framed set of herbaceous plants, each frame containing a family. They are arranged in their natural order, beginning on the west face of the northwest corner and passing southward. This collection serves to illustrate the grouping of plants according to their botanical characters.

On the floor of the north transept are three cases, two of lichens and one of mosses, each containing sufficient species to fairly represent the genera of these classes of plants.

On the floor of the south transept is a case of replicas of tropical fruits, accompanied in many instances by products gained from the different species.



PLAN OF DEPARTMENTS OF
ZOOLOGY AND ORNITHOLOGY.

DEPARTMENT OF ZOOLOGY.

The collections in Zoology occupy Halls 19, 20, 22, 23, 24, 25, 26, 27, the greater part of the West Court and the alcoves on the south side of this court. Of these halls and alcoves the Department of Ornithology occupies Halls 26 and 27 and Alcove 100, and the collections found therein will be described on page 137.

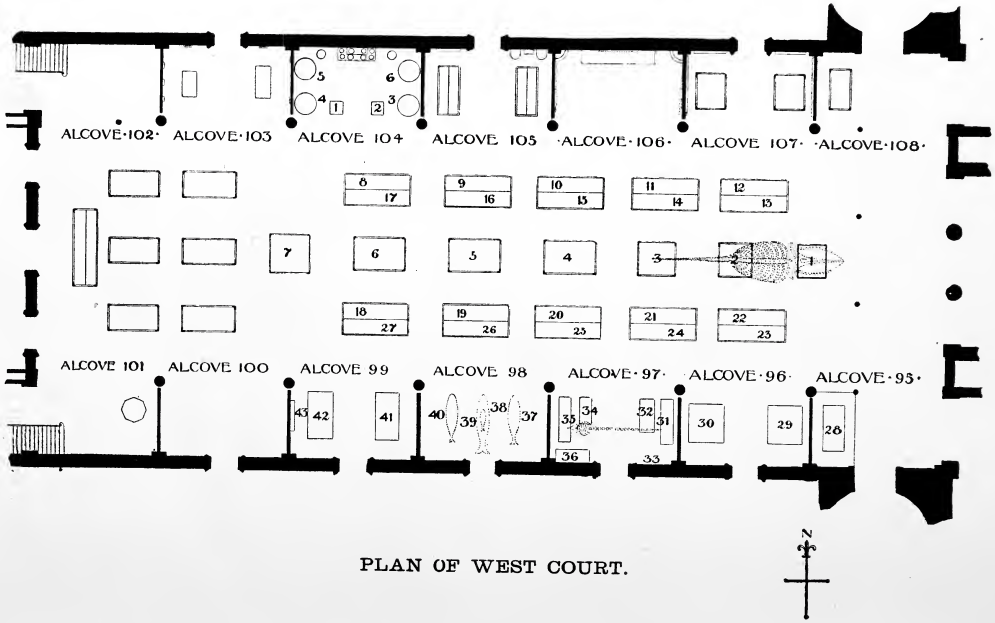
A word may be said regarding the names on the labels of the objects. The inquiry is often made why "common names," "English names," are not employed instead of the Latin systematic names. This brief answer may be given: The experience of naturalists for a century and a half has demonstrated the necessity of using the system of naming now in use. All described objects must have a name. Relatively few of them have a "common name." No system that would meet acceptance could probably be devised to give all described animals a vernacular name.

English names invented by naturalists would not be common names, and when given are not usually accepted by people in general. On the labels the common English names are usually given, when such exist. They are to be taken *simply as names;* just as we do our own and our neighbors' names.

WEST COURT.

Under the supposition that the visitor will enter the Department of Zoology through the West Court, this will be first described.

The contents of the West Court and its adjoining alcoves consist, to a great extent, of objects which are too large to be arranged in any of the halls, and of the overflow of material from those halls. The collections are therefore of a somewhat mixed character.



PLAN OF WEST COURT.

Beginning at the middle of the east end of the court there is first to be observed, suspended by chains from the roof of the building, the skeleton of a North Atlantic right whale (*Balæna biscayensis*). This skeleton has a length of forty-four and one-half feet, while the head has a length of twelve and one-half feet.

Immediately below the skeleton is a large case containing a group of proboscis monkeys, seven in number, of different ages and both sexes, and displaying the attitudes and habits of life. This case and its contents are the gift of Mr. Martin A. Ryerson, and the mounting was done by Mr. C. E. Akeley, the taxidermist of the Museum.

Beyond this, running down the middle of the court, is a row of large cases whose contents are as follows:

Case 2.—Group of pumas.

Case 3.—Pacific walrus.

Case 4.—Northern fur seal, male, female and young, and a Steller's sea lion from the Pacific coast.

Case 5.—Five seals, among them the sea elephant from the Kerguelen Islands.

Case 6.—Group of llamas, alpaca and vicugna.

Case 7.—Group of orang-utans. This case, like the first in this row, was presented by Mr. Martin A. Ryerson, and the taxidermy was done by Mr. Akeley. The group consists of an old male, a young male, two females and two young. This family is represented as being in the top of a durio bread-fruit tree, where they are engaged in securing the fruit and disporting themselves.

COLLECTION OF MOLLUSKS.

The remaining cases in this court are flat cases on tables and are devoted to exhibiting the collection of brachiopod and molluscan shells. The visitor is supposed to begin with Case No. 8, at the west end of the row on the north side of the court. Only the principal families in each case will be referred to here.

The collection of *Mollusca* contains some 4,000 or more species. It is believed to represent fairly well the subject of conchology, since a large proportion of the genera and important subgenera are present.

Case 8.—An attempt has been made in this case to illustrate some of the facts of evolution, such as distribution in time and space, the evolution and extinction of species and the adaptation of species to their environment.

Case 9.—At the west end of this case is placed the small collection of *Brachiopoda*. These are not, in reality, Mollusca, but have hitherto usually been associated with them, and are placed here for convenience. In this case are also found the *Pandoridæ*, *Tellinidæ*, the *Teredinidæ* (shipworms, piddocks, etc.).

Case 10.— *Teredinidæ*, continued; *Pholadidæ*, *Myidæ*; *Solenidæ* (razor-shells).

Case 11.—*Psammobiidæ*; *Donacidæ* (wedge-shells); *Veneridæ*, a very large family, which contains many beautiful shells.

Case 12.—*Veneridæ*, continued; *Chamidæ*.

Case 13.—*Cardidæ* (cockle-shells); *Tridacnidæ* (giant clams). Two very large examples of this family may be seen in Hall 25. *Cardidæ*.

Case 14.—*Unionidæ* (river-mussels). These mollusks live in the ponds and streams of all regions of the world, except the coldest. They abound in individuals and species in our own region.

Case 15.—*Unionidæ*, continued; *Arcidæ* (ark-shells).

Case 16.— *Mytilidæ* (mussels). *Aviculidæ* (wing-shells). This family, includes, among other species, the "pearl oysters," of which specimens are here shown. Other examples, some beautifully etched may be seen in Hall 32. Other remarkable genera are *Malleus* and *Vulsella*.

Case 17.—*Aviculidæ*, continued; *Pectinidæ* (scallop-shells); *Spondylidæ* (thorny oysters). The last two families contain many shells which are interesting on account of their forms and their brilliant colors.

Case 18 is on the south side of the court at the west end. In it are continued the *Spondylidæ*; *Ostreidæ* (oysters); *Dentaliidæ* (tooth-shells); *Chitonidæ*. The latter is a remarkable family and contains over 300 species. The most striking characteristic of these animals is the serial arrangement of eight pieces of shell along the back.

Case 19.—*Patellidæ* (limpet-shells); *Fissurellidæ* (key-hole limpets); *Haliotidæ* (ear-shells).

Case 20.—*Trochidæ* and *Turbinidæ* (top-shells).

Case 21.—*Neritidæ; Naticidæ; Xenophoridæ.*

Case 22.—*Calyptræidæ* (limpets); *Ampullaridæ* (apple-snails); *Littorinidæ* (periwinkles).

Case 23.—*Melaniidæ Turritellidæ; Vermetidæ* (worm-shells, the shells being more or less contorted like worm-tubes); *Cerithiidæ, Strombidæ* (conch-shells).

Case 24.—*Strombidæ* (continued); *Cypræidæ* (cowries), a family containing some of the most beautiful shells known.

Case 25.—*Ovulidæ; Doliidæ* (tun-shells); *Cassidæ* (helmet-shells). *Tritonidæ* (triton-shells).

Case 26.—*Muricidæ*, a large family of mostly spiny and roughened shells.

Case 27.—*Muricidæ*, (continued); *Nassidæ* (dog-whelks); *Buccinidæ* (whelks); *Turbinellidæ*, from Case 4, Hall 25.

The visitor who wishes to examine the remainder of the molluscan collection may now enter Hall 25, where the series is continued in Case 4 in the northeast corner of the hall.

ALCOVES.

Alcove 95.—Male elephant and young.

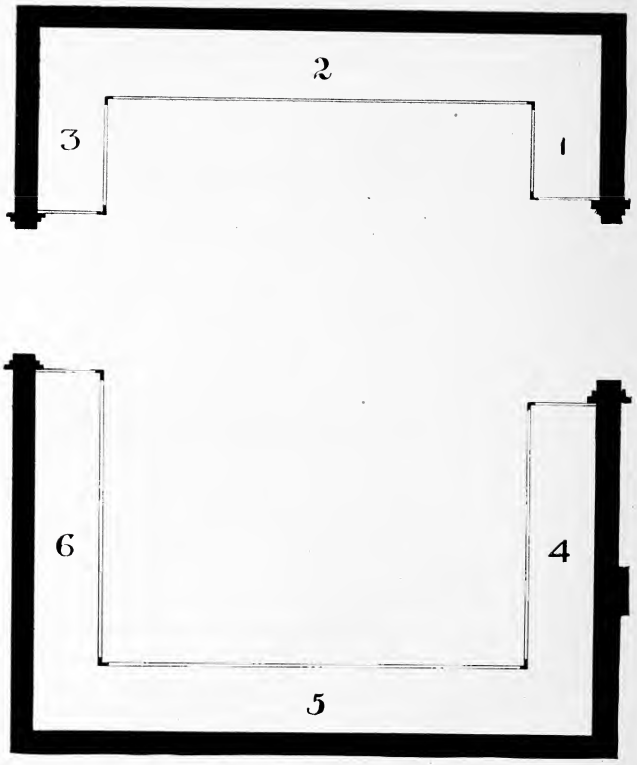
Alcove 96.—Loggerhead turtle and leather-back turtle.

Alcove 97.—Skeletons of wapiti, hippopotamus, rhinoceros, camel, bottle-nosed whale, jaws of sperm-whale.

Alcove 98.—Models of grampus, porpoise, etc.

Alcove 99.—Mounted male wapiti and giraffe; giant crab from Japan.

The main collection of mounted mammals is on exhibition in Halls 19 and 20, where they are arranged as systematically as possible, beginning with the lowest families in Hall 19 and ending with the highest families at the west end of Hall 20. The cases are numbered in agreement with the arrangement of the collection.



PLAN OF HALL 19.

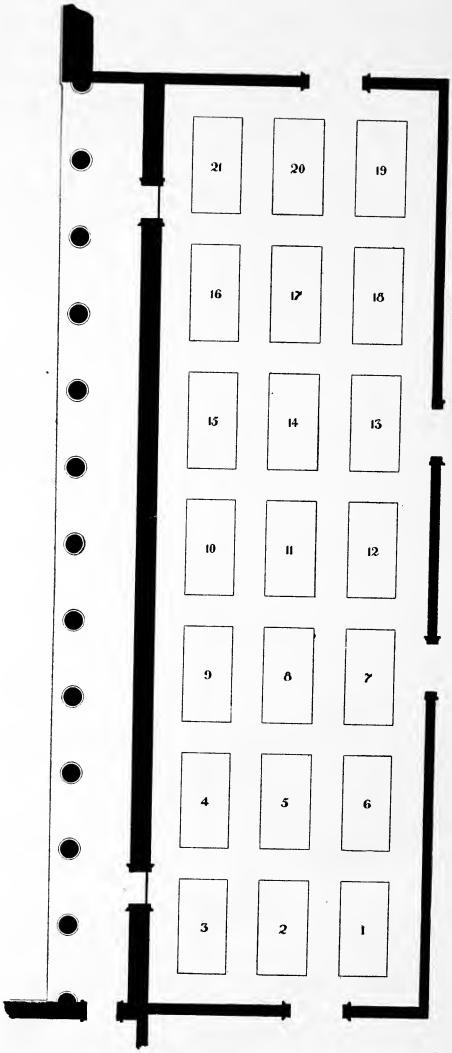
HALL 19

MAMMALS.

Case 1.—Four representatives of the lowest sub-class of mammals, the *Prototheria*. Of these the most interesting is the duck-bill (*Ornithorhynchus*). It is so called on account of its duck-like beak. It is a native of Australia. It is aquatic in its habits and swims with facility. Although a true mammal, the remarkable fact has been discovered that it lays eggs instead of producing living young. The *Echidnas*, or spiny ant-eaters, are inhabitants of New Guinea, Tasmania and Australia.

Case 2.—Members of the second sub-class of mammals, the *Metatheria*, order *Marsupialia*. These comprise the phalangers, the bandicoots, the kangaroos, the dasyures, all inhabitants of Australia, Tasmania and New Guinea, and the opossums, dwellers in the Americas. They present many strange and interesting forms of life. The phalangers usually live in trees and have prehensile tails. Some species subsist on vegetation, others on insects. The "flying phalangers" resemble our flying squirrels in having a fold of skin which acts as a parachute. The bandicoots (*Perameles*) burrow in the earth and subsist on roots and grain. The kangaroos are grass-eating animals. The dasyures are devourers of flesh. One species (*Dasyurus ursinus*) has earned the name of "Tasmanian devil." All the other mammals belong to the sub-class *Eutheria*.

Case 3.—Contains Edentates (*Bruta*). These occupy also a part of Case 2. Among the Edentates shown are armadillos, the strangely armored pichiciago from Argentine Republic, two species of sloth, several species of ant-eaters and two species of scaly ant-eaters, or pangolins, from Africa. The armadillos have most of the skin converted into an armour of bony plates. They live on roots, insects, reptiles and carrion. They are able to burrow with astonishing rapidity. The pichiciago is a very rare burrowing animal. The great ant-eater lives on white ants, whose dwellings it tears open with its strong claws. The pangolins (*Manis*) have the body covered with overlapping horny plates. They subsist on ants.



PLAN OF HALL 20.

Case 4. — Contains a portion of the gnawing mammals (*Rodentia*). Among these are the hares and rabbits, the capybara, chinchillas, and porcupines. The capybara (*Hydrochœrus*) inhabits a large portion of South America, and is the largest living rodent. It is the prey of the jaguar. The chinchilla (*Lagidium*) here shown is not the true chinchilla so prized for its soft fur. The porcupines are remarkable for their long sharp spines. They are *not* able to shoot these out at their enemies.

Case 5.—Contains the remainder of the rodents—the rats, mice, muskrats, beavers, squirrels, and spermophiles.

In **Case 6** are displayed the *Insectivora* and the *Chiroptera* (bats). In the former order are found the strange tenrec (*Centetes*) of Madagascar, the *Solenodon* from Cuba, the hedge-hog, the shrews, the moles, and the so-called flying lemur (*Galeopithecus*) from Sumatra. Among the bats are some large and remarkable species. The largest species belong to the family of fruit-bats, living on fruits and the juices of plants. The smaller bats subsist mostly on insects. The vampire bat is of small size and there is no specimen exhibited.

From Hall 19 the visitor will pass into Hall 20.

HALL 20.

MAMMALS.

The cases, twenty-one in all, are numbered across the hall in alternate directions, the first one being

Case 1.—Two representatives of the *Sirenia*. These are aquatic herbivorous animals which, in external form, resemble the whales. They have, however, no close relationship with the latter animals. The uppermost specimen is the American manatee, or sea-cow, a resident of Florida. The lower specimen is the dugong from Australia.

Case 2.—Burchell's zebra. This is a larger animal than the true zebra and has the stripes on the hinder part of the body somewhat differently arranged.

Case 3.—Hogs, peccaries and the Malayan tapir. The peccaries here shown go in small herds of 8 to 10 and are not as pug-

nacious as is another species found in South America. The tapirs have a remarkable geographical distribution. The species here exhibited lives in the Malay peninsula and some adjacent islands; four other species inhabit Central and South America.

Case 4.—Male and female moose.

Case 5.—Reindeer and its close relative, the caribou, from Maine. These are the only deer the females of which have well-developed horns.

Case 6.—Various species of deer; among these is the little chevrotain (*Tragulus*), the smallest and the most generalized of all the deer-like animals. Indeed, it forms a distinct section of hoofed quadrupeds. Other interesting species in this case are the muntjac; the little deer, *Cervus steerii*, the type of its species; and the female wapiti; the male of this species will be found in Alcove 99, West Court.

Case 7.—Three specimens, male, female and calf, of the water buffalo (*Probubalus mindorensis*) from the Philippine archipelago. These specimens were collected by Prof. J. B. Steere, of Ann Arbor, Michigan.

Case 8.—Old male and young male of the American bison.

Case 9.—Cow and calf of the American bison. Prong-horn, or American antelope.

Case 10.—Bennett's gazelle, India; Grant's gazelle, Africa; the water-buck, Africa; the palla from Africa and the black-buck from India.

Case 11.—Five species of antelope from British East Africa, viz.: The sassabye (*Bubalis lunatus*), Lichtenstein's hartebeest (*B. lichtensteini*), and Coke's hartebeest (*B. cokei*), a male and female of Kirk's dwarf antelope (*Neotragus kirkii*); also a species of the genus *Cephalopus*.

Case 12.—Two species of gnus—the white-tailed gnu and the white-bearded gnu.

Case 13.—Contains a fine example of the roan antelope, a stately animal from Africa; the nilghai from India; and a gazelle (*Gazella subgutturosa*) from Persia.

Case 14.—A number of goats and sheep, seven specimens in all, from various regions of the world. The oxen, antelopes, sheep and goats are all very closely related.

Case 15.—An example of the musk ox, from Great Slave Lake.

Case 16.—In this case begins the extensive order of flesh-eating animals (*Carnivora*). Those shown here belong to the large family of *Mustelidæ*. Among the interesting forms are the otters, the sea-otter, the skunks, badgers, martens, the glutton, etc.

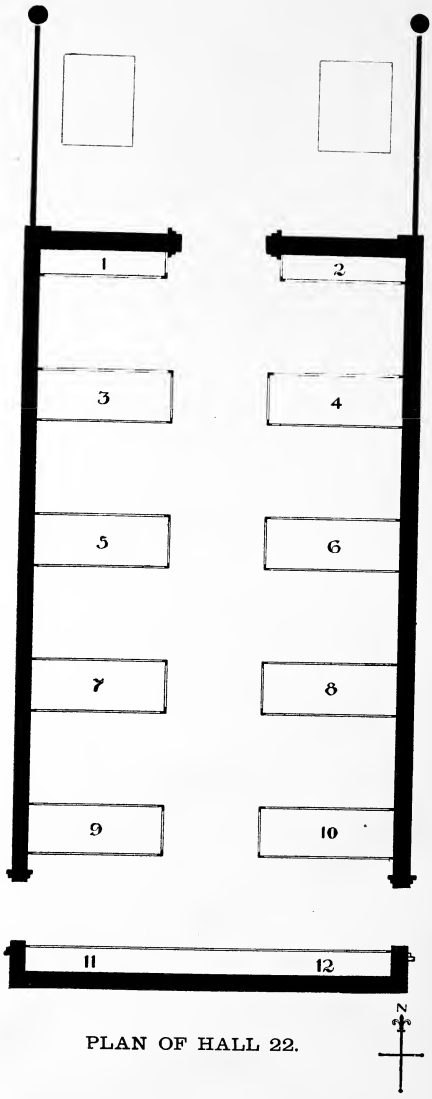
Case 17.—Three grizzly bears, two adults and one young. In this case, upper portion, are also exhibited members of the *Procyonidæ* (raccoons, panda, etc.) and a few species belonging to the *Viverridæ* (civets, etc.).

Case 18.—Polar bear; species of black bears from North America, the Himalayas and Japan; and the sun-bear from Borneo.

Case 19.—Specimens of two species of hyenas, and several species of dogs and foxes.

Case 20.—Here are shown, in the lower portion of the case, lions and tigers, a male and female of each. In the upper division of the case are exhibited several other species belonging to the interesting family of cats.

Case 21.—Representatives of the order *Quadrumana*, containing the lemurs and monkeys. Some twenty-seven species are shown here. There is a case of orangs and another of proboscis monkeys exhibited in the West Court.



PLAN OF HALL 22.

HALL 22.

REPTILES AND FISHES.

In reality, there are in this Hall materials illustrating six of the primary divisions, called *classes*, of the vertebrated animals, viz: the ascidians (*Tunicata*); the lampreys (*Cyclostomi*); the sharks, etc. (*Elasmobranchii*); the true fishes (*Pisces*); the salamanders, frogs, etc. (*Batrachia*); and the reptiles (*Reptilia*).

Case 1.—The little material representing the group of ascidians (*Tunicata*). This consists almost wholly of glass models. There is also a very little material belonging to the *Cyclostomi* (Lampreys).

Cases 1 to 6, 8.—The true fishes also begin in Case 1. The two species of sturgeons, which should come in here, are placed in Case 8, on account of their large size. As far as possible the fishes are arranged in systematic order. The materials are not extensive. They consist of mounted fishes, usually not well prepared, of specimens in fluid, and about sixty plaster casts of fishes which inhabit the coasts of Norway.

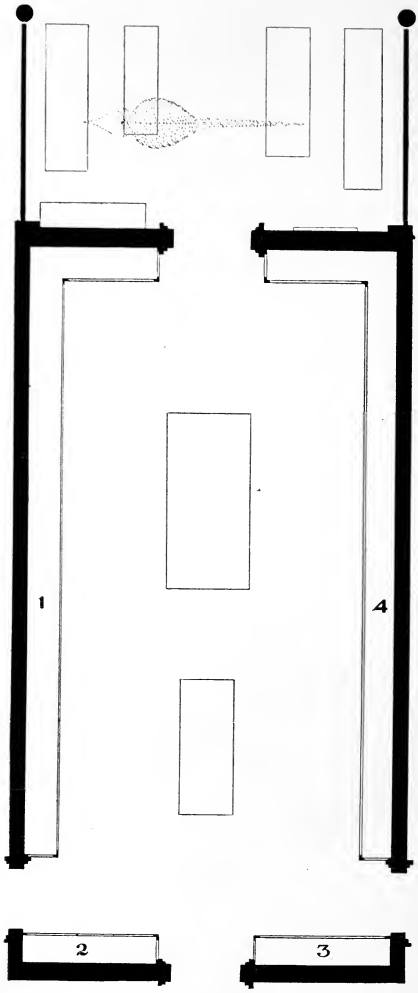
The fluid preparations consist of some of the fresh-water fishes of the region about Chicago, and a collection made on the western coast of Florida and presented to the museum by Mr. Owen F. Aldis, of Chicago.

Among the more striking fishes in the collection, attention may be called to the conger, the muræna, the sword-fish and the goose-fish.

Case 7.—A number of sharks, mostly from foreign waters. The mackerel shark, the tiger shark (*Stegostoma*) from Australia, and the angel shark are worthy of attention.

Case 9.—Specimens of the rays (*Raiæ*). The saw-fish (*Pristis*) and the species of *Rhinobatus* are the most shark-like in appearance. The torpedo is an electric fish. The genus *Raja* is common, especially in northern seas. The *Urogymnus* is a remarkable ray. The rough skin is used for covering shields, etc. *Stoasodon* is one of the "sting-rays," there being a barbed weapon in the base of the tail.

In the lower division of this case are exhibited two specimens of the green turtle, and one of a South American land



PLAN OF HALL 23.

tortoise (*Podocnemis*). There are also some fresh-water turtles preserved in formalin.

Cases 10, 11 and 12.—The collection of batrachians and reptiles. The small collection of batrachians is arranged in the east end of Case 12.

The class of *Reptilia*, as regards living forms, is divided into the following orders: *Rhynchocephalia*, embracing the New Zealand Tuatera. *Squamata*, containing the snakes and lizards. *Chelonia*, turtles. *Crocodilia*, crocodiles, alligators, gavials.

There are a few representatives of all these orders. Most of the species in the collection are from foreign countries, while our own reptilian fauna is hardly represented. Among the conspicuous reptiles exhibited are the alligators, the cayman, the gavial, the large specimen of the lace lizard (*Varanus*), the pythons, etc.

HALL 23.

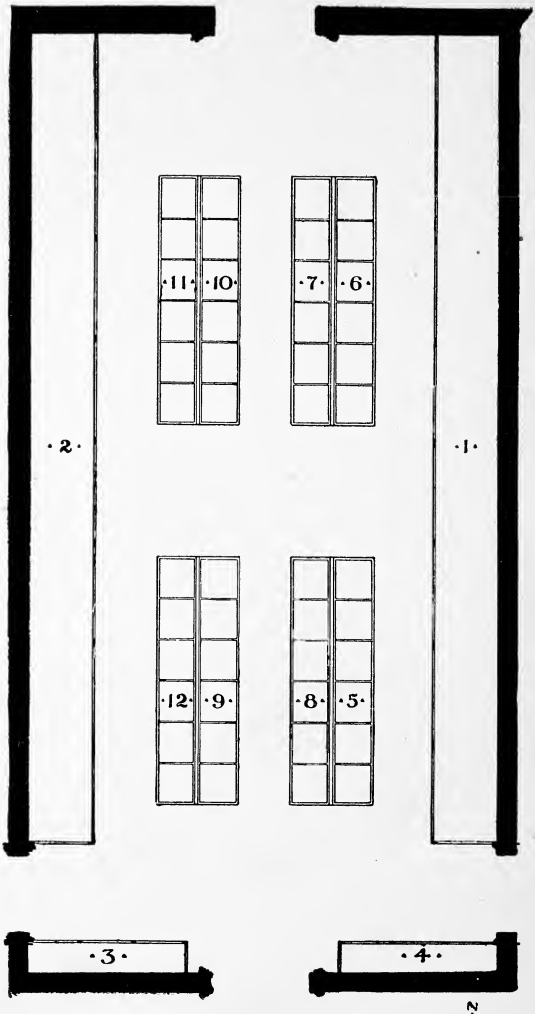
OSTEOLOGY.

The osteological collection consists of mounted skeletons of over 225 species. These belong to more than thirty orders and 150 families, making it a most valuable means for the study of the structure of the *Vertebrata*. The cases are arranged against the walls. In the middle of the hall stand skeletons of the elephant and the giraffe. In the alcove of this hall stand skeletons of the wapiti, the hippopotamus, the rhinoceros and the camel.

Case 1 occupies the west side of the hall and a portion of the north side. On the north side the series of skeletons begin with those of the fishes. These are followed by those of the amphibians and reptiles; among these are skeletons of the python, gavial, crocodile, turtles and lizards. The remainder of Case 1 is occupied by skeletons of mammals. These are continued into Case 2, which contains skeletons of goats, prong-horn and llama.

Case 4.—Contains the remainder of the mammals, ending at the north end of this hall with seventeen skeletons of monkeys and lemurs.

Case 3.—Skeletons of the birds, over fifty in number.



PLAN OF HALL 24.

HALL 24.

SPONGES, JELLY-FISHES, CORALS, ETC.

In this hall are exhibited the materials illustrating the branches of the animal kingdom known as the *Protozoa*, the *Porifera*, the *Cœlenterata*, and the *Echinodermata*.

Cases 1 and 2.—The *Protozoa*, almost wholly animals of microscopic size, are illustrated by models, faithful representations of these animals magnified 2,300 times. These are found in the extreme south end of the case.

The *Porifera*, or sponges, include some interesting forms, such as Neptune's cup, the glass-rope sponge, Venus' flower basket, etc.

Near the sponges begin the *Cœlenterata*. This branch includes the hydroids, the various forms of jelly-fishes, the sea-anemones and the corals.

The hydroids and jelly-fishes are represented by a number of glass models. These include one of the Portuguese man-of-war.

Closely related to the hydroids are the species of the genus *Millepora*. They form solid coral-like masses.

The remainder of Case 1 is occupied by the *Actinozoa*. A few of these, the sea-anemones, form no solid skeleton and are able to move slowly about. These soft, very contractile animals are represented here principally by glass models.

Of the corals which form a solid limestone skeleton there are two orders, viz : the *Zoantharia* and the *Alcyonoida*. All the solid corals shown in Case 1 belong to the first-named order, as well as many of those in Case 2. The simplest of these corals in structure are the species of the genus *Fungia*. The individuals are nearly circular and may be several inches in diameter. Each is the skeleton of a single animal. Usually, however, the coral mass is composed of the coalesced skeletons of many coral animals. These individual animals may be of considerable size and distinct from one another, as in *Astræa;* or they may coalesce with their neighbors and be of considerable size, as in the brain-coral (*Meandrina*), or small. In the stag-horn corals (*Madrepora*) the individuals which secreted the coral are quite small.

The second order of corals, the *Alcyonoida*, shown in the south half of Case 2, includes the sea-fans, the sea-whips, organ-pipe coral, etc. There is not often a limestone skeleton, although this is occasionally present, as in the precious red-coral. Usually the supporting skeleton contains a horny axis. This may be observed in many of the specimens. There are several alcoholic preparations of corals and some glass models, which show the organization of these interesting animals.

CRINOIDS, STAR-FISH, SEA-URCHINS, ETC.

Cases 3 and 4 and Table Cases.—The class of animals designated by the term *Echinodermata* includes the *Crinoidea* (sea-lilies, etc.), the *Ophiuroidea* (brittle-stars and basket-fishes), the *Asteroidea* (star-fishes), *Echinoidea* (sea-urchins), and the *Holothuroidea* (sea-cucumbers). These are exhibited in the Wall-cases 3 and 4, and in Table-cases 5, 6, 7, 8, 9 10, 11 and 12. The series begins with Table case 5.

The class takes its name from one of the most obvious characteristics of the group — the possession of a covering of spines. These spines undergo the most extraordinary modifications, not only in the different groups of the class, but even in different parts of the body of some individuals. They are sometimes wholly wanting.

Case 5.—Here are shown the lowest forms of the class, the *Crinoidea*. Many species are furnished with a long stem, by means of which the animal is attached to some fixed object. Comparatively few species now exist, but in some of the earlier geological periods the crinoids were extremely abundant. In Wall-case 3 are shown some alcoholic preparations.

In Case 5 are also exhibited the *Ophiuroidea*, some of which are known under the names brittle-stars and serpent-stars ; others as basket-fishes ; although they are in nowise related to true fishes. Some of them are remarkable for their very long and attenuated arms. The basket-fish (*Astrophyton*) is remarkable for its branching arms.

Cases 6, 7 and 8 and part of 9—Specimens of the order *Asteroidea* (starfishes). The simplest form of these animals is a central disk passing gradually into five arms; but there are extreme modifications of this pattern. The arms may be more nu-

merous and very long or very short. The five arms may form simply the angles of a pentagon, or they may form the greater portion of the animal. Some of the larger species are exhibited in Wall-case 4.

Cases 9, 10, 11 and 12.—In Case 9 begin the *Echinoidea*, or sea-urchins. The skeleton of all these consists of ten zones of plates closely joined and forming a sort of box. On the outer surface of this is an armature of spines. The form of the animal varies greatly, some being globular, some slightly flattened, others, as the "sand-dollars," extremely so. The spines undergo strange modifications.

In the south end of Case 12 are exhibited a portion of the *Holothuroidea*, or sea-cucumbers. Several alcoholic examples of these will be found in the Wall-case, 3.

In Case 12 are also found a few worms and a few species of the *Polyzoa*. Others of both groups are contained in Wall-case 3.

Overhead in this room is suspended a life-size model of the enormous *Octopus*, or devil-fish, which occurs on the coast of California.

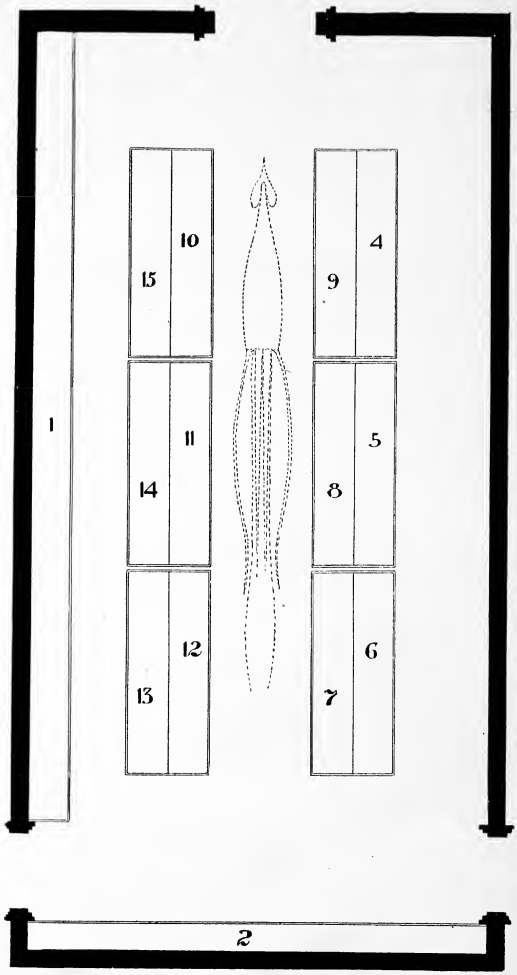
HALL 25.

INSECTS, CRUSTACEANS, MOLLUSKS.

Wall-case 1.—Collection of crustaceans. Although the number of species is small, those represented are valuable and exemplify the strange modifications of form and structure which are found in this group. The barnacles, as an illustration, have little appearance of kinship to the lobsters and crabs; but studies of their early stages of development prove that they are true crustaceans. A specimen of the giant crab from Japan is found on the wall of the alcove of this hall.

Case 2.—A collection of about 2,000 butterflies and moths.

Case 4.—With this case the visitor takes up again the molluscan series which he has been examining in the West Court (see page 115). Here are contained a portion of the *Turbinellidæ*, continued from Case 27, West Court; *Fasciolariidæ; Fusidæ* (spindle-shells), and *Mitrid*, (mitre-shells).



PLAN OF HALL 25.

Case 5. — *Marginellidæ; Volutidæ;* a family containing many large and beautifully colored shells. A rare shell is *Voluta Junonia.* It formerly sold for as much as $200; now for $8 or $10.

Case 6.— *Harpidæ* (harp-shells); *Olividæ* (olive-shells), great favorites with collectors; and *Pleuotomidæ.*

Case 7.—*Conidæ* (cones), an extensive family, living mostly in warm seas. Few families make a handsomer collection than do the cones. *Teribridæ* (augur-shells).

Case 8.—Materials illustrating two groups of mollusks, many of whose members have the shell rudimentary or wanting entirely. The *Nucleobranchiata* are all pelagic animals, swimming at the surface of the sea. The *Opisthobranchiata* are also marine and are termed sea-slugs. Many of these animals are represented here by beautifully executed glass models.

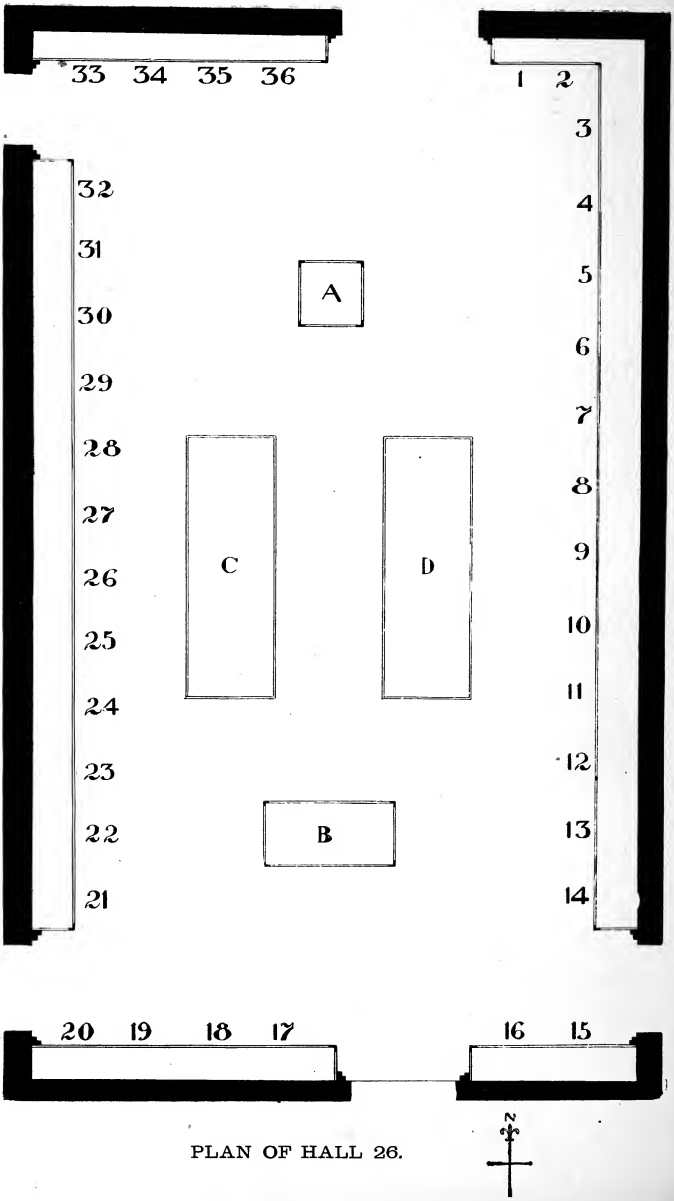
Case 9.—A number of families of air-breathing mollusks (*Pulmonata*), *Stenogyridæ.*

Case 10.—*Stenogyridæ,* continued. The genus *Achatina* contains some of the largest known air-breathing shells. Most of the species live in Africa, where they remain in trees, descending to lay their eggs. Some of the eggs are exhibited. *Pupidæ; Bulimulidæ.*

Cases 11, 12 and 13.—Representatives of the very extensive family of *Helicidæ.* Over 6,500 species of this family have been described. All are air-breathers, inhabiting all countries, except those very cold. Many of the most attractive species in these cases are from the Philippine Islands. Some species of *Bulimus* reach a length of six inches. They lay large eggs which resemble those of birds. Some of these are shown.

Case 14.—*Pteropoda,* mollusks inhabiting the open sea. The shell is often absent; *Limaeidæ* (the slugs).

Case 15.—The *Cephalopoda,* a class which includes the nautilus, the squids, the species of octopus and the argonauts. Specimens of a number of species in alcohol are in one of the wall-cases. Shells of the nautilus have been sectioned so as to show the internal structure. A considerable number of the soft cephalopoda are represented by means of glass models. A model of the giant squid of the coast of Newfoundland is suspended overhead. In Hall 24 is a model of the giant octopus of the Pacific coast of the United States.



PLAN OF HALL 26.

DEPARTMENT OF ORNITHOLOGY.

The exhibition series of specimens in this department occupy Halls 26 and 27. The entrance at the West Court should be the starting point to study these collections.

HALL 26.

GENERAL ORNITHOLOGY.

At present there are 601 specimens representing about 535 species. The 535 species illustrate the leading characters of about one hundred families which are arranged in systematic order according to the classification propounded by Dr. Stejneger in the Standard or Riverside Natural History. The groups are arranged in vertical series in consecutive order from left to right.

WALL CASES.

Sec. 1.—The South American ostrich.

Sec. 2.—The emu of Australia.

Sec. 3.—The cassowary, three species of the wingless, tailless Kiwi or Apteryx from New Zealand, tinamou from South America, and four species of penguin, a group whose members are confined to the Antarctic regions.

Sec. 4.—Grebes, auks, guillemots, gulls, terns, albatrosses, petrels, fulmars, etc.

Sec. 5.—Sheath-bills, plovers, turnstones, curlews, snipe, stone-plovers, and bustards.

Sec. 6.—Cranes, rails and horned screamers.

Sec. 7.—Ducks, geese and swans.

Sec. 8.—Flamingoes, ibises, storks.

Sec. 9.—Storks, herons, bitterns, etc.

Sec. 10.—Pelicans, gannets, cormorants and snake-birds or darters.

Sec. 11.—A good example of the hoatzin, the only known representative of the order *Opisthocomi.* For several days after hatching, the young of this bird presents some characters more like a mammal than a bird, namely, the fore-limb is provided with toes and claws, which, however, are modified later and the fore-limb becomes normal. This section also contains quail, grouse and partridge.

Secs. 12, 13, 14 and 15.—Ptarmigans, guinea-fowls, pheasants, peacocks, turkeys, curassows, etc.

Sec. 16.—The pigeons.

Secs. 17 and 18.—Vultures, eagles, hawks and owls.

Secs. 19 and 20.—The parrots, parokeets and cockatoos.

Sec. 21.—The plantain-eaters and cuckoos.

Sec. 22.—Cuckoos, podargi, night-hawks, goat-suckers, rollers, etc.

Sec. 23.—The bee-eaters, motmots and kingfishers.

Sec. 24.—The hornbills.

Sec. 25.—The hoopoes, puff-birds, jacamars, toucans, barbets and woodpeckers.

Sec. 26.—The trogons, humming-birds and swifts, also the lyre-birds of Australia.

Sec. 27.—The broadbills, pittas, tyrant fly-catchers and cotingas.

Sec. 28.—Ant-thrushes, woodhewers, larks, wagtails and babblers.

Sec. 29.—The Old World or true fly-catchers, the thrushes, swallows, cuckoo-shrikes and drongo-shrikes.

Sec. 30.—The waxwings, wood-swallows, shrikes, tits and nuthatches and the true orioles, a group not native to America.

Secs. 31, 32 and 33.—The bower birds of Australia, the long-billed and the typical birds of Paradise. Fifty specimens and twenty-five species give a good idea of the incomparable beauty of this group of birds.

Sec. 34.—The crows, jays and magpies.

Sec. 35.—The Old World starlings, the honey-birds and sun-birds, the latter of which are often referred to as the humming-birds of the Old World, then the creepers and honey-creepers and wood-warblers.

Sec. 36.—The tanagers, one of the most beautiful of the groups of strictly American birds; the weaver birds, American orioles and, lastly, the sparrows, finches and grossbeaks. These latter are the most highly specialized in the class birds.

Center Cases.

Case A.—A group composed of an adult African ostrich, a chick and an egg.

Case B.—A group illustrating the very extraordinary domestic arrangements of the rhinoceros hornbill during the breeding season.

Cases C and D.—Collections of the nests and eggs of native and exotic birds.

HALL 27.

NORTH AMERICAN ORNITHOLOGY.

Devoted exclusively to North American birds with an idea of giving special prominence to the ornithology of Illinois. The arrangement followed, that adopted by the American Ornithologists' Union in their check list of North American birds, begins at the right hand, entering from Hall 26 and continues from right to left. The family groups being exhibited in vertical series in the various sections of the wall cases.

Wall Cases.

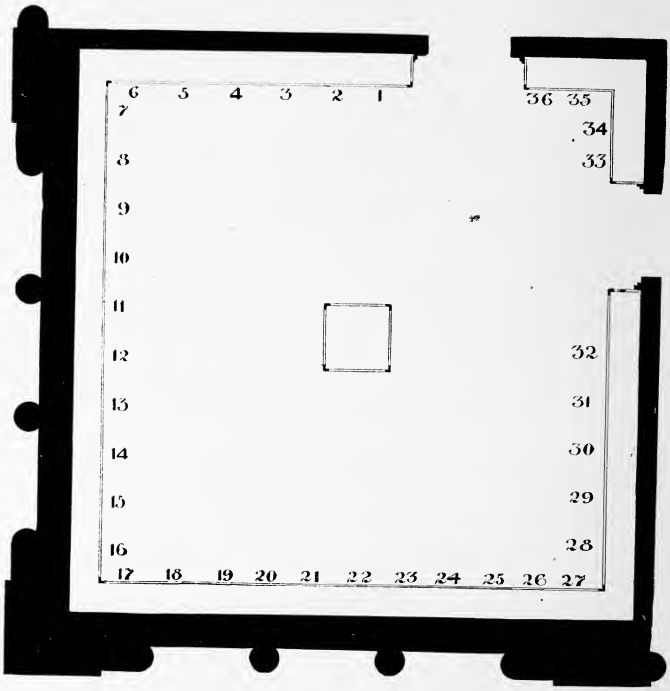
Sec. 1.—The diving birds—grebes, loons and auks.

Secs. 2, 3 and 4.—The long-winged swimmers, jaegers, gulls, terns and skimmers.

Sec. 5.—The tube-nosed swimmers, albatrosses, fulmars and shearwaters and the totipalmate swimmers.

Sec. 6.—Gannets, darters, cormorants, pelicans and man-o'-war birds.

Secs. 7, 8, 9, 10, 11, 12 and 13.—Ducks, geese and swans. Special attention is called to the fine pair of now extinct Labrador duck.



PLAN OF HALL 27.

Secs. 14, 15, 16 and 17.—Flamingoes, spoonbills, ibises, the herons, egrets and bitterns.

Sec. 18.—The cranes.

Sec. 19.—The rails, gallinules and coots.

Secs. 20, 21, 22, 23 and 24.—The shore birds—phalaropes, avocets, stilts, snipes, sandpipers, curlew, plover, turnstone and oyster-catchers.

Secs. 25, 26 and 27.—The gallinaceous birds—the grouse, partridges and quail, the turkeys and the pigeons.

Secs. 28, 29, 30 and 31.—The birds of prey—the vultures, the falcons, hawks, buzzards, eagles, kites and owls.

Sec. 32.—The parrots; including two fine examples of the now very rare Carolina paroquet; the cuckoos and kingfishers.

Sec. 33.—The goatsuckers and swifts; the Tyrant flycatchers, larks, the crows and jays.

Sec. 34.—Blackbirds and orioles; finches, sparrows, juncos, buntings.

Sec. 35.—Tanagers, swallows, waxwings, shrikes, vireos and wood warblers.

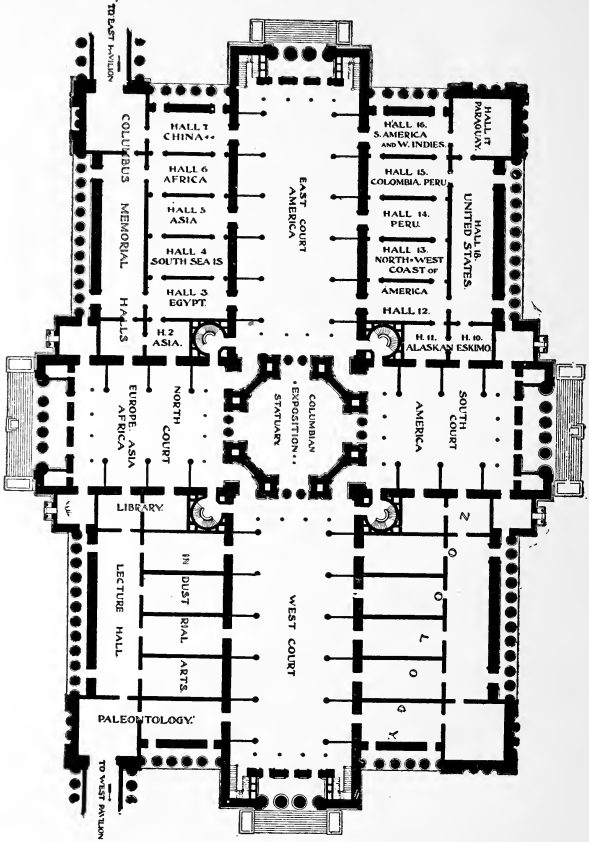
Sec. 36.—The wrens, thrashers, creepers, nuthatches and tits, kinglets, thrushes and bluebirds.

Center Cases.

In the center of Hall 27 is a group of the American eider duck, representing the male and female.

Gallery.

The gallery of this hall contains the study collection of bird skins all arranged in systematic order in dust- and moth-proof cases.



PLAN OF DEPARTMENT OF ANTHROPOLOGY.
(Comprises sections with heavy face title.)

DEPARTMENT OF ANTHROPOLOGY.

Nature and Purpose of Collections.—The collections brought together in the Department of Anthropology are intended mainly to illustrate the more primitive or uncivilized phases of the development of the human race. There are two well-marked divisions of the subject, and the materials illustrating them are separately installed. One relates to man himself, to his physical and mental constitution and powers, and the other to the works of his hands, to the visible phenomena of culture.

The first division consists of apparatus used in studying the greatly varied physical and psychical phenomena, and of extensive collections of crania casts and other objects, articles and materials, illustrating the physical characteristics of the race. These exhibits are arranged in the gallery of the East Court.

The second division comprises very extensive exhibits of the handiwork of man, which are placed on the main floor of the courts and the halls of the southeast section of the building.

The works of living or historic peoples, are for the most part assembled according to the tribe or nation to which they pertain; those of prehistoric peoples are brought together in groups, according to the locality from which they are derived, to the people, time, or stage of progress they are thought to represent, or with reference to some other special subject to be illustrated.

The various groups thus indicated are placed in the halls in an order corresponding as far as possible with their original geographic relations. In this way the various objects and articles, and through them the people represented, are conveniently studied and compared. It is also possible with this arrangement to illustrate the striking and profound effect of environment—of the local animal, vegetal and mineral resources and the varied geographic and climatic conditions—upon the people and culture of each region.

Certain collective exhibits are brought together in separate rooms to illustrate special subjects, or to facilitate comparative

study in some important direction. This is exemplified in Alcove 122, where numerous examples of religious art are assembled; in the North Court, which contains an exhibit of musical instruments; and in the South Court, which is devoted to aboriginal American sculpture.

Origin of Collections.—As to their origin the exhibits may be grouped in three principal categories: (1) collections made for the World's Columbian Exposition by its Anthropological Department and turned over to the Museum at the close of the Fair; (2)collections from various sources exhibited by the owners at the World's Fair, in the Anthropological building and elsewhere, and acquired by the Museum by gift or purchase; (3) materials not shown at the Fair, but acquired by gift, collection or purchase subsequently to the foundation of the Museum.

Of the first class the more notable are ethnological collections from Alaska, British Columbia, Canada, California and the Middle and Eastern States; casts of Mexican, Central American and Peruvian antiquities; and archeological collections from Ohio Mounds. Of the second class are a collection of North American ethnological material donated by Mr. Edward E. Ayer; the Hassler collection of featherwork and other ethnological specimens from the Indians of Paraguay; the Montes collection of Peruvian antiquities; the Wyman collection of copper implements and relics of stone from Wisconsin; the Gunning collection of idols; the Colombian collection of objects of gold, earthenware and stone; the Boas collection of skulls; the Riggs collection of archeologic material from the Southern States; the Johnson collection of reproductions of Irish antiquities; the Finsch collection from New Guinea; the Peace collection from New Caledonia; the Remenyi collection from South Africa; the Pogosky collection from Siberia; contents of a Chinese temple; the Green cliff house collection; the Javanese collection; the Lumholtz collection of ethnological objects from northern Mexico; and various collections from Alaska. Of the third class are Pueblo models, pottery and quarry material donated by the Bureau of Ethnology and National Museum; Berlin collection of Assyrian and Egyptian casts; Harris collection of Peruvian antiquities; Bruce collection from Alaska; collection of Mexican antiquities donated by Mr. Allison V. Armour; the great collections of Mr. Ayer from Italy and Egypt; and the Keam collections from the ancient Pueblo region of Arizona.

Placement of Collections. — The Department occupies the North Court, the East Court, the South Court, the southeast section of the main building, the southern series of halls of the northeast section, and the east and south galleries of the East Court.

The North Court is occupied mainly by collections illustrating the archeology of Europe, with overflow exhibits from the Asiatic section on the east side.

The South Court is devoted to large objects, mainly reproductions of Central American antiquities and a series of totem poles from the North Pacific Coast.

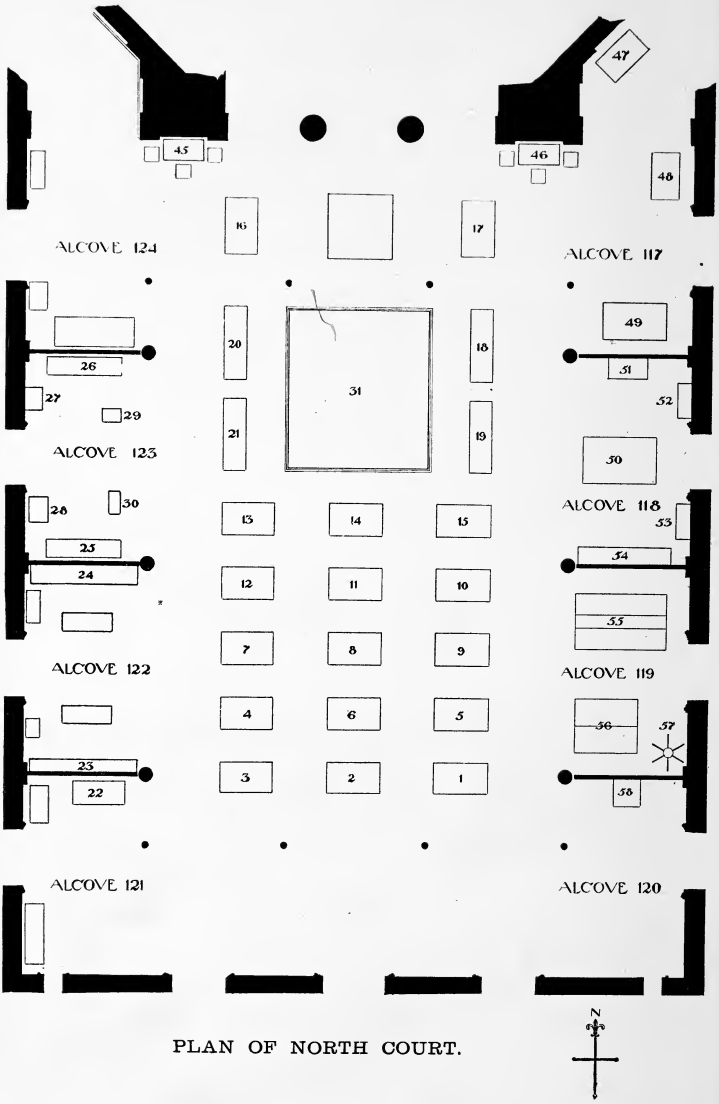
The East Court and its alcoves contain a somewhat varied group of exhibits, the larger part, however, relating to North American archeology. Some of the alcoves have overflow exhibits from neighboring halls.

Hall 2 contains casts of Assyrian and Chaldean antiquities. Hall 3 is filled with Egyptian antiquities, and the rest of the halls on the north side (4, 5, 6 and 7) are occupied by collections illustrating the ethnology of Africa, Asia and the Pacific Islands.

The southeast section is devoted to the ethnology and archeology of America. Halls 10 and 11 contain collections from the Eskimo of Alaska, Labrador and Greenland; these exhibits overflow somewhat into Hall 18 or Ayer Hall, which is devoted especially to the collections donated by President Ayer. The latter exhibits pertain largely to tribes of the great interior region, the Pacific states and British Columbia. Halls 12 and 13 contain exhibits from the Northwest Coast, beginning at the southwest with South Alaska, and ending at the northeast with the State of Washington.

Halls 14, 15, 16 and 17 are devoted to the ethnology and archeology of South America.

The psychical and physical laboratories, and collections illustrating physical anthropology, occupy the galleries of the East Court.



PLAN OF NORTH COURT.

NORTH COURT.

EUROPEAN ARCHEOLOGY.

The central floor space of this court is devoted to European archeology, while the alcoves contain miscellaneous exhibits, including graphic arts, historic relics and musical instruments on the west and south, and Assyrian antiquities, oriental idols, etc., on the east.

Cases 1, 2 and 3.—Facing the north entrance of the building are three cases containing the Johnson collection of reproductions of Irish antiquities, consisting of crosses, crosiers, shrines, bells, harps, drinking-horns, vases and personal ornaments. This is justly regarded as a most remarkable and interesting collection —the reproductions having been made with the utmost care.

Cases 4 to 22.—Following the cases of Irish antiquities are numerous cases containing mainly Greek, Roman, Etruscan and Phœnician antiquities, a large part of the bronzes being reproductions from the originals now preserved in the Naples Museum. There are two or three cases of original bronzes and in these are found some rare pieces; the bath tub, table and vases found in a villa near Pompeii are said to be among the most valuable specimens of their class known.

Of the reproductions, special attention may be called to the tables, braziers, chairs, etc., installed on pedestals in court and alcoves. These collections were assembled by President E. E. Ayer during the years 1894, '95 and '96.

Cases 4 and 6.—Contain nearly two hundred examples of the exquisite glassware of the ancient Mediterranean nations. Much the greater number are credited to the Romans whose influence and art extended over so many widely separated regions; but it is believed that a limited number of specimens are Phœnician. The uses were largely those of the toilet. The forms and sizes are varied, and the color is in many cases attractive and brilliant.

Associated with the above exhibits is a model of the new *Reichstag* or Parliament building in Berlin, Germany. It is expected that this exhibit will be removed at an early date.

Alcove 121.—Reproductions of objects of bronze, mainly from Pompeii, originals preserved in the Naples Museum. The balances, weights, cymbals and surgical instruments are especially notable, indicating how closely related are some of the appliances of the present day to those of the greatest of nations 2,000 years ago. In a small case are a few illustrations of European stone age art. The arrow points, spear heads and hatchets from eastern Italy can hardly be distinguished from corresponding classes of implements found in America.

Alcove 122.—The wall cases contain an excellent series of images and other works of art in stone, bronze, wood, earthenware, etc., relating to the religious beliefs and observances of various oriental peoples. Buddhistic and Brahmanistic subjects predominate. This is a part of the Gunning collection. Forming a part of the same series are an elaborately wrought brass incense burner from Benares, India, and the model of a Japanese Buddhistic altar occupying spaces next the doorway.

Alcoves 123 and 124 are devoted to plaster casts of Assyrian and Chaldean antiquities, which include a winged lion, a winged bull, obelisk of Shalmenesser, the Moabite stone and two colossal human figures, one being fragmental. Casts of some fine examples of bas-reliefs appear in Alcove 124.

EAST COURT.

ARCHEOLOGY AND ETHNOLOGY OF NORTH AMERICA.

This spacious hall is devoted in the main to exhibits relating to the archeology of North America; a few cases contain ethnological material, and four of the alcoves at the west end contain overflow exhibits from the Northwest Coast and Egypt halls. The central floor space has a middle line of cases holding important exhibits of figure groups in plaster, mound models, etc., surrounded by table cases containing various groups of archeologic material. The installment of these exhibits cannot be considered permanent, as collections are being added from time to time.

Case 1.—Beginning at the west we have, in the middle line, a group of three Indians, executed in plaster and elaborated with much detail. They are represented as engaged in the work of quarrying bowlders and roughing out stone implements from them. Associated with this group are five cases illustrating the ancient flint, copper, soapstone and red pipestone quarries of the United States.

Case 2.– A set of plaster casts representing the various types of stone implements found in America. This is a donation from the Smithsonian Institution.

Case 3.—This remarkable exhibit consists of some 700 rough shaped flint disks found as a hoard or cache in a small mound on Hopewell farm, near Chillicothe, Ohio. The flint occurs in the form of irregular nodules at various points in the Ohio valley between Cincinnati and Cairo. The disks were roughed out and carried long distances to be stored for trade or use. Five of the associated table cases contain archeologic material of exceptional interest, found in the mounds of the Hopewell group, explored for the World's Columbian Exposition by W. K. Moorehead. Notable among these relics and deposits are casts of copper implements and ornaments, the material having been obtained from the shores of Lake Superior; a case of obsidian implements, many of them broken by the heat of altar fires, the material having been derived from the west or south 1,500 to 2,500 miles away; mica from the Appalachian Mountains; and shells from the Gulf or South Atlantic Coast. Some of the carvings in stone and bone are unique and remarkable. A most striking feature of these exhibits is the great quantities of pearls, most of them having suffered from exposure to the sacrificial fires.

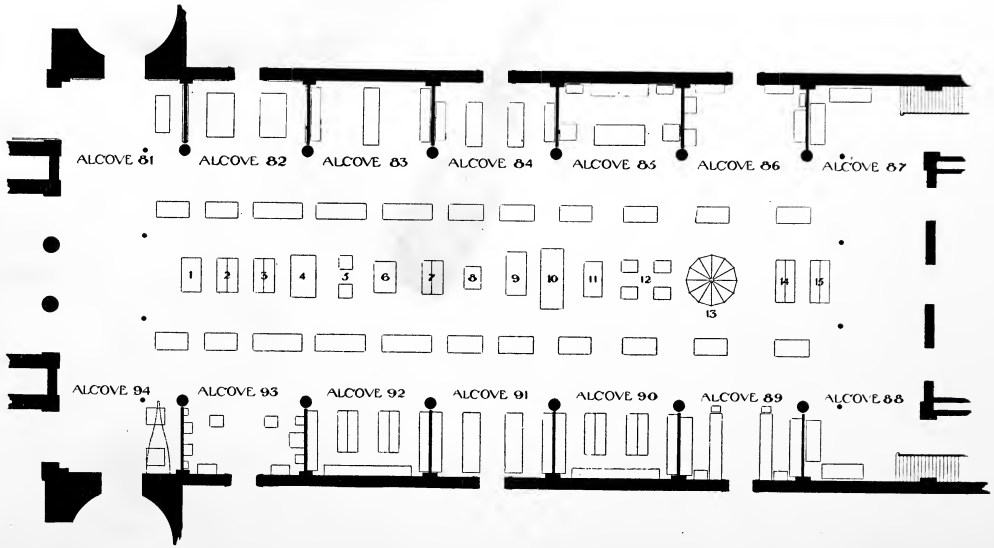
No. 5.—Here we have two examples of the clay altars upon which the sacrifice of innumerable articles was made.

Case 6.—This case contains a model of the serpent mound, Adams county, Ohio, which has recently been embodied in a park under the auspices of the Peabody Museum of Cambridge, Mass.

Case 7.—Relics from Ohio mounds.

Case 8.—A single life-size figure in plaster, representing a cannibal dancer of the Kwakiutl Indians of British Columbia.

Case 9.—Relics from the cliff houses of Utah. In a number of table cases ranged along the west side are other remains from ancient Pueblan and other western sources.



PLAN OF EAST COURT.

Case 10.—Large scale model of the Pueblo of Walpi, Arizona, inhabited by the Moki Indians.

Case 11.—This case and six or seven table cases on the south side contain interesting and valuable collections from Mexico, for the most part the gift of Mr. A. V. Armour. They illustrate the art in stone, clay, metal and bone, of the ancient half-civilized tribes of Yucatan, Chiapas, Oaxaca and the great plateau of Mexico.

Case 12.—Four models illustrating the houses of the Eskimo. They are the snow house of Baffin's Land, the stone house, and the summer tent of the same locality, and the sod house of East Greenland.

Case 13.—Original skin lodge of the Cree Indians of Manitoba; with various appurtenances.

Case 14.—Guatemalan antiquities.

Case 15.—Costa Rican antiquities.

ALCOVES OF THE EAST COURT.

Alcove 81.—Exhibits of Egyptian antiquities, originals and casts.

Alcove 82.—Egyptian antiquities including one case of plaster casts of important sculptures, one case containing mummy boxes and mortuary objects; bas-reliefs from tombs, and two doorways of tombs placed on the walls.

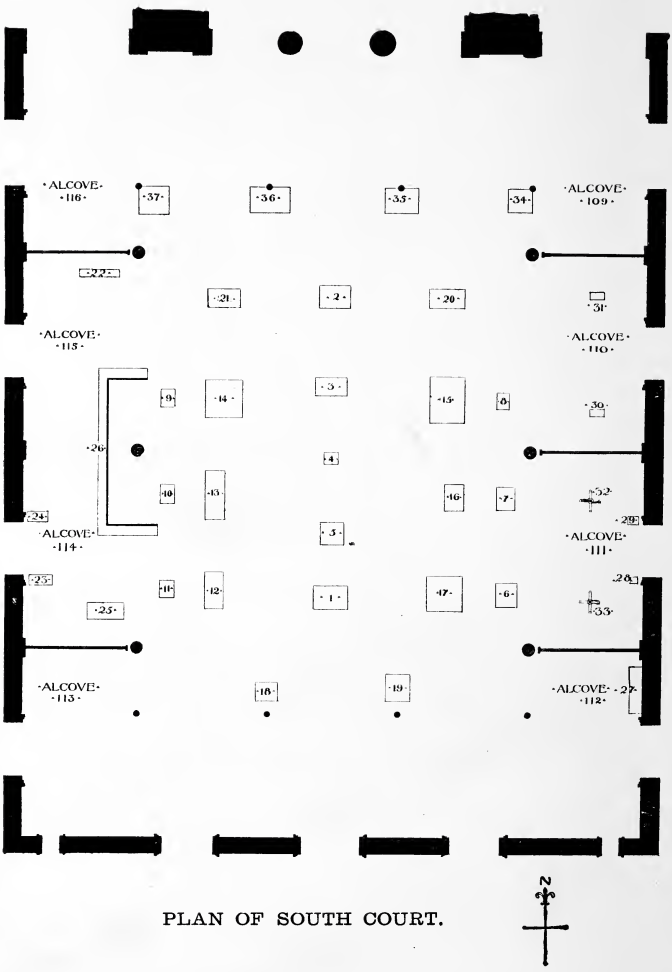
Alcove 83.—Antiquities from Southern California, including mortars, mealing stones, perforated stones, axes, bone implements, pottery and shell ornaments.

Alcove 84.—Mummies, pottery, basketry, matting, sandals, ropes and woven articles of the Cliff Dwellers of Utah.

Alcoves 85 and 86.—Collections from the Pueblo country, ancient and modern, and models of towns and dwellings.

Alcove 89.—Archeologic and ethnologic collections from Mexico.

Alcove 90.—Collections of antiquities from the Southern States: on the walls Catlin's paintings of Indians.



PLAN OF SOUTH COURT.

Alcove 91.—The cases of this alcove are devoted to archeologic collections from Wisconsin and Maine. On the walls are Catlin's paintings.

Alcove 92.—Archeologic collections from Arkansas and other southern states. On the walls are Catlin's paintings.

Alcove 93.—Contains collections from Northwest Coast tribes. The floor is occupied by two wooden figures employed as grave posts. Against the walls are numerous examples of the remarkable carved totem poles and house posts of these tribes.

Alcove 94.—The prow of a canoe of the Haida Indians, ornamented with totemic figures, is set against the wall. Models of two houses of the Northwest Coast Indians occupy the floor space.

Swung at various points beneath the galleries, are boats representing many primitive peoples.

SOUTH COURT.

AMERICAN ABORIGINAL SCULPTURE.

The South Court contains mainly reproductions of Central American antiquities. At the north end of the court are exhibited four totem poles, or heraldic columns, from British Columbia and Alaska.

No. 1.—Colossal figure of a deity, with inscriptions, Quirigua, Guatemala.

No. 2.—Colossal figure of a deity with inscriptions, Quirigua, Guatemala.

No. 3.—Figure of the god Tlaloc, usually called Chac-mool, Chichenitza, Yucatan.

No. 4.—Inscribed column, Uxmal, Yucatan.

No. 5.—An altar representing a monkey with death's head, Copan, Honduras.

Nos. 6, 7, 8, 9, 10 and 11.—Stelæ with inscriptions and figures of deities, Copan, Honduras.

Nos. 12, 13, 14, 15, 16, 17, 18, 19, 20 and 21.—Inscribed and sculptured stones, believed in most cases to be altars, as they are generally found in front of the so-called idols.

Nos. 23, 24 and 25.—Sculptures, probably wall ornaments, Santa Lucia Cozumalhuapa, Guatemala.

No. 26.—Sculptured stones forming a square inclosure at Uxmal, Yucatan; above are casts of carved doorsteps. A series of photographs of Mexican and Central American ruins are exhibited on the inside of the screen.

No. 27.—Sculptured stone pilasters and carved wooden lintel from the sanctuary doorway of El Castillo, Chichenitza.

Nos. 28 and 29.—Sculptured figures, Valley of Mexico.

Nos. 30 and 31.—Sculptured figures, Santa Lucia Cozumalhuapa, Guatemala.

Nos. 32 and 33.—Photographs of Mexican and Central American ruins, in swinging frames.

Nos. 34, 35, 36 and 37.—Totem poles, Alaska and British Columbia.

The alcove walls are occupied by numerous casts of bas-relief sculptures in stone and wood, from many of the great ruins of Mexico, Central America and Peru.

HALL 2.

ARCHEOLOGY OF ASIA.

Continuing the exhibits of Alcoves 123 and 124, Hall 2 contains a valuable set of casts of Asiatic antiquities, mainly Chaldean and Assyrian. Interesting sculptures from Java are placed in a case in this hall.

HALL 3.

EGYPTIAN ARCHEOLOGY.

In this hall are now installed the extensive collections brought together by President E. E. Ayer during his recent trips to Egypt. The nucleus of the collection is a set of twenty mummies representing a wide range of characters, and covering a period of nearly two thousand years of mummy-making, closing with the development of Christianity. Notable exhibits may be briefly referred to.

Case 1.—The oldest mummy, so far as the inscriptions have been read, is that contained in a coffin with light colored lid crossed with yellow bars, placed near the middle of the room. Its date is 1,500 years B. C.

Case 2.—Large mummy well filled with bitumen and having striking faces on cartonage and lid of box.

Cases 3 and 6.—The two wide, low cases contain neatly prepared mummies in their original coffins three of which are of wood, and one, a unique specimen, of interlaced bulrushes.

Cases 4 and 5.—Two striking coffins occupy cases near the north end of the hall; one is a rectangular box with arched lid and corner posts, and is elaborately painted with symbolic designs and inscriptions; the other is what is known as a mummy-shaped case, and is a fine example of the more ornate painted coffins.

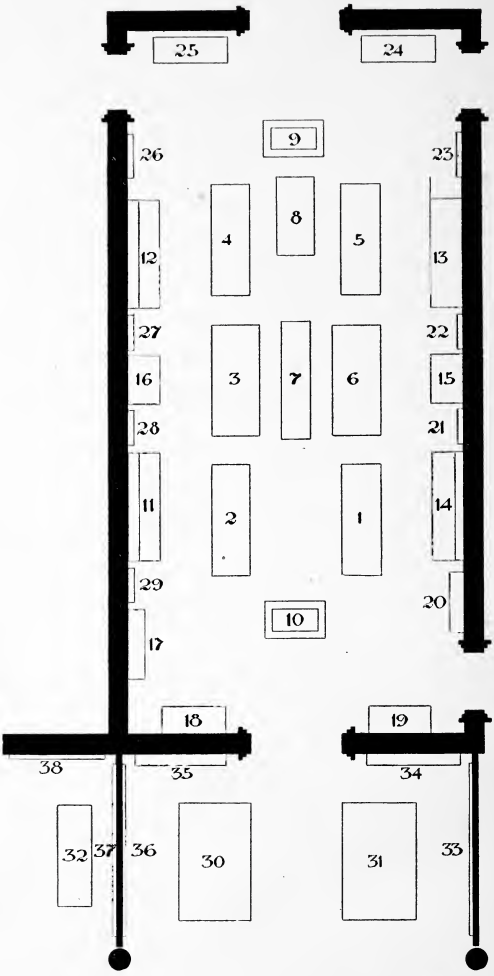
Case 7.—An excellent example of mummy of early period. The inner and outer cases are both exhibited; the inner case, containing the body, has never been opened.

Case 8.—In the small floor case are mummies of two young girls with elaborate gilt masks.

Cases 15 and 16.—In wall cases at the east and west are two pairs of coffins placed in an upright position.

Case 17.—Against the west wall, near the south end, is a case containing five mummies of young persons. One of these is remarkable in having a portrait painted on wood substituted for the usual mask, and another has the wrapping removed so that a good idea of the state of preservation may be gained.

In other floor cases and in the wall cases are many interesting relics of art, including utensils of bronze, iron, wood, earthenware,



PLAN OF HALL 3 AND
ALCOVES 81 AND 82.

and stone, and numerous examples of jewelry of the simpler varieties.

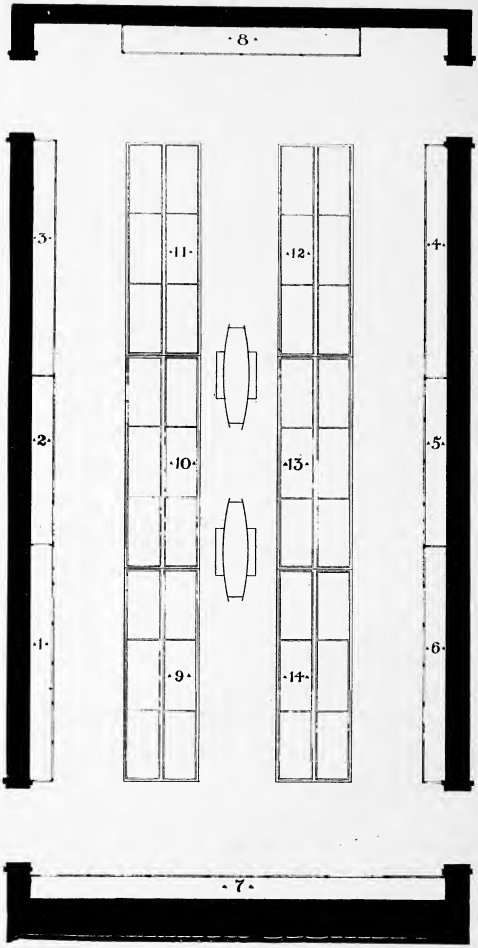
Occupying the upper line on the wall are a number of good examples of the fronts of balcony windows from modern Cairo, and three specimens of mushraba colored glass screens.

The alcove to this hall, connecting with the East Court, is occupied by important Egyptian exhibits.

Case 30.—A set of excellent casts of ancient Egyptian sculptures, the originals of which are preserved in various transatlantic museums.

Case 31.—Numerous mortuary objects, among which are to be especially noted the alabaster vases and canopic jars.

Nos. 32 to 38.—The walls of the alcove are covered with interesting exhibits. On the east are bas-relief sculptures from the walls of tombs; on the north, at the sides of the doorway, are two excellent examples of sculptured doorways of tombs; on the west are casts of bas-relief sculptures above and fragmentary tomb sculptures below. In the adjoining alcove and passageway on the west are additional exhibits, including casts, sculptures and mortuary fabrics. Most notable, perhaps, is a perfectly preserved papyrus displayed in a frame against a rotunda pier.



PLAN OF HALL 4.

HALL 4.

OCEANICA.

This hall contains the Finsch collection, the Peace collection, and portions of the Hagenbeck collection.

Case 1.—Lances, bows and arrows, shields, war clubs, drums, masks and grass mats from New Guinea.

Case 2.—Lances, paddles, war clubs, masks and grass mattings from New Britain.

Case 3.—Lances and fringed bark girdles from New Caledonia.

Case 4.—Models of houses, pottery, baskets, grass bags, grass cloth, fans, ornaments and engraved bamboo.

Case 5.—Wooden cylinder for printing on bark, bark cloth, and grass skirts from Samoa.

Case 6.—Grass cloth, grass skirts and mats from New Hebrides.

Case 7.—Carvings, lances, bows, arrows, clubs and paddles from various South Sea Islands.

Case 8.—Idols from New Caledonia and New Hebrides. Funeral manikin from New Hebrides.

Case 9.—Stone implements, fishing tackle, wood, gourd and clay vessels, bark and textile clothing and various personal ornaments from New Guinea.

Case 10.—Implements and weapons of wood, stone and shell; baskets, masks, figurines and various other ceremonial objects, musical instruments and personal ornaments, New Britain and New Ireland.

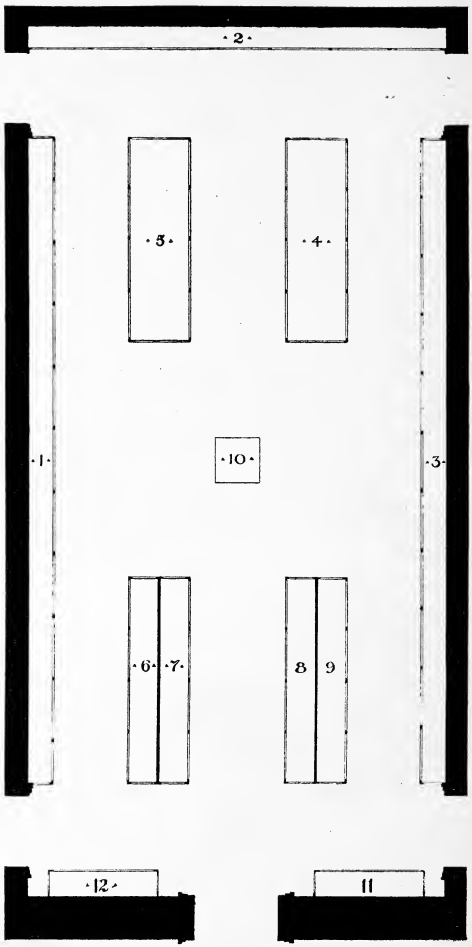
Case 11.—Clubs, large jade axes, New Caledonia.

Case 12.—Creeses—sword-like knives—with sheaths, a distinctively Malay weapon, Malay Archipelago.

Case 13.—Bark-beating implements, clubs, grass cloth and mats, textile fibers, and various personal ornaments from Micronesia and Polynesia.

Case 14.—Lances, Admiralty Islands. Clubs and stone implements from New Zealand. Lances, shields and boomerangs from Australia.

In the middle of the hall are placed two wooden drums from Samoa.



PLAN OF HALL 5.

HALL 5.

ASIA.

This hall contains the Pogosky collection from numerous barbarous tribes in Eastern Siberia, the Javanese theater set of masks, etc., exhibited at the World's Fair, and parts of numerous collections of lesser importance.

Case 1.—Fur, fabric and fish skin garments of the Tungus and Goldian men and women. In the northern end of the case sinew nets, mats and looms of the Saghalien Aino; coats made from thistle fiber, elm bark and carp skins.

Case 2.—Corean armor, chest, boxes and basket. Japanese embroidery, silk costume, ancient armor, matting and wood carving. Chinese masks, pillow, hat, chop-sticks, opium pipe and Chinese and Japanese swords.

Case 3.—Javanese theater set of masks, costumes, headdresses and marionettes.

Case 4.—Javanese musical instruments and Ceylon drums.

Case 5.—Ceylon spice mortars, model carts and outriggers, shoes, spoons and metal work. Turkish inlaid work and wood carving.

Case 6.—Siberian and Saghalien Island, summer and winter boots, stockings and trowsers.

Case 7.—Singalese costumes, pottery and baskets.

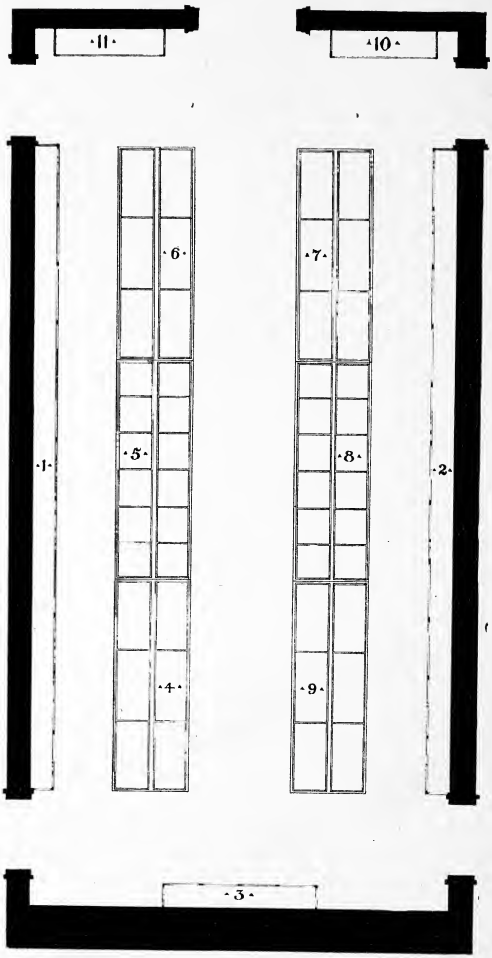
Case 8.—Ceylon theatrical masks.

Case 9.—Ceylon vegetable fiber, winnowing baskets and fans. Hats from Malay Archipelago.

Case 10.—Model of a Japanese pagoda.

Case 11.—Shields, spears, arrows, oars, a small gun or cannon; Malay Archipelago.

Case 12.—Ornamented bedspread and mats made of deer and squirrel skins; Tungus tribes of Eastern Siberia.



PLAN OF HALL 6.

HALL 6.

AFRICA.

This hall contains the Remenyi collection, part of the Hagenbeck collection, and the collections of Messrs. Lingle and Davenport.

Case 1.—Beginning at the south end, basket work of the Zulu. Skin blankets from the Hottentots. Nubian shields, spears, vessels and musical instruments, camel trappings, saddles and straw mats.

Case 2.—Dahomey cloth, mats, drums, fetishes and leather work. Grass cloth, hats and mats from Cameroon and Gaboon, and blacksmith's bellows and cross bows from Gaboon. Fine grass cloth mats, wooden dishes, images, stool and musical instruments from the Congo Basin.

Case 3.—Zulu shields, spears and clubs.

Case 4.—Bracelets, snuff-boxes, spoons, tobacco pipes, head rests, earthen and wooden vessels, and basket work of the Zulu.

Case 5.— Basketry, sandals, horse trappings, head rests, spoons, musical instruments and personal ornaments, Nubia.

Case 6.—Spears, arrows, quivers, knives, swords, war clubs, shields, etc., Nubia.

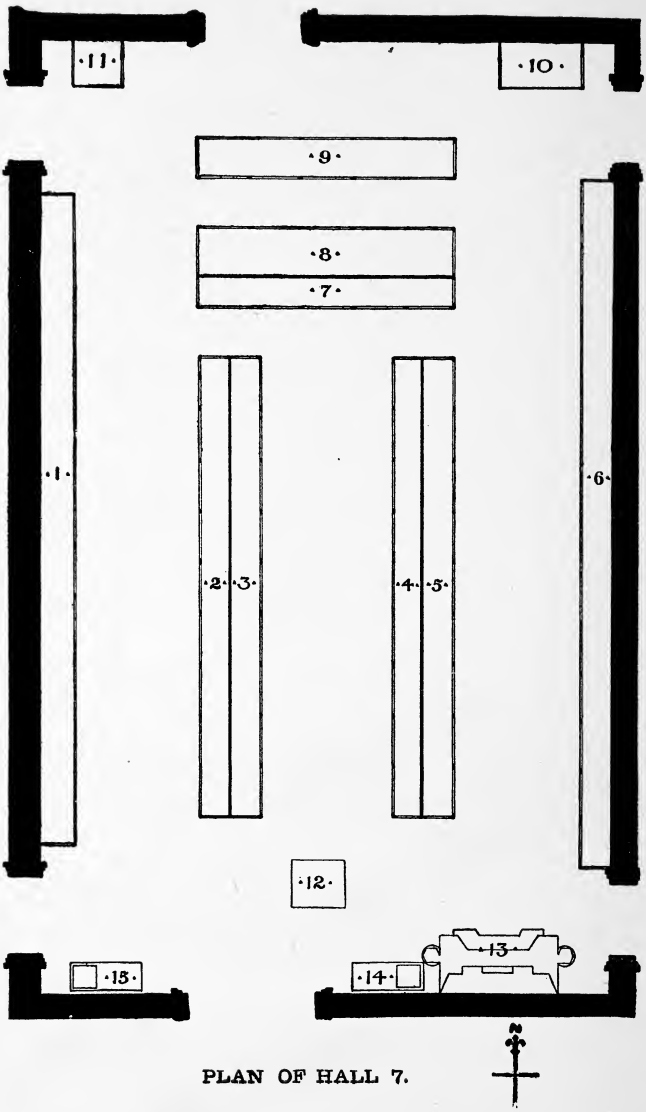
Case 7.— Various utensils, implements, weapons, musical instruments and personal ornaments from the Congo Basin and West Coast.

Case 8.—Walking sticks, clubs, powder horns, arrows, axes and whips of the Zulu.

Case 9.—Zulu necklaces, armlets, anklets and belts.

Case 10.—Shields, spears, arrows, knives, hatchets, horns, etc., Congo Basin.

Case 11.—Shields, spears, cross bows, knives, blacksmiths' bellows, West Coast.



PLAN OF HALL 7.

HALL 7.

CHINA.

NOTES FURNISHED BY MR. H. SLING.

In this room are arranged the religious furniture of a Chinese Buddhistic temple. The various figures and groups of figures are intended as examples and object lessons in morality, more especially those in cases one and six.

Cases 1 and 6.—The members of the Buddhistic Pantheon.

In the upper part of these two cases are shown those who, having lived an exemplary life on earth, are now being rewarded in heaven. This high distinction is obtained through canonization by the Emperor. who both declares who shall be elevated to membership in the pantheon, and over what his authority shall extend.

The Ten Courts of Justice: In the lower part of these cases are shown the Ten Courts of Justice, before which the souls of those who have infringed the Buddhistic laws of life, are tried. Here we find the punishment of a traitor, who is being roasted to death under a copper bell; the punishment of a butcher who is a heavy offender against the Buddhistic teachings, which forbids the taking of life; the punishment of a parricide, who is cut in pieces; and finally the last Court of Justice, where those who have lived a life of mere animal enjoyment are compelled as a punishment to re-enter life under the forms of animals.

Case 2.—Models of the gardens of rich families; a portrait of Confucius, the great teacher of morality; and in the south half of the case, fish baskets, frog nets and fork.

Case 3.—Contains four tableaux of traditional events.

1.—The Emperor and his suite in a religious procession.

1*a*—A young Emperor, following the custom of the Imperial Family, going to worship his lately deceased father.

2.—Two generals coming before the Emperor to pray for reenforcements.

3.—A captive general being sent for by his former master escapes from his guards after a struggle and returns home, leaving his wife, who is the daughter of his captor.

Case 4.—1. The general of an army having suffered defeat, the fortunes of the day are finally retrieved by his brother, seven years of age, who comes to his assistance.

2.—A young man who has lost his father and is not able properly to bury him, sells himself to obtain the necessary money. As a reward for his piety a wife is sent him from Heaven.

3.—The Court of the Emperor who is supposed to have built the great wall of China. His wife is supposed to have been sent him from Heaven, bringing with her a magic wand, by means of which the Emperor accomplished his great undertaking. His wife finally left him and returned to Heaven, taking the wand with her, after which the Empire fell into other hands. This Emperor is also credited with having burned all the books and records in the Empire relating to events before his reign.

Case 5.—The group in the top of this case represents a Governor and his escort going to view the execution of a criminal. In the bottom of the case at the north end is a representation of a pleasure party being attacked by members of the wild tribes of North China. The remainder of the case is filled with various ornaments, including a paper dragon.

The two pictures at the south end of cases 2 and 3, and 4 and 5 represent Sam Gai Sin Shung, who is supposed to protect the house, especially from storms. These pictures are hung on outer doors throughout China.

Case 7.—Buddhistic saints.

These eight persons agreed to die together that they might be in Heaven together. After their death they appeared to the King, who canonized them under the name of the Eight Hermits.

Case 8.—3. Kwan Kung was a very wise and able general whom the Emperor canonized. He is worshiped throughout China.

2.—Is the faithful armor bearer of the former.

1.—Is the faithful Captain of the Guard of No. 3.

5.—Is the son of No. 3, and has in his hand his father's official seal.

4.—Is the God of Heaven, the highest member of the Pantheon.

6.—Is the Goddess of Peace.

Case 9.—Contains the incense burners which stand before the high altar. They are sometimes made of silver and sometimes of lead.

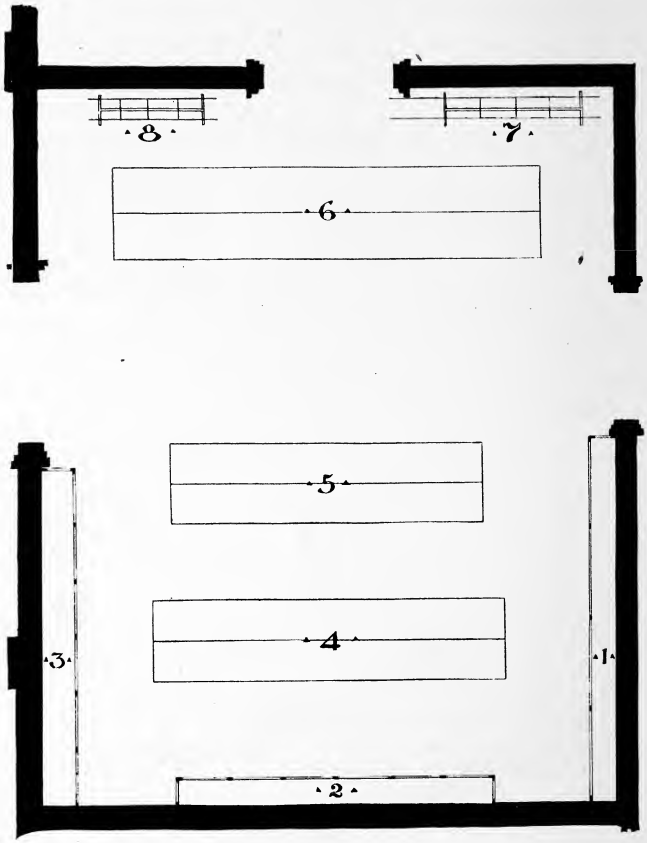
Case 10.—The Laughing Buddhist. A very pious and generous man. He died of excessive laughter.

Case 11.—The Sleeping Buddhist, who made a vow to open his eyes only on the 30th of June. Consequently the people celebrate this day as a holiday.

Case 12.—The Myth of the Princess, who to select a husband threw her handkerchief in the Temple Court. It fell at the feet of a beggar, whom she married in spite of the wishes of her family, and he became Emperor of China.

No. 13.—Represents the Myth of the Six Kings, who after long wars were reconciled by Soo Chun; the latter, as a reward, was made Prime Minister by each of them.

Nos. 14 and 15.—Giants placed on each side of the temple door as door-keepers. They are supposed to keep away evil spirits.



PLAN OF HALL 10.

HALL 10.

ESKIMO.

The Eskimo tribes are separated into two great groups, a western occupying the shores of Alaska and the British possessions, and an eastern occupying Labrador, Greenland and the adjacent regions; all are closely allied in blood, habits, customs and arts. They subsist largely by hunting and fishing, and evince much ingenuity in the pursuit of these callings.

Case 1.—Sleds, snow-shoes, reindeer and dog harness whips, goads, oars, etc., of the Alaskan Eskimo.

Case 2.—Boots, shoes, gloves, mittens, etc., of the Alaskan Eskimo.

Case 3.—Clothing, largely of water-proof materials for use on the water; Alaskan Eskimo.

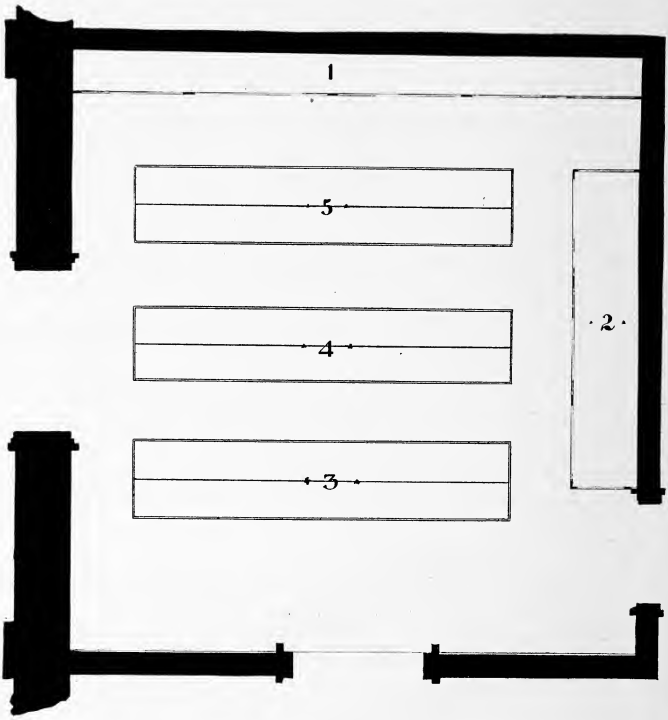
Case 4.—On the south side are snow knives, awls, scrapers, creepers for snow travel, etc. On the north side are bark and wood trays and pails, wood boxes, stone lamps, etc.; Alaskan Eskimo.

Case 5.—On the south side, grass baskets, mats, shoes and textile apparatus and materials. On the north side, dolls, doll-clothes, gloves, bags, etc., made of skins of various animals; Alaskan Eskimo.

Case 6.—Various articles in ivory, wood, stone, etc; from northern Alaska, 1896 collection of Bruce.

Cases 7 and 8.—Sleds from the Eskimo of Alaska and Labrador.

Over the cases of this hall are installed several examples of the canoes of the Eskimo tribes.



PLAN OF HALL 11.

HALL 11.

ESKIMO.

Case 1.—Contains a number of excellent costumes made of skins of deer, seals, birds and squirrels. Alternating with these are harpoons, spears, ice canes, ice scoops, boxes, baskets, etc.; Eskimo of Alaska.

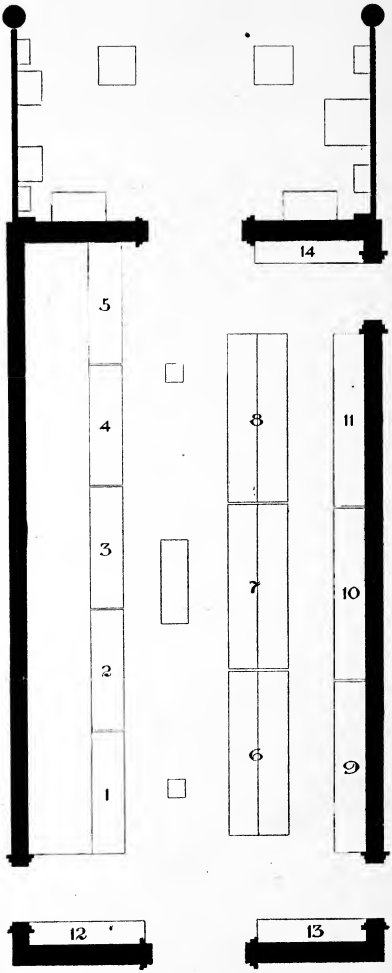
Case 2.—Is occupied by collections from the Eskimo of northern Greenland.

Case 3.—On the south side are adzes, knives, scrapers and other implements, mainly of stone. On the north are bows, arrows and quivers; Eskimo of Alaska,

Case 4.—On the south side, east end, are drilling and fire making apparatus; west end, bird snares and various traps for catching animals. On the north side, spears, harpoons, throwing sticks, etc.; Eskimo of Alaska.

Case 5.—On the south side, fishing tackle and implements used in fishing; on the north, models of sleds, kayaks, snow-shoes, fish traps, etc., made by the Eskimo of Alaska.

Over the cases of this hall are installed several examples of skin boats of the Eskimo tribes.



PLAN OF HALL 12 AND
ALCOVE 93

HALL 12.

NORTH PACIFIC COAST.

On the West Side of the hall is a model of a portion of the village of Skidegate, arranged on a platform. This model presents the characteristic features of the villages of the Haida Indians who inhabit Queen Charlotte Island, British Columbia. The carved columns attached to the front of the houses represent the crests of the house owners. The large isolated columns in front of the houses are erected in memory of deceased relatives or friends. The posts having a large carved board attached to their tops are for burials, the bodies being deposited behind the carved board on the top of the columns.

Cases 1, 2, 3, 4 and 5.—Various articles obtained from the Haida, Tsimshian and other tribes of northern British Columbia and southern Alaska. Attention may be called to the numerous ceremonial objects made of cedar bark and worn or used in the dances of secret societies; to the carved wooden rattles and particularly the large wooden whistles and trumpets which are supposed to imitate the voices of spirits.

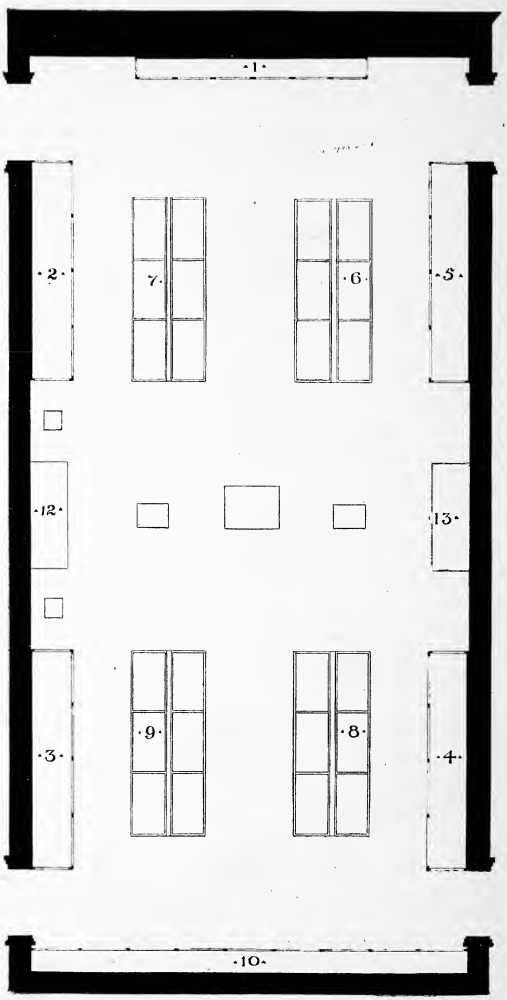
Case 6.—Bark and other textile materials and textile appliances from the Northwest Coast tribes.

Cases 7 and 8.—Various utensils, ornaments and ceremonial objects obtained from the Belacoola Indians of British Columbia.

Case 9.—The southern portion of the case contains a collection from the Haida Indians of Queen Charlotte Islands. The northern portion of the case contains specimens collected among the Tsimshian Indians of British Columbia.

Case 10 and 11.—An interesting series of masks and other articles obtained from the Belacoola Indians of British Columbia. The center of Case 10 is taken up by portions of a large mask representing a winged dog, the fabulous ancestor of one of the tribes in the interior of the country.

No. 14.—On the pedestal at the north end of the hall are models of a Haida house, and a chief's tomb; the latter is in the form of a house, the custom being to place the coffin on the inside. At the south end, on a pedestal, are models of three houses of the Belacoola Indians, and on the opposite side of the doorway is a series of models of heraldic columns from various parts of the Pacific Coast.



PLAN OF HALL 13.

HALL 13.

NORTH PACIFIC COAST.

Cases 1 and 2.—Collection of masks, rattles, ornaments, etc. used in ceremonial dances of the Indian tribes of British Columbia.

Cases 3, 4 and 10.—Masks and dancing ornaments mainly of the Kwakiutl Indians of Vancouver Island; boxes, dishes, ropes, etc., of the same people.

Case 5.—Utensils, masks and basketry from the west coast of Vancouver Island, from Puget Sound and from Shoalwater Bay. Wood carving representing the guardian spirit of a medicine-man of the Chinook Indians. Models of types of canoes used by the Indians of the State of Washington. Cradle of the Chinook Indians.

Case 6.—Ornaments, dishes, spoons and snow-shoes of the Indians of Puget Sound. Stone implements from the interior of British Columbia.

Case 7.—Various utensils and ornaments from the Indians of the Northwest Coast.

Case 8.—Food products, household utensils, models of house posts, and gambling implements; Kwakiutl Indians.

Case 9.—Battle-axes, pile-drivers, rattles, dancing implements; various forms of money, such as pieces of copper tied together by fours, and brass bracelets fastened to sticks; Kwakiutl Indians.

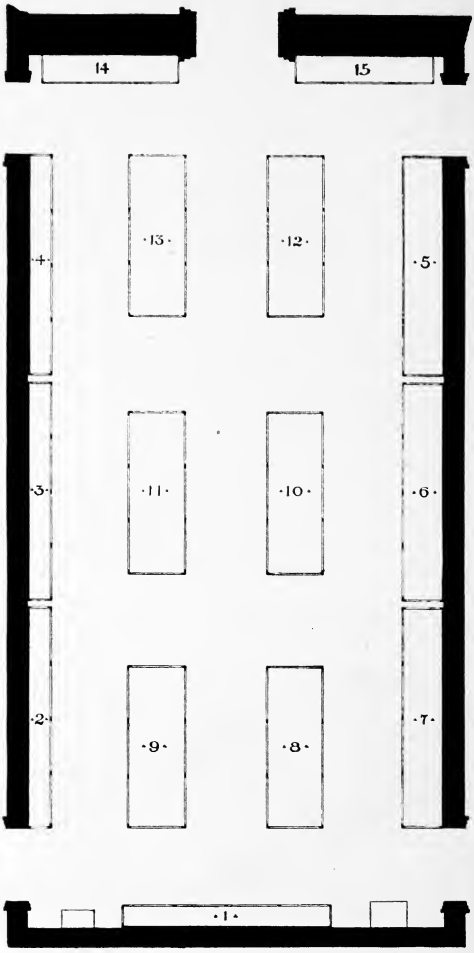
Nos. 11 and 12.—Bed-rooms of the Kwakiutl Indians of Vancouver Island, with painted designs representing the crests of the occupants.

On the North Wall.—Large carving representing a fabulous double-headed snake; used in ceremonies.

On the South Wall.—The carving over the case represents the same fabulous being, and is used in the same manner.

On the East and West Walls.—The painted boards are clan crests of the Kwakiutl Indians. One of these doorways is placed in front of the house, the other in the rear of the house.

Occupying the central floor space are boxes and carvings.



PLAN OF HALL 14.

HALL 14.

PERU.

In this hall are installed the very interesting collections of Peruvian antiquities made by Mr. Dorsey and Lieutenant Safford for the World's Columbian Exposition. The series of mummies is the most extensive and valuable preserved in this country.

Case 1.—Contents of several graves; Ancon.

Case 2.—Mummy pack, pottery, skulls; Chancay.

Case 3.—Pottery, textile articles, skulls; Sierra Gorda.

Case 4.—Contents of several graves; Ancon.

Cases 5, 6 and 7.—Contents of numerous graves; Ancon.

Case 8.—Mummy packs and contents of graves; Ancon.

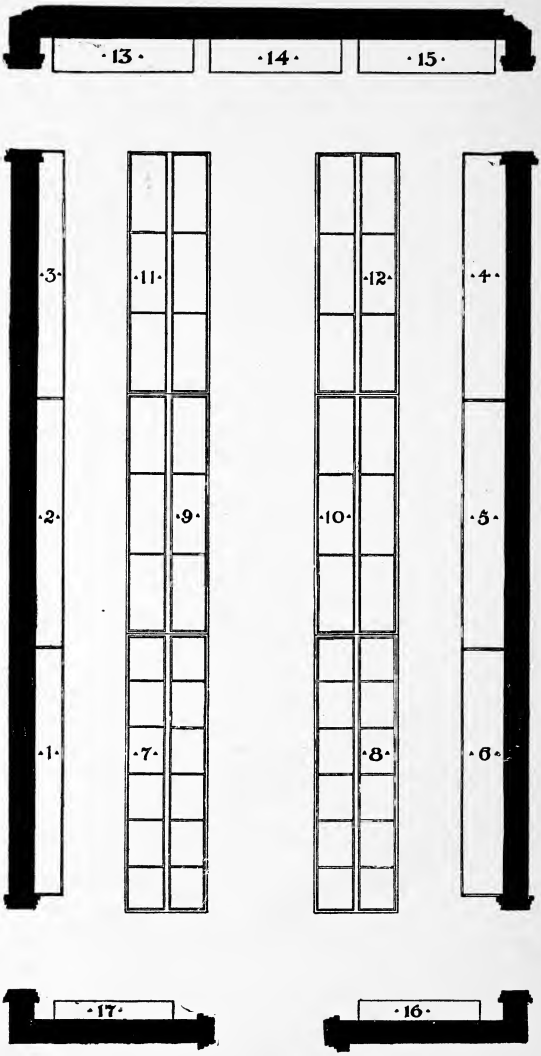
Case 9.—Mummy packs and contents of an important pack; Ancon.

Cases 10 and 11.—Mummy packs and other contents of graves; Ancon.

Cases 12 and 13.—Mummy packs and exposed mummies with various contents of packs and graves; Ancon.

Cases 14 and 15.—Contents of graves; Ancon.

Placed against the south wall of the hall are two very interesting stone chairs from a ruin near Quito, Ecuador; Harris collection.



PLAN OF HALL 15.

HALL 15.

COLOMBIA—ECUADOR.

This hall contains the Montes collection, a collection of gold ornaments from the United States of Colombia, and parts of the Dorsey collections.

Case 1.—Articles of pottery, wood, metal, shell and bone; Chimbote, Peru.

Case 2.—Pottery and implements and ornaments of metal and stone; Santa Valley, Peru.

Case 3.—Pottery in various styles; Santa Valley, Peru.

Case 4.—Pottery and a few objects of stone; Cuzco, Peru.

Case 5.—Pottery, objects of stone, and mummies; Cuzco, Peru.

Case 6.—Pottery and articles of stone, metal and wood; Cuzco, Peru.

Case 7.—Mortuary relics (east side); Arica, Peru. Mummies and fabrics (west side); Iquique, Peru.

Case 8.—Mummies; Ancon, Peru.

Case 9.—Wooden implements, fishing appliances, personal ornaments; Iquique, Peru.

Case 10.—Pottery, stone implements, copper ornaments and stones of peculiar shape and unknown use; Laplata Island, Ecuador.

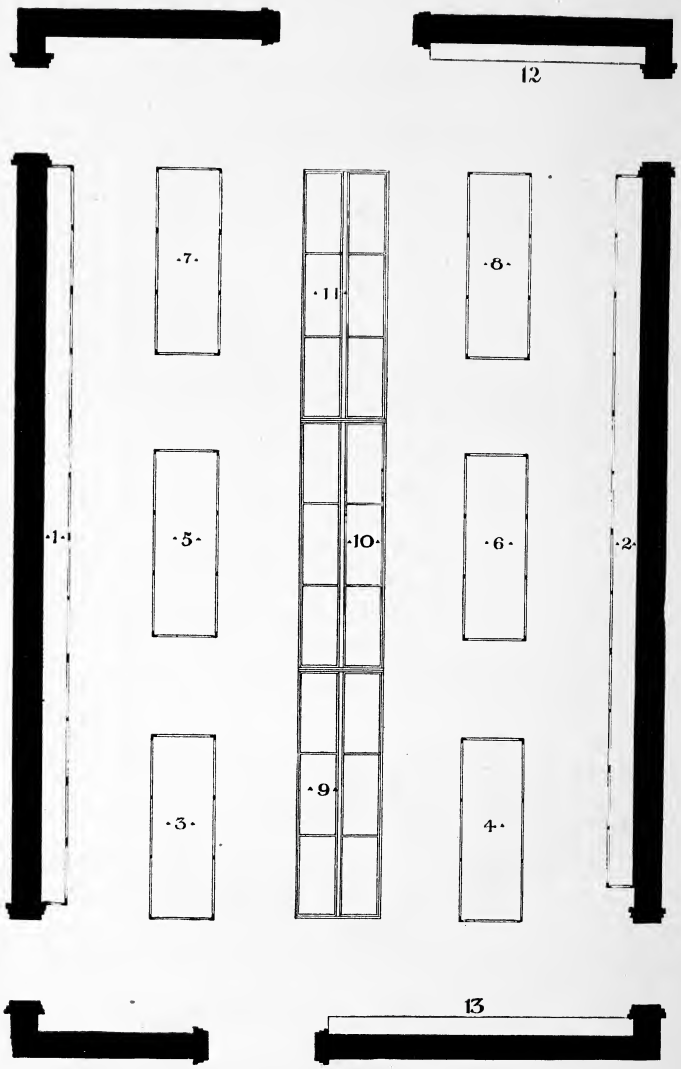
Case 11.—Contents of graves, pottery, fabrics, etc.; Iquique, Peru.

Case 12.—Stone vessels, implements and weapons; Cuzco, Peru.

Cases 13, 14 and 15.—In the upright sections, gold ornaments; Colombia. In the sloping cases, various implements, ornaments, figurines, etc.; Colombia and Peru.

Case 16.—Fabrics, utensils and ornaments; Peru.

Case 17.—Fabrics, looms, objects of metal, etc.; Ancon.



PLAN OF HALL 16.

HALL 16.

SOUTH AMERICA.

This hall contains mainly collections from the Atlantic watershed of South America, and from the West Indies. The principal collections are those of Messrs. J. J. Quelch, Roger Welles, F. A. Ober and Lieutenant Safford.

Case 1.—Beginning at the southern end of this case: Pottery from Curacoa and Porto Rico; mortar models, musical instruments (models), bark cloth and gourds from Porto Rico. Stone implements from the West Indies. North of this is a collection illustrating the weaving industry, and some miscellaneous objects from the United States of Colombia. The northernmost portion of the case contains specimens from British Guiana, a mortar, head ornaments, wrestling shield, cassava grater, and various textile articles and materials.

Case 2.—Models of Bolivian and Peruvian Indians in native and mixed costumes, and interesting exhibits of textile and other products obtained from the natives of these countries.

Cases 3 and 4.—Brazilian basketry, hammock, hats, fish-traps, mats and textile materials.

Case 5.—Venezuela: Lances, bows and arrows, blow guns, poisoned arrows, quivers, strainer, model of bowl, etc.; cassava grater, torch, bark cloth, etc.

Case 6.—Venezuela: Hammocks, basketry, pottery, gourd vessels.

Case 7.—British Guiana: Baskets, stools of wood, fruits, bread, textile articles and materials.

Case 8.—British Guiana: Pottery, gourds, head ornaments.

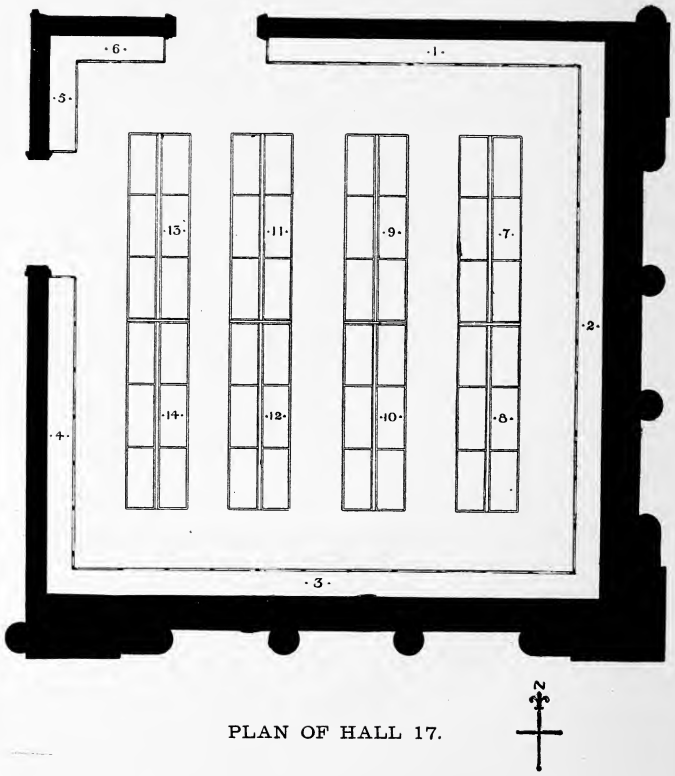
Case 9.—Ornamented gourds, ropes, bark clothing, blow guns, drums and feather ornaments from Brazil.

Case 10.—Head ornaments, poisoned arrows, snuff pipes, balls of twine and pigments from Venezuela. Spun cotton, poisoned arrows, cassava bread and nuts from British Guiana.

Case 11.—Seed, teeth and shell necklaces and bracelets from Peru; feather ornaments from Bolivia; musical instruments, pottery and slings from Bolivia.

Case 12.—Netted, drawn, open and lace work, done by the semi-civilized Indians of Peru.

Case 13.—Ponchos, blankets and looms from Bolivia and Peru.



PLAN OF HALL 17.

HALL 17.

PARAGUAY.

This hall contains principally the collection of Dr. E. Hassler. The tribes represented inhabit the Gran Chaco. The most northern members of the group inhabit Brazil and Bolivia, while the more southern extend into the Argentine Republic. The principal tribes representing are the Tobas, Lenguas, Chamacoccos, Guaranis, Cuximosso, Panas, Paitas and Omiris. The collection is especially interesting as representing tribes which have had but little contact with civilization. The collection contains much beautiful feather work, and a number of remarkable stone weapons. In Case 14 is a collection made by Lieutenant D. U. Bertollette, with a few articles from the Safford collection.

Case 1.—Bows and arrows.

Case 2.—Feather pendants, head ornaments, feather belts, deer's hoof necklaces, reed and feather necklaces.

Case 3.—Bags, hammocks, nets and ropes.

Case 4.—Bows with double strings for shooting baked clay balls; bows and arrows for war and hunting.

Cases 5 and 6.—Stone axes ornamented with feathers, wooden clubs, iron-tipped lances, wooden lances, wooden spades for digging roots, pottery.

Case 7.—Feather ornaments.

Case 8.—Shell necklaces and ear-rings, bead-work, woolen belts, grass fans and hats, and feather ornaments.

Case 9.—Feather ornaments.

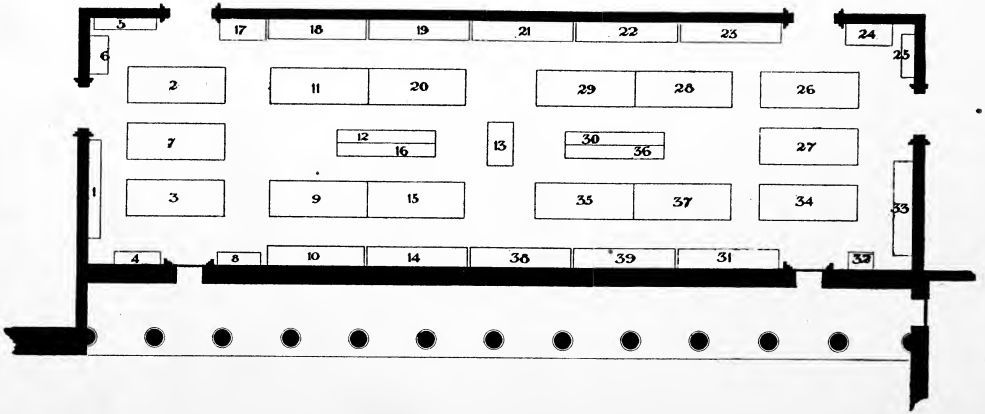
Case 10.—Ornaments of shells and feathers; gourds, amulets, stone axes, flutes, pipes and fire drill.

Case 11.—Feather pendants.

Case 12.—Bone and teeth necklaces, necklaces and pendants of deer hoofs, necklaces of beetle heads, bones and snake rattles, whistles and combs.

Case 13.—Feather ornaments.

Case 14.—Feather ornaments, gourds, bows and arrows and necklaces.



PLAN OF HALL 18.

HALL 18.

AYER HALL.

NORTH AMERICAN ETHNOLOGY.

This hall contains mainly collections illustrating North American ethnology donated by Mr. Edward E. Ayer.

Case 1.—Weapons and hunting and fishing implements of the Alaskan Eskimo.

Case 2.—Masks, pipes, boxes, needle-cases and various small utensils and carvings of the Alaskan Eskimo.

Cases 3, 4 and 5.—Clothing, implements, utensils, weapons, carvings and toys of the Eskimo of North Greenland and the shores of Hudson Bay.

Case 6.—Carved wooden chests of the Northwest Coast Indians.

Case 7.—Masks, carvings, pipes, gaming apparatus, rattles, ornaments and various carvings of the Indian tribes of Alaska and British Columbia.

Case 8.—Wooden food-trays and spoons of the Northwest Coast tribes.

Case 9.—Basketry, pouches, drums, carved clubs, bark-working implements, trap-sticks, fish-hooks, knives, snow-shoes, etc., of the Indian tribes of Alaska and British Columbia and the State of Washington.

Case 10.—Basketry of the Northwest Coast tribes, wooden hats, etc.

Case 11.—Carved, painted and inlaid wooden trays and dishes, and horn and wooden spoons of the Northwest Coast tribes.

Case 12.—Richly decorated woolen ceremonial blankets of the Chilkat Indians of southern Alaska.

Case 13.—Selected examples of the basketry of the Northwest Coast and California tribes.

Case 14.—Choice series of baskets of the California tribes.

Case 15.—Clothing, baskets, personal ornaments, etc., of the California Indians.

Case 16.—Robes, clothing, snow-shoes, packing cases, etc., of the Cree Indians.

Cases 17 and 18.—Clothing, snow-shoes, weapons, etc., of the Cree and Athapascan Indians.

Case 19.— Decorated robes, cradles, saddles, snow-shoes, pouches, etc., Cree Indians.

Case 20.—Bead-work of the Chippewa Indians, and choice specimens of Cree quill work.

Cases 21 and 22.— Clothing, robes, drums, bead-work, etc., of the Sioux Indians and other tribes of the Great Plains.

Case 23.—Weapons of the Indian tribes of the Great Plains.

Case 24.—Richly decorated carrying pouches, horse trappings, etc., of the Great Plains Indians.

Case 25.—Part of costume of Chief Spotted Tail; also, part of the costume of his daughter, Minnehaha.

Case 26.—Moccasins, pouches and knife cases of the Sioux and other tribes of the Great Plains.

Case 27.—Personal ornaments and miscellaneous articles from the Great Plains tribes.

Case 28 —Bead decorated cradles and pouches of the Great Plains tribes.

Case 29.—Pipes and tobacco pouches of the tribes of the Great Plains.

Case 30.—Blankets, sashes, baskets, etc., of the Moki Indians of Arizona.

Case 31.—Pottery of the Moki Indians.

Case 32.—Silversmith work of the Navajo Indians.

Case 33.—Blankets, sashes, loom models, etc., of the Navajo Indians of Arizona.

Suspended over the wall cases are numerous specimens of skin and bark boats, representing various tribes.

Case 34.—Clothing, baskets, bows, arrows, and medicine man's outfit, Navajo Indians.

Case 35.— Clothing, bows, arrows, quivers, pouches, sheaths, etc., Ute Indians.

Cases 36 and 37.— Clothing, weapons, personal ornaments, dolls, scalp, Apache Indians.

Case 38.—Basketry of the Apache Indians.

Case 39.—Basketry of the Pima and Yuma Indians.

PHYSICAL AND PSYCHICAL ANTHROPOLOGY.

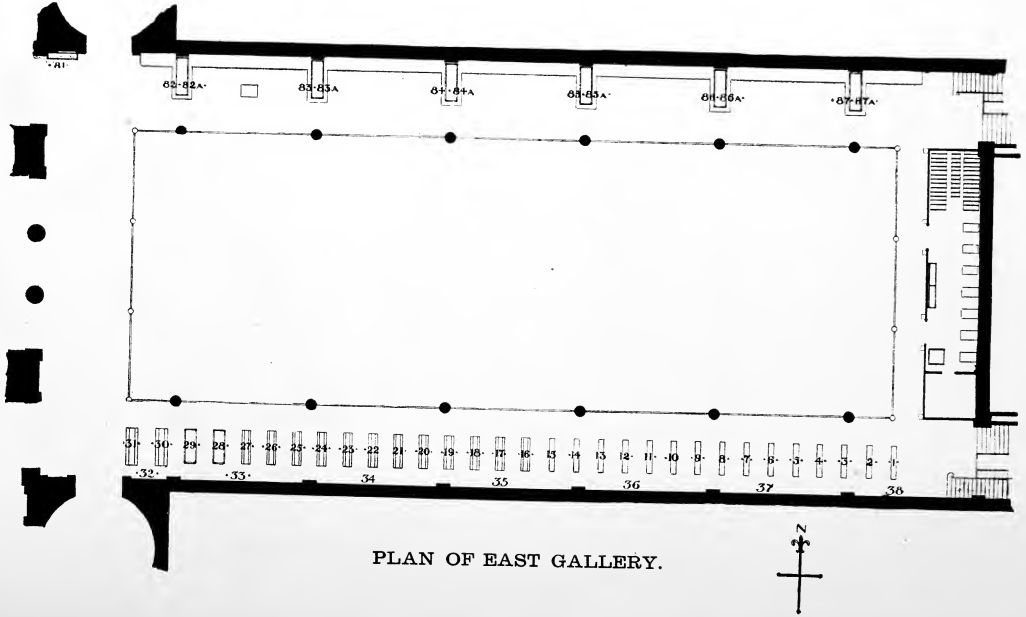
This section is situated on the east and south galleries of the East Court. On the east gallery is the Anthropometric Laboratory, in which are placed the various physical and psychological apparatus.

The object of the psychologic apparatus here exhibited is to illustrate the methods of testing the various senses, the accuracy of movements, the quickness and delicacy of perception, and the strength of other mental powers; it also serves to contribute to the accumulation of such mental measurements. Near the south end of the room are instruments for determining the delicacy of touch, of judging distances by the sense movement, of judging weights by the effort needed to raise them, of making several movements of equal extent and the like.

For the eye, tests are made of the accuracy with which the length of lines are judged and reproduced, and spaces equally divided; the accuracy of aim or coördination of eye and hand; the quickness and correctness with which closely similar marks can be distinguished. The range and clearness of vision is determined by the smallest size of certain forms and dots visible at a given distance, while the development of the color-sense is brought out by the quickness and delicacy of form and shade distinctions.

A special set of apparatus determines within 1-100 second the time needed for executing a certain movement, for responding to a sound or a touch, or a visual impression; also the time needed to distinguish between several touches, or several visual impressions, and to chose a movement according to the part of the body touched, or the number or color seen. Further experiments determine the range and accuracy of various forms of memory and the powers of association.

Such tests in addition to determining for the individual in what respects and to what degree his development and capacities differ from the average, have a scientific, an educational and a practical value that is sure to increase as the tests are more extensively introduced and their results interpreted.



PLAN OF EAST GALLERY.

There are also in the same room, apparatus for illustrating the law governing the distribution of individuals in a binominal curve, and for the drawing of the outlines of the various parts of the skeleton.

In addition there are apparatus for taking the measurements of the body. Among the instruments here used are an adjustable table for measuring the stature, and a chain constructed on a similar principle to study the variations in the length of the trunk, at different angles of incline to the perpendicular.

A notice hung in the middle panel, on the outside of the laboratory wall, will indicate the hours during which the laboratory will be open.

On the south gallery are situated cases containing the collections of crania, skeletons, etc.

Case 1.—(East End of Gallery). Crania illustrating Systematic Craniology. The skulls illustrate a number of types and the most frequent variations, such as the proportions and forms of the head and of the face; forms of sutures; centers of ossification; and artificial and natural deformations. The artificial deformations of the skull are practiced in many places throughout the world, and may be divided generally into two classes: The one, lengthening the skull; the other, increasing its height and width. The deformations are generally produced by bandages so disposed around the head of the infant as to produce the required modification of form.

Case 2.—Systematic Craniology and Skulls from Europe and Africa, in the order named.

Cases 3 and 4.—Skulls from Oceanica. Attention is specially called to the ornamented skulls from New Guinea.

Case 5.—Skulls from Oceanica, and of the Eskimo from the northern coast of America and from Greenland.

No. 31.—(Wall). Charts illustrating the growth and proportions of the body of the American Indians.

Cases 6, 7 and 8.—Skulls from the northwest coast of America. These are from Indians living on the Pacific Coast, between California and Alaska. Note the artificial deformations of skulls.

Case 9.—Skulls from Vancouver Island and California.

Case 19.—Skulls of the modern Indians east of the Rocky Mountains, from mounds of Florida and the Cliff Dwellings of Colorado.

Cases 11 and 12.—Skulls of mound builders, from Illinois, Wisconsin, Missouri, and Kansas. Many of these skulls show artificial and post-mortem deformations.

Cases 13, 14 and 15.—Skulls from Peru (vicinity of Cuzco, Ancon, Sierra Gorda, Arica). These skulls, like those in Cases 6, 7 and 8, show the effect of artificial deformation.

No. 35. —(Wall). Photographs of South Sea Islanders.

The next series of cases contain disarticulated skeletons.

Cases 16 to 20.—Skeletons from Vancouver Island, British Columbia.

Cases 21 and 22.—Skeletons of Iroquois Indians.

Cases 23, 24 and 25.—Peruvian skeletons.

No. 33. —(Wall). Life masks of the people of the east coast of Asia and of Oceanica.

Case 26.—The Cunningham series of models illustrating the surface of the brain and its correlation with the skull.

Case 27.—Casts of cranial cavities of various animals and races of men.

Cases 28 and 29.—Articulated skeletons of a gorrilla, and of individuals of various races.

Cases 30 and 31.—The chemical constituents of the human body.

DEPARTMENT OF INDUSTRIAL ARTS.

Such contributions to the Department of Industrial Arts as are available for museum purposes have been arranged to show, as far as possible, the more important steps that have led to improvement in handiwork, or progress in the invention of those implements, machines, and processes which have proved to be important factors in the world's material development.

The objects exhibited have, with a few exceptions, been culled and classified from a large mass of contributed material. Owing to the limited space available for the creation of special sections, many gifts to the department have been temporarily placed in storage.

Since intercommunication has had so great an influence upon every department of applied science, and especially upon what may be called the epoch-making inventions, the groupings have been made irrespective of geographical lines.

The Divisions of the Department of Industrial Arts thus far created are as follows, located in the Halls specified:

Division of Textile Industries: Halls 30 and 31.

Division of Gems, Gold, and Curios: Hall 32, Alcove 105.

Division of Ceramic Industries: Hall 33.

Division of Transportation.

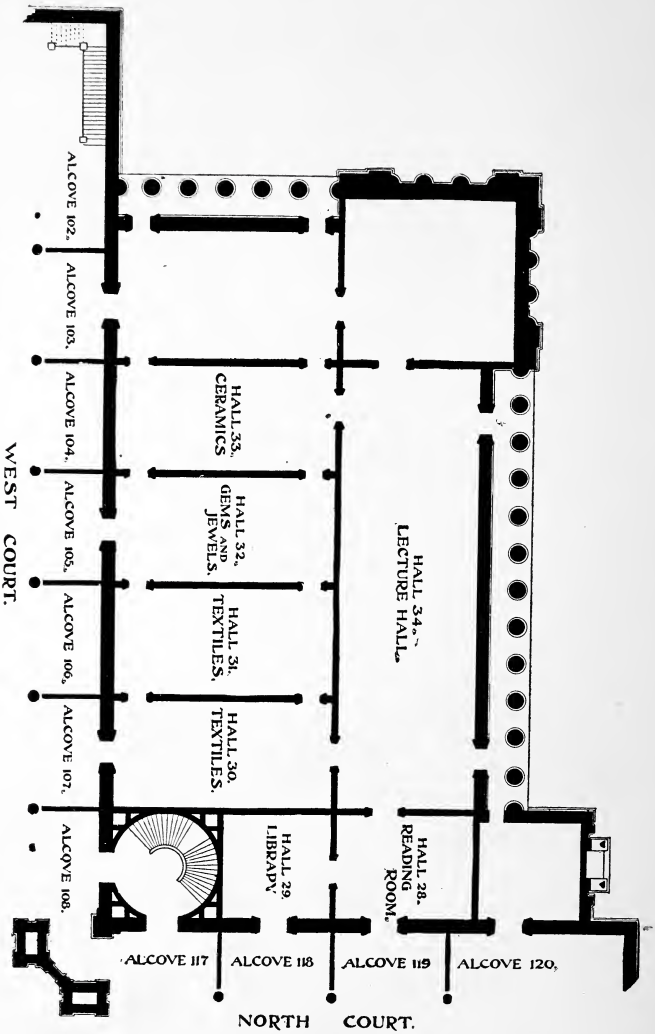
- A. Marine Transportation: Halls 37 and 38.
- B. Human Burthen-Bearers: Hall 39.
- C. Pack Animals: Hall 40.
- D. Land Vehicles: Hall 55.
- E. Street (or Tram) Cars: Hall 54.

Division of Steam Transportation.

Evolution of the Locomotive: Halls 43 to 53.

Pennsylvania Railroad Collection: Halls 41, 57.

Railway Appliances: Hall 42.



PLAN OF DEPARTMENT OF INDUSTRIAL ARTS, LIBRARY, ETC.

HALLS 30 AND 31.

TEXTILE INDUSTRIES.

The collections in this Division have been arranged to show as far as possible the more important steps which have led to improvement in hand work or progress in the invention of those implements, machines and processes that have brought about the marvellous development of the Textile Industries.

HALL 30.

This hall has been set aside for the installation of such old looms as can be obtained and models of the more modern types, together with the appliances used by the uncivilized people.

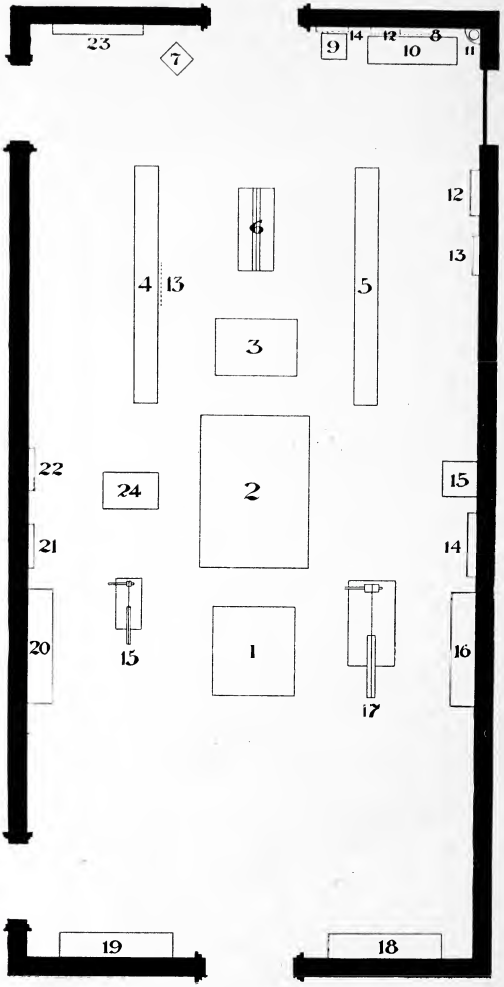
The objects of greatest interest found in this hall are two old looms, one constructed and used on the Kentucky frontier during the last century for the weaving of homespun stuff, of which there is a well preserved specimen shown, and one of the first, if not the first, Jacquard loom used in America for the manufacture of what is now known as ingrain carpet. These looms are in excellent condition, there being nothing missing or any modern additions made to them.

There is also a model of a Japanese hand loom, such as is used to-day for the weaving of silk tapestries. Uncivilized races have furnished a few very interesting specimens of their handiwork in the construction of looms and the material thereon.

There is also to be found in this hall a well arranged collection of specimens of ancient textiles embracing many rich designs and colorings of brocades, velvets, damasks, and embroideries of many combinations, and various specimens of flax, hemp and jute and the processes under which these products are treated before being placed upon the market in a manufactured state.

Case 1.—Loom constructed and used on Kentucky frontier for the weaving of homespun stuffs.

Case 2.—Jacquard loom, one of the first used in America for the making of ingrain carpets, with an example of the work done upon it.



PLAN OF HALL 30.

Case 3.—Model of a Japanese hand-loom, upon which is a small portion of a silken tapestry, similar to the Tsuzure Nishiki tapestry which hangs upon the south wall of adjoining hall (31).

Case 4.—Fibers; collections from United States Agricultural Department and articles manufactured therefrom.

Case 5.—Fibers; collections from United States Agricultural Department and articles manufactured therefrom.

Case 6.—Enlarged models of silk worms. Moths and cocoons showing development from the egg.

Case 7.—Pine fiber mattings, carpets and rugs.

Case 8.—Specimens of wool, illustrating various steps in the manufacture of blankets.

No. 9.—Device used by lacemakers, Island of Ceylon.

No. 10.—Flax brake.

No. 11.—Glass cylinder containing specimens of cotton and woolen waste.

No. 12.—Specimens of raw cotton, showing the successive steps in the manufacture of cotton threads.

No. 13.—Specimens of flax stalks, and flax in various forms, and specimens of manufactured linens.

No. 14.—The process of mohair from fleece to finished fabric.

No. 15.—Spinning wheel, foot power.

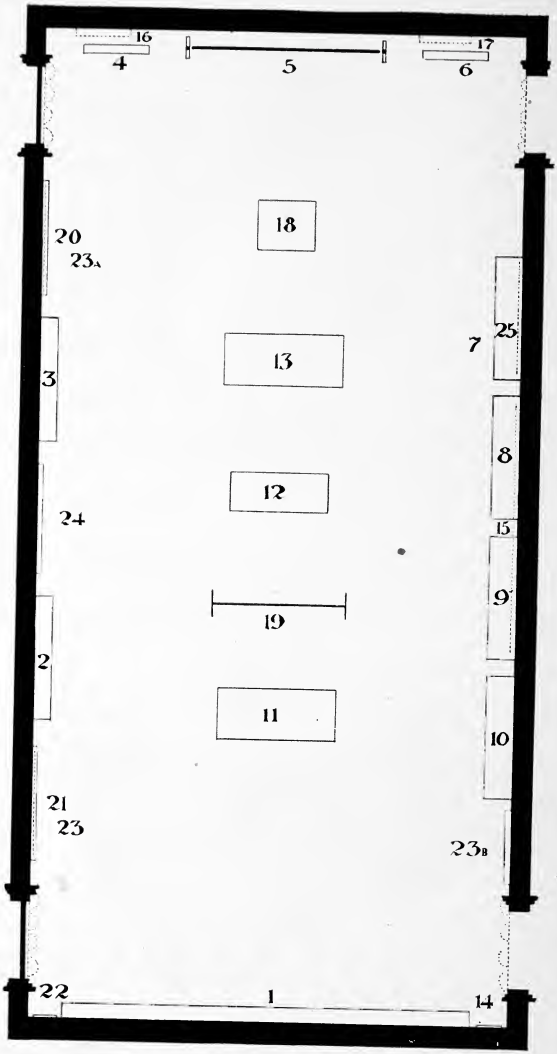
Case 16.—Various belongings of a loom and model of Navajo loom with example of weaving. Tappa cloth and instrument used in the making of it

No. 17.—Spinning wheel, hand power; said to be over 116 years old.

Case 18.—Loom used by natives of Congo and specimens of the fiber used in the making of cloth; also, specimens of the cloth.

Case 19.—Peruvian loom, with partly worked example of the weaving, articles used in the preparation of woolen yarns, etc., taken from the grave of an ancient Peruvian. Hand-loom as used by the natives of United States of Colombia, with example of weaving.

Case 20.—Hand-loom of Guatemala, with examples of work done thereon; also, a native hand-loom from Bolivia, with partly



PLAN OF HALL 31.

woven specimens, and implements used in connection with weaving.

No. 21.—Various specimens of Irish and Courtrai flax.

No. 22.—Specimens of manufactured linens.

No. 23.—Rope and matting made of the sheath of the shuro.

Case 24.—Working model of mechanical part of Jacquard loom.

Upon the walls of Alcove 107 and upon east and west walls of the hall and around the walls of the adjoining hall (Lecture Hall) are displayed excellent specimens of antique brocades, velvets, laces, embroideries, etc.

HALL 31.

In this hall are shown the products of the loom and needle, and many interesting specimens, ancient and modern, of the loom will be found.

Case 1.—Tsuzure Nishiki tapestry. This beautiful piece of tapestry, 22 feet long, 13 feet wide, represents the religious rites performed at the consecration of the Nikko Temple, and is of silk, woven on a hand-loom, a model of which may be seen in Case No. 8. The artist, besides successfully portraying the magnificence of that famous temple, has succeeded in delineating, in a most successful manner, human figures clad in many different and peculiar costumes. The procession consists of over 1,500 persons. The principal objects are three sacred cars or portable shrines decorated with metallic mirrors, birds, sacred portals, tapestries, etc. Each of them used to be carried by 100 men, and two of them are here represented. Of the groups of men forming this procession, the most noteworthy are a body of guards in full armor, immediately following the first group consisting of the body of the heralds and the two Daimyo (princes) specially charged with the superintendence of the celebration of the occasion.

The building forming the central figure is the famous Yomeimon, which is a gate standing before the main building containing the statue of Prince Ieyasu. The gate is 37 feet high and the roof is 25 x 15 feet. Under each of the four corners of the roof is hung a bell of solid gold. The gable is decorated with carvings of rare animals. The inscription on the tablet on the front of the gate was written by the 106th Emperor, Goyosei, and the characters are of pure gold. The upper part of the pillars supporting the

second story have carvings of dragons, gold and white, while the lower parts are decorated with lions. The pillars are twelve in number, of which the one here represented as standing in the center of the rear, is called the Inverted Pillar; the carvings of wavelets upon it are upside down. The explanation given is, "That perfection being sure to be accompanied with waning, that pillar has been intentionally inverted so as to prevent any further diminution of the grandeur and perfection of that building." On the railings are carved human figures, birds, animals, treasures and musical instruments. Brilliant figures of birds and flowers decorate the walls of the partitions on either side of the gate, as well as the roofed fence on both sides, which is over 300 feet long when extended in one line. The amount of labor spent on its manufacture can be judged when it is stated that a single face is the work of from three to ten days. Over four years, it is said, was spent in the production of this beautiful tapestry.

Case 2.—Korean beds made in Palace at Seoul.

Case 3.—Ceremonial vestment.

No. 4.—Japanese embroidered picture, "The White Phœnix on Paulownia Imperialis." A striking specimen of Japanese embroidery.

No. 5.—Double damask table-cloth. A duplicate of one of a set manufactured for Her Majesty, Queen Victoria.

No. 6.—A double damask napkin. A duplicate of one of a set manufactured for Her Majesty, Queen Victoria.

Case 7.—Collections of Italian tassels of the sixteenth to eighteenth centuries.

Case 8.—Upholstering goods, plush goods, dress goods and carpet covering, manufactured from Ramie fiber. White goods, laces, table damasks, etc., made from Ramie fiber.

Case 9.—Jamaica and Fayal fibers, ferns and articles manufactured therefrom.

Case 10.—Laces and needle-work from Fayal. Needle-work from Ireland. Nanduty lace handkerchief from Paraguay, etc.

Case 11.—Korean silken garments.

Case 12.—Straw hats woven by natives of South and Central American countries. Mexico and elsewhere.

Case 13.—Examples of Turkish textiles.

No. 14.—A chair-seat of woolen and silk tapestry, exact counterpart of the Gobelin weaving. The second piece done in America and woven by M. Foussadier for Wm. Baumgarten & Co., New York. Made January, 1894. The loom used in the production of this tapestry was made in New York, the harness being made of American twine; the woolen yarns and silk are native also, while the bobbins and combs are of home manufacture.

No. 15.—A Persian prayer rug; size, 14 feet 10 inches long by 10 feet wide, composed of twelve individual prayer rugs joined deftly and with considerable effect. This rug is of unknown age, but the donor states it is several hundred years old. The coloring of portions of this rug is very attractive, and it is claimed by experts that the art of preparing some of the dyes used has been lost. Two of its colorings, a most beautiful velvet green and a blue, resembling shades of malachite, are remarkably rich.

No. 16.— Japanese silk-embroidered picture, "Fujiyama."

No. 17.—Japanese silk-embroidered picture, "Plum Blossoms."

Case 18.—Foreign and domestic manufactured silks.

No. 19.—Chinese silk-embroidered screen in hand-carved teak wood frame.

No. 20.—Cut velvet picture of Fujiyama. ("Sacred Mountain").

No. 21.—Japanese embroidered picture of chrysanthemums.

No. 22.—Japanese embroidered picture of bird and grasses.

No. 23 D, 23 a, 23 b.—80 well selected specimens of Indian fabric. A collection of baskets illustrating the ingenuity of the Indians of Central and South America in the weaving of straw, fibers and rushes are also to be found upon the walls.

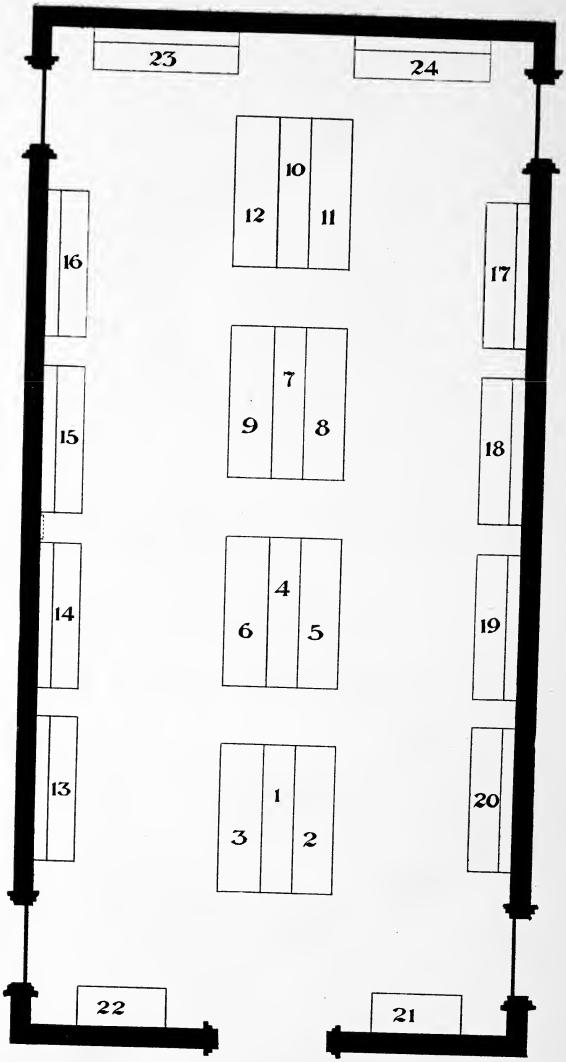
No. 24.—Mummy and mortuary cloths.

ALCOVE 107.

An old original foot-power fabric glove machine used in Chemnitz, Germany, in 1834.

An old original foot-power hosiery machine used in Chemnitz, Germany.

Upon the walls are examples of old embroideries and textiles.



PLAN OF HALL 32.

HALL 32.

HIGINBOTHAM HALL.

GEMS AND JEWELS.

The collection of gems and precious stones that, during the World's Columbian Exposition, attracted so much attention at the Tiffany pavilion in the Manufactures Building, and in the gallery of the Mines and Mining Building, has been added to and occupies the central cases in this hall. It is believed to be the most complete collection in existence, for it contains nearly every known gem or precious stone, in the finest cut examples, in fine crystals, cleavages or rolled grains, always of gem value. Many of the objects in the collection are of historical interest and of world-wide reputation.

Case 1.—Handsome objects made of rhodonite, jasper, and varieties of rare gem stones found in the Ural Mountains, Asiatic Russia. Prominent objects are a rhodonite jewel casket, rhodonite ink stand, two rhodonite coupés of rare markings, with jasper bases. Rhodonite is a favorite stone with the imperial family of Russia.

Three fruit pieces of realistic effect made at Ekaterinburg, Asiatic Russia, composed of the following hard and rare gem stones found in the Ural Mountains: Raspberries of rhodonite, blackberries of amethyst, white currants of chalcedony, plums of onyx and sard, mulberries of citrine, black currants of onyx and red currants of sard. The vases are of Kalkansky jasper and the leaves of precious serpentine.

A composite bust of Empress Eugenie; feathers, opals and red jasper; hat, sard; hair, sard; face, chalcedony; collar, bloodstone; beads, yellow jasper; dress panel, lapis-lazuli; body, sard.

Cane of solid silver, inlaid with discs of turquoise from Kurdistan, southwest Asia.

Florentine mosaic of marble, malachite, etc., representing Fall of Rome.

Case 2.—Engraved diamond bust of King William II. of Holland, executed by DeVrees of Amsterdam, which required all of his spare time for five years. Was shown in 1878, at the Paris Exposition.

A diamond crystal adhering to common boart, from Kimberly, South Africa.

A model of the Dewey diamond, weight 23½ carats, found in 1855, near Manchester, Va.

Diamond (round boart), weight $41\frac{9}{32}$ carats. This variety is extremely hard, shows a radiated structure if broken, and is peculiar to Brazil.

Cut and uncut specimens of black diamond from Bahia, Brazil, South America.

A collection of over fifty diamonds in their natural state, and a crystal in matrix from South Africa.

Gem gravel containing ruby, sapphire, zircon, tourmaline, quartz, etc., from a Ceylon river bed.

A collection of fifteen rubies, from Ural mountains, North Carolina and Georgia.

Cut and uncut specimens of various colored sapphires, found on the banks of the Missouri river sixteen miles from Helena, Mont.

Uncut specimens of sapphires from Ceylon, Siam, India, and Asiatic Russia.

Richly colored chrysoberyls and alexandrite, from Ceylon and the Ural Mountains.

Six star sapphires, from Ceylon, the largest of which weighs 134 karats.

A ninety-nine and a sixty-six karat yellow sapphire (oriental topaz), a fifty-nine karat blue sapphire, also yellow, pink, white, and other colored sapphires. Spinel — fine red, blue and other colors.

The Chilton doubly-terminated emerald crystal in a matrix of black limestone, from U. S. Colombia.

Emerald crystal six inches in length and about a half inch in diameter, remarkable for its length, from Alexander county, N. C.

Case 3.—Blue topaz, smoky quartz of fine cutting and exquisite luster, albite, golden beryls, and orthoclase, from the Ural Mountains, also colored topazes of Asiatic Russia, Brazil, Ceylon and Colorado.

The 352 karat Hope aquamarine and other fine examples of sea-green, sea-blue, yellow, and other colors of beryl.

Beautiful beryls from Maine, Russia and Brazil, also strings of turquoise beads made by the Indians of Santo Domingo, N. M.

Case 4.—An exceedingly fine collection of quartz and quartz cuttings, notably:—

A large jewel casket composed of twenty-six engraved crystal slabs, mounted in jeweled and enameled silver; style, seventeenth century; original in Ambras Collection, Vienna.

Screen, "The Finding of Moses," engraved on a thin section of rock crystal 9 3-5 inches in diameter, believed to be the largest section of its kind in existence.

Tazza of quartz, engraved to represent a marine festival.

Large crystal sphere, from the summit of Mt. Antero, Colorado, one of the largest crystal balls ever polished.

A group of crystal balls mounted on a stand of metallic leaves, the whole representing fruit and foliage.

A quartz crystal, scratched so as to show the method of slicing quartz in the manufacture of spectacle lenses.

A series of fourteen specimens of crystal intended to show the various steps in the cutting of a brilliant.

Fine examples of cut crystal from Asiatic Russia; seal having a Turkish inscription on one end and a Russian on the opposite; a frame of the seventeenth century; chandelier pendant, eighteenth century, French cutting; a head of a horse and a bust of Ivan Tourgeneff.

A cut crystal, from Mexico, the finest specimen of aboriginal work of this kind ever found in that country.

Case 5.—Zircons of various colors. A dark golden smoke color, round brilliant, weight 41⅝ karats, Kandy, Ceylon. Also one weighing 46½ karats from same place.

Tourmalines of many colors, from Brazil and Maine.

Fine specimens of phenacite from Ural Mountains and Colorado.

Rubellites from Brazil, weighing 21 karats.

Green garnets, Ural cutting, cushion-shaped.

Precious garnets: Navajo Nations, New Mexico; Bohemia; and Kimberly, South Africa.

Rare specimens of peridot from Levant.

Rare specimens of almandite.

Essonites from Maine and Ceylon.

Spodumene, yellow, Minas-Geraes, Brazil.

Carbuncles, Siriam Pegu, India.

Spessartites from Virginia.

Case 6.—Rock crystals from Madagascar, Brazil, and Ural Mountains. A beautiful collection of the doubly-terminated quartz crystals, loose and in the matrix, from Herkimer county, New York, commonly known as Little Falls diamonds.

Cats-eyes, quartz, and polished, from Bavaria, North Carolina, and Ceylon.

Thirteen cut and two uncut specimens of rose quartz from near Albany, Oxford county, Maine.

Three polished specimens of plasma from Openau, Baden, Germany.

Case 7.—Agate section. Natural color, transparent, from Uruguay, South America.

Wood opal from Colorado.

Opal in matrix, from Queensland, Australia.

Flexible sandstone from North Carolina.

Geode from Uruguay.

Polished specimens of banded jasper from Russia.

Agates of Uruguay, South America, grotesquely cut to resemble owls and human faces.

Case 8.—Cut amethysts from Brazil, France, Ireland, Ceylon, Hungary and Russia; believed to be the finest collection in existence.

Uncut amethysts from Mexico, North Carolina and Russia.

Spanish topazes, a fine series. In the "Spanish topaz" the original coloring of the carbon in the smoky quartz has been changed by the action of heat to the rich hues so much admired.

Cut and uncut smoky quartz from North Carolina, Colorado, Ural Mountains and Switzerland.

Case 9.—Opals in the natural state, also engraved and polished, from Russia, Queensland, Mexico and Washington State, including the famous Sun God opal from the Hope collection, which is said to have been known in a Persian temple for three centuries.

Fine specimens of tiger-eye of rare luster, jasper, mocha stones, moss agates, sardonyx, chrysoprase, agates and chalcedony.

The finest specimen of hydrolite known (the bubble of symmetrical shape being two and one-half inches in diameter) together with many beautiful and rare specimens of agate and chalcedony, cut and uncut, from many parts of the world.

Case 10.—Specimen of crystallized apophyllite from Mexico, a magnificent piece of labradorite and a very beautiful specimen of iron pyrites.

Two sections of a boulder of jade from the western coast of Australia; jadeite from Burmah, India.

Fluorite from Derbyshire and Cumberland, England, one group being encrusted with calcite crystals. Two specimens of antique carving of lion's feet in marble, from Rome, Italy.

Porphyry from Finland and Egypt.

Phulite from Norway. Landscape marble from England.

Case 11.—Fine collection of crystallized Amazon stone from Pike's Peak, containing several unique specimens of twin crystals; superb moonstones from Ceylon; sunstones from Norway.

Interesting cut specimens of iolite, wollastonite, titanite, kyanite and prehnite.

Gems cut from the so-called "minerals of the rarer earths," samarskite, gadolinite, allanite and euxenite, also magnificent groups of dioptase, the rarest ore of copper; an interesting series of malachite and azurite from Arizona; a series of cut fluorites.

Ancient Mexican mirror of iron pyrite.

Antique Persian figures of lapis-lazuli; lapis-lazuli from Bolivia, South America.

Case 12.—Obsidian fragments and obsidian arrow points and ornaments.

A collection of jade ornaments from China, Mexico and New Zealand.

Cases 13, 14, 15, 16, 17 and 18.—These wall cases contain the Tiffany collection of Indian jewelry, and form the most complete series ever exhibited in any museum. Many of the pieces are very old, of rare forms, consisting of rings, armlets, bosom ornaments, surah holders, ornaments for the forehead, hair, ear, waist, ankles, upper arm, etc., together illustrating the remarkable variety of the ornaments and of the jeweler's handicraft practiced in India for more than 2,000 years. The collection is divided into three sections:

First: Objects made from pure unalloyed gold, as worn by the higher caste only, containing diamonds, rubies, emeralds, sapphires, pearls, garnets, rock crystals, etc., and embellished with rich red and green enamels peculiar to the Indian work.

Second: Collection of silver jewelry, consisting of many large and beautifully wrought pieces, worn by a lower caste.

Third: Base metal jewelry, worn by the lowest caste only.

Case 13.—Contains forty-seven pieces of Delhi jewelry, which consists principally of necklaces and head ornaments of gold set with diamonds, pearls, rubies, emeralds, garnets, turquoises and crystal, and is characterized by the great number of pearls used and the frequency of small emerald pendants as decorations.

A gold necklace with yellow and green sapphire pendants. A pair of ear-rings of red and green enamel and pearls from Goa.

Two heavily wrought gold and silk necklaces from Muttra.

Case 14.—Contains upwards of fifty examples of jewelry from Bombay, which is remarkable for the few gems used and the great delicacy and artistic feeling shown in the gold work; also, fourteen pieces of Rajputana jewelry which resembles the jewelry of Delhi, but is heavier and less delicate.

Thirteen pieces of jewelry, consisting of surah holders, necklaces, armlets and nose rings from Baddhi. The jewelry from Baddhi is distinguished by the number of small gems used, one surah holder containing 492 rubies and eighty-two diamonds.

Four gold head ornaments from Bijapore.

One string of gold beads from Gwalior.

Case 15.—Considerable space is occupied by talisman necklaces and other pieces of jewelry from Jeypore, which show an abundance of enamelling. There are also fifteen beautiful specimens of jewelry from Kathiawar, principally necklaces, which resemble those of Delhi, though containing less enamel.

There are also several necklaces from Brahma, and eleven gold belts and necklaces from Amritsar.

Case16.—Devoted entirely to a collection of forty-seven pieces of gold jewelry from Gujarat which is characterized by the larger quantity of gold and small number of jewels used.

Case 17.— A collection of silver jewelry which contains many beautiful designs and fine examples of the ingenuity displayed by the oriental silversmiths in joining together the simple parts which united make a symmetrical whole.

The silver work is from the cities of Gujarat, Rajputana, Amritsar, the Deccan district, Lahore and Bombay.

Case 18.—Examples of silver jewelry, and jewelry of base metal worn by the lowest caste. The latter while quite heavy is artistically designed, the ornamentation differing in great degree from that employed in silver and gold work.

The jewelry of base metal is mostly from the state of Gwalior.

Case 19.—A collection of Abalone pearls from California, and Union pearls from Wisconsin, Tennessee and Texas; etched and cameo shells. Two large pearl oyster shells from west coast of Australia, which together weigh 151.55 ounces. Fresh water mussel containing figures of Buddha made of tin foil, coated with nacre; inserted by Chinese priests while shell was living at temple in Central China.

Fish tierisfer ingrown in pearl oyster from western coast of lower California.

Conch shells and conch pearls from Bahama Islands.

Clam shells and clam pearls from Long Island Sound and Chesapeake Bay.

Pearl blisters.

Precious coral from coast of Algiers. Coral on pearl oyster shells.

Pink coral ornaments, mummy eye—the eye of the giant cuttle fish from Peru.

Case 20.—Examples of Mexican silver filigree work.

Collection of amber of various shades and markings. Also ornaments made from amber, among which may be seen a string of about sixty-five amber beads, each bead containing an insect, from Sammland, East Prussia.

Amber with vegetable enclosures.

String of amber fluorescent beads from Sicily.

A circular amber bead from Cholula, Mexico. Believed to be the first noted appearance of amber as an ornament in ancient Mexico. It was used as an incense in their temples.

A collection of thirty-three examples of Etruscan jewelry.

A large and interesting collection of Egyptian jewelry.

A Pompeiian necklace.

Case 21.—Carved bronze eagle on red lacquered stand. Iron Damascene plate.

Solid silver communion plate, pierced by German bullets, in the Franco-Prussian war at Saarbrück. This was the first volley fired in the war. A new plate of the style perforated by German bullets in Franco-Prussian war.

Pair of carved wood figures, silver mounted, made in 1673, from Lord Charlemont's collection.

A carved ivory ornament taken from Shakespeare's home.

An engraved mother of pearl and silver box from Kenilworth Castle.

An antique snuff box of brass and copper from Holland.

Case 22.—Crown worn by the Duke of Sussex at the coronation of Her Majesty, Queen Victoria.

Two large and handsomely designed maces of solid silver which were carried in advance of a Maharajah by his attendants on all state occasions. The most prized possession of a Maharajah are his maces. He may lose his jewels, his money, his lands and his friends, but very seldom is he willing to part with the emblems of his authority, consequently very few maces have ever been brought out of India.

Two large and handsome tortoise shell combs, the larger one measuring fourteen inches in breadth and twelve inches high.

Card case, enamel work, sterling silver, hand painted, representing a bride in the national costume of Norway.

Walnut of silver containing a landscape made of natural pieces of Colorado native silver, gold, etc. Made in Denver.

Watch with Turkish numerals made in France latter part of eighteenth century for Turkish dignitary. Enamel work on back. It is yet in good running order.

Silver gilt wine cup in the form of a ship, which were much used in England in the sixteenth century.

Case 23.—Gold nuggets and crystallized gold. Gold ornaments from U. S. of Colombia.

Case 24.—Cameos and intaglios.

ALCOVE 105.

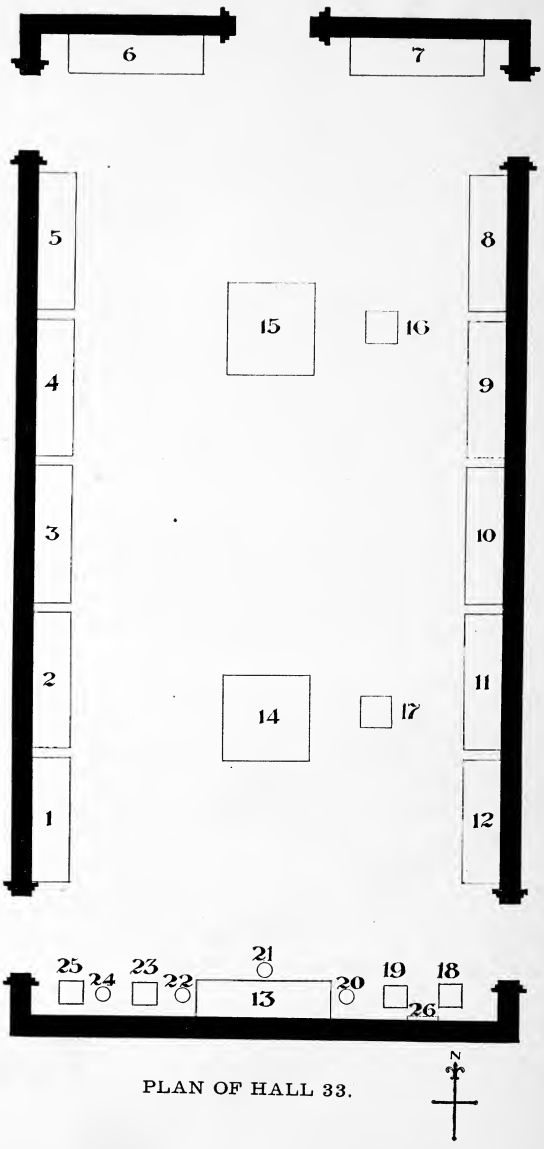
Coins of gold, electrum, silver, bullion, potin, aluminum, nickel, bronze, copper, brass, iron, tin, lead, glass, porcelain and paper, illustrating the metallurgy of coinage.

American coinage covering one hundred years.

Ancient coins—Roman, Greek and Italian.

Shield of steel and gold (5 feet by 8 feet) upon which are illustrated scenes in the Norse legend of Frithiof and Ingeborg.

Bronze group—Lafayette and Washington, by Bartholdi, the eminent French sculptor.



PLAN OF HALL 33.

HALL 33.

CERAMIC INDUSTRIES.

The introduction of the most primitive of ceramic arts in any part of the globe is regarded as a first step in the beginning of civilization, and many objects made by the ancient peoples are to be found in the halls devoted to archeology. While the fabrication of Chinese and Japanese porcelain has been carried on for centuries, the manufacture in Europe began only about two hundred years ago. There the masters of the art for years enjoyed the patronage of the kings and princes.

Upwards of seventy-five years ago the first hand porcelains made in America came from the Tucker works near Philadelphia, but the industry languished after 1838. Several pieces of fine "Tucker" ware are in the collection.

The development of the art in America in late years is most encouraging.

Case 1. — Porcelain plate. Arita ware; diameter 24 inches; depth at center 2⅝ inches; decorated in imitation of the work of Kakiyemon, the distinguished Hizen potter.

Porcelain statue of Bellman, the greatest lyrical poet of Sweden.

Porcelain statue of Gustavus III.

Porcelain plate, hand-painted by Thorne, Stockholm, Sweden.

Porcelain plate, blue and gold border, Stockholm, Sweden.

Porcelain plate, chrysanthemums and fighting cocks; imitation of Japanese.

A decorated earthen jar, Jamaica.

Case 2.—Porcelain vase, decorated in birds of bright plumage, made by pupils of School of Technology, Tokio, Japan, for Exposition at Chicago.

An exceedingly fine old Satsuma tray, representing a festival scene.

Five platters of Japanese (Seto) ware.

A cloisonné incense burner.

Cloisonné flowers in black lacquer.

A cloisonné bon-bon box.

Porcelain picture of Japanese (Seto) ware, representing a bridge of five curved sections on abutments, and pagoda-like buildings in background.

Case 3.—Thirteen Rhoda plates and four Damascus plates.

Case 4.—Fine examples of Pennsylvania German Sgraffiato ware, made early in the century. The earliest known piece in this collection bears the date of its manufacture, 1793. There are seven excellent specimens of this very interesting ware.

Case 5.—Specimens of old Staffordshire, with American views and subjects, antique delft, old Chinese ware, majolica, Lowestoft, Chelsea, and other American ware.

Case 6.—A collection of old Staffordshire platters, plates, cups and saucers with American views.

Case 7.—A collection of old Staffordshire ware, among which may be seen an exceptionally rare and unique design known as the "States" piece.

Case 8.—Examples of old Staffordshire with proverbs and sayings of Benjamin Franklin's. Also with American historic subjects, etc.

A set of Wedgewood plates bearing pictures of the various buildings of the Chicago Exposition,

Terra-cotta plaques of buildings of the Chicago Exposition made in Australia. Plates of Exposition buildings, made in Germany.

Case 9.—Examples of the Tucker hard porcelain, made between 1825 and 1838. American majolica made in Phoenixville, Pa.

Toby jug, white ware made at Trenton, N. J., 1887.

Two pitchers of old Liverpool (black and white ware), and various specimens of American ware.

Case 10.—An antique delft beer mug, polychrome decoration, with pewter cover dated 1777. Wine bowl of antique delft.

Antique delft apothecary jar with blue decoration.

Jug of antique Italian majolica.

Chocolate pot of early Rookwood.

Mug of Rookwood ware.

Pitcher of Doulton stoneware.

Four porcelain cameos, white relief on blue ground (Wedgwood), made prior to 1795.

Cup and saucer of antique Chinese egg-shell ware, and examples of work of potteries long since suspended operation.

Case 11.—Glass-ware manufactured by the Venice and Murano Manufacturing Co., at their exhibit, Midway Plaisance, Chicago Day, Oct. 9, 1893; replicas of famous pieces.

Case 12.—Glass-ware manufactured in Ehrenfeld, Prussia.

Case 13.—Tea set of porcelain covered with gold by "Chryso-Ceramic" process executed by the Misses Healey, Washington, D. C.

Vase, exact copy of the Royal Meissen, (a German vase), with landscape in Jemtland, by Thorne.

Porcelain vase, Greek design, ornamented with gold, a copy of Macribey, similar to the Limoges ware.

Porcelain from the Worcester Royal Porcelain Company.

Porcelain compotier and candelabra made by the St. Mary's Porcelain Works, Langton, Staffordshire, England.

Case 14.—Tiffany Favrile glass. The outcome of a series of recently conducted experiments by Mr. Louis C. Tiffany of New York. The result of this investigation is shown in new combinations of color with color, color over color, the deepening of tone, the subtle quality of texture, the introduction of new colors, the union of metal with glass, and the ornamental effects obtained by imbedding lines and threads of one colored glass into that of another, while in a melted state and during the operation of blowing. Tiffany Favrile glass has been made into a variety of original forms in vases and other objects of interest.

Case 15.—A large porcelain center-piece of Limoges ware for dining-table; remarkable for success achieved in delicate coloring at high temperature. It is one of the most important pieces of hard porcelain ever made, and in the making of it difficulties have been overcome that only a manufacturer can appreciate.

Nos. 16 and 17.—Two large and handsome Kutani (Japan) vases of purple and blue, hydrangea design.

This ware is much prized in Japan on account of its fine enamel colors and elaborate ornamentation.

No. 18.—Plaster figure of "Temptation," made and presented by Fujita Bünzo, of Tokyo.

No. 19.—Large vase of Ault faience.

No. 20.—Jardiniere and pedestal of Ault faience.

No. 21.—Vase of Ault faience.

No. 22.—Jardiniere and pedestal of Ault faience.

No. 23.—Large vase of trade Satsuma.

No. 24.—Jardiniere and pedestal of Ault faience.

No. 25.—Plaster figure of "Victory," made and presented by Fujita Bünzo of Tokyo, Japan.

No. 26.—Cloisonné picture without wire, representing "Fujiyama."

ALCOVE 104.

Two large handsome royal blue Berlin porcelain vases, decorated with medallions, cupids and festoons of golden vines and raised flowers. They stand nine feet and two inches high, and are among the largest porcelain vases ever made. They are a gift from Richard Horstman, of Berlin, and are of great value.

Three ancient earthen wine jars from Rome, which attracted great attention during the Exposition, where they were located near the Horticultural Building. These jars, which have a capacity of about 400 gallons, were in use many years ago in the preparation of wine, and were collected in Italy by an expert sent abroad by the World's Columbian Exposition. No. 1 was found at Lubiaco in the grounds of the late Duc di Sermonta. Nos. 2 and 3 were found at the Villa Ludovici while excavating for the foundation of the Boncompagni Palace. No. 6 is a large glazed jar of symmetrical form from Japan.

Tea jar of Shigaraki ware, used in certain parts of Japan as a storage for tea and as a preventative from dampness to the same.

Vases and urns of terra-cotta.

WEST END, WEST COURT.

LEATHERS.

In the six large cases at the west end of the West Court will be found a valuable collection of tanned and untanned skins and leathers collected by Tiffany & Co., of New York.

This firm began to make this collection in 1876 to acquaint themselves with the industrial possibilities of using the skins of fishes, reptiles, birds and rare mammals. It was the forming of this collection that has led to the introduction of the leathers made from the frog, alligator, snake and other reptiles.

ALCOVE 101.

FISHERIES APPLIANCES.

On the wall may be found nets, seines and floats from Norway. A primitive anchor from Norway. A seine over one-quarter of a mile long, made in Russia; buoys, fish traps, etc., from other countries.

ALCOVE 102.

WHALING AND ARATIC RELICS.

A collection of implements used in whaling; guns, harpoons and bomb lances of the various kinds, illustrating the progress of the whaling industry. Arctic clothing made for members of the Greely Relief Expedition, including reindeer and felt sleeping bags, polar bear skins and felt suits and harness used by men when drawing sledges will be found in the two upright cases at extreme west end of the West Court.

ALCOVE 106.

AGRICULTURAL MACHINERY.

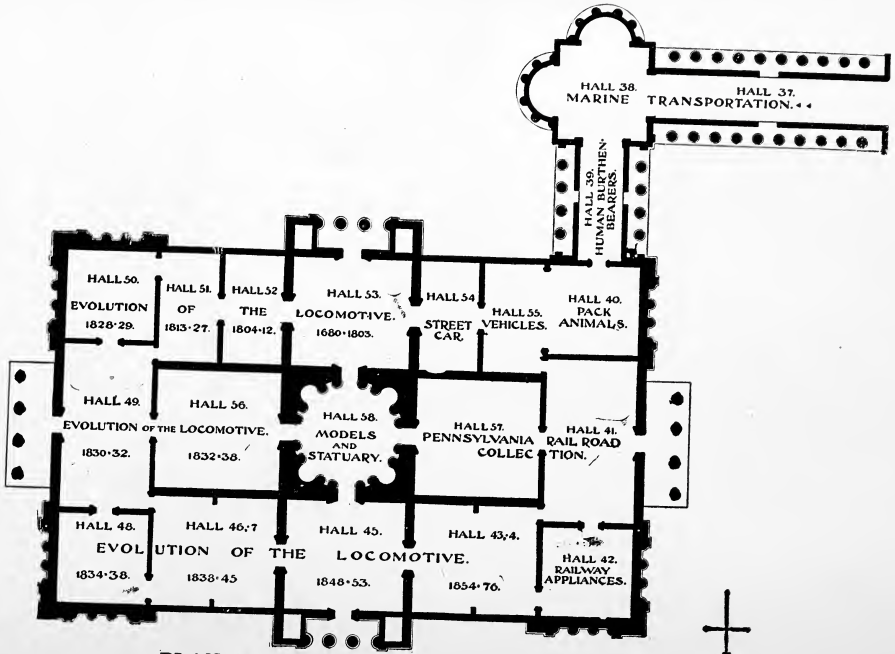
The material in this collection was contributed by Mr. Cyrus H. McCormick.

Models illustrating the development of mowing and reaping machines.

Arabian plows.

Chinese plows, harrows and other agricultural implements.

Sections of a South American windmill.



PLAN OF DIVISION OF TRANSPORTATION.

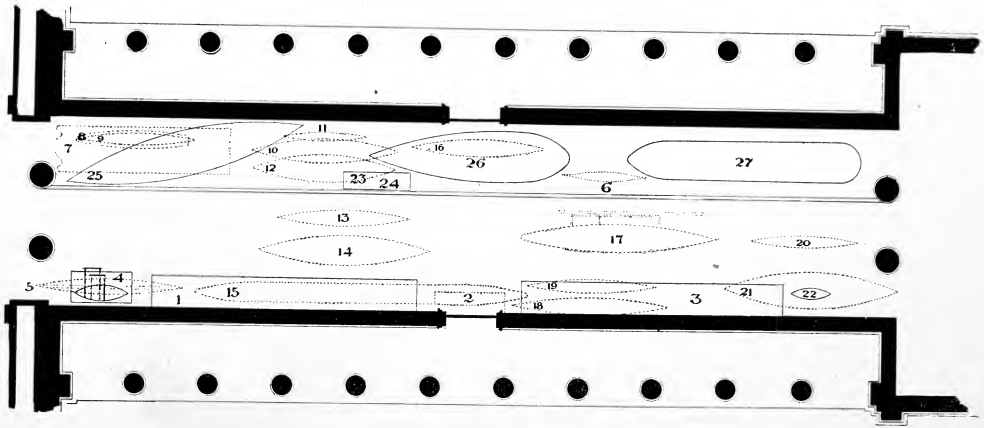
HALLS 37, 38, 39, 40, 55 AND 54, EAST PAVILION.

DIVISION OF TRANSPORTATION.

A. Marine Transportation: Halls 37 and 38.
B. Human Burthen-Bearers: Hall 39.
C. Pack Animals: Hall 40.
D. Land Vehicles: Hall 55.
E. Street (or Tram) Cars: Hall 54.

In the Division of Transportation all methods of marine and land conveyance are included, except the steam railway, which may be regarded as the culmination of the several series installed in the six Halls above enumerated. The exhibits are arranged in the order of development, beginning with the floating log and the human burthen-bearers and pack animals, continuing through methods of utilizing man and animals for traction, sledges and vehicles with wheels, and concluding with the street (or tram) car, which, when hauled by animals, marked the beginning of the present railway system.

The objects in this section, with very few exceptions, were acquired from the Department of Transportation Exhibits, World's Columbian Exposition.



PLAN OF HALL 37.

HALLS 37 AND 38.

MARINE TRANSPORTATION.

In these Halls are installed an interesting series of original boats and models illustrating various methods of marine conveyance, floating with the tide, towing by man and beast, propulsion by pole, oar and sail, including models of the steamboat, steamers, towing rafts of logs and coal barges; also many relics of old-time whaling vessels.

In the center of Hall 38 stands an experimental Flying Machine, built by Lawrence Hargraves, of Stanwell Park, Clifton (near Sydney), New South Wales.

No. 1.—Models illustrating the progress of improvement in primitive craft, beginning with the chatti, or fisherman floating upon an earthen jar, and including various boats propelled by poles or oars. Other important objects are the Cingalese catamarans and outrigger canoes; the poorinda, a barge of state from Kashmir, India; an imperial caique, the state barge of the Sultan of Turkey; the Mohr punkee, or peacock boat, of the Ganges, used by the Rajahs and wealthier Hindoos as a pleasure boat; a barge from Burmah; state barge of the Governor of Kashmir, India; and finally the state barge of the Boa or Emperor of Burmah.

No. 2.—Padda (model) Colombo, Ceylon.

No. 3.—Models of oriental boats propelled by sails, beginning with the log raft, equipped with primitive sail; followed by the heavily laden Hindoo trading vessels moving by wind, and concluding with the great freight junk of the China coast—the highest development of the Asiatic sailing vessel. Interesting objects in this case are East Indian cargo boats with loads, illustrating the Hindoo methods of combined sailing, rowing and towing against the current; the loungo and louzgat, Burmese freight boats for transporting produce; the likin, or Chinese revenue cutter, and an extensive series of junks that ply along the China coast.

No. 4.—(Upper boat.) Yattrava or Dhoney of Colombo, Ceylon. A decked vessel with outrigger and lugsails; usually manned by a crew of six men. Model about one-thirtieth full size.

(Lower boat.) Orua from Ceylon. Fishing boat with outrigger and lug sail. Model one-eighth of full size.

No. 5.—Catamaran, or raft (original), from Colombo, Ceylon. This was formerly used for transporting the royal mails from Colombo, coastwise, about the island.

No. 6.—Balsa (original), boat made of rushes, Lake Titicaca, Peru; for one person only.

No. 7.—Bimba (original), a catamaran, or raft with sides. St. Paul de Loanda, Angola, Africa.

No. 8.—Balsa (original), boat made of rushes, Lake Titicaca, Peru. Owing to its light draught large cargoes are often carried.

No. 9.—Cabilletto (original), fishing boat, made of rushes Huanchaca, Peru. Used in fishing, especially in heavy surf. The occupant kneels just abaft amidships of this boat and propels it by means of a short broad-bladed paddle.

No. 10.—Donga (original), from Benguela, Africa. A very primitive dugout. The addition of the strip along the gunwale is one of the earliest efforts to increase height of sides of the boat.

No. 11.—Dugout (original), for carrying two persons, Colon, Colombia, South America.

No. 12.—Dugout (original), from the headwaters of Rio Ozama, San Domingo. Made by Indians, but showing European influences both in exterior and interior form.

No. 13.—Dugout (original), from Seneca Indian Reservation, New York.

No. 14.—Corial (original), made by the Accawoi Indians, headwaters of the Demerara river, British Guiana, South America. This is the highest type of dugout canoe made by savages of any country, and is not patterned after the craft of any civilized race.

No. 15.—Tlo (original), a dugout for fishing purposes, made by the Bella Coola Indians, near Fort Wrangel, Alaska.

No. 16.—Dugout, with sail (original). Colon, Colombia, South America.

No. 17.—Surf canoe (original), with outrigger, Apia, Samoa. Used for general transportation and fishing where surf is heavy.

No. 18.—Woodskin (original), made by Accawoi Indians on headwaters of Rio Essequibo, British Guiana, South America; the most primitive form of bark canoe.

No. 19.—Birchbark (original) upper Yukon River, Alaska. The highest type of bark canoe made by savages is made by the Indians of North America.

No. 20.—Kyak (original), a decked skin boat used by Esquimo of America, Asia, and Europe in hunting and fishing. Port Clarence, Alaska.

No. 21.—Caique (original), or row-boat; Constantinople, Turkey. A pleasure boat.

No. 22.—(Stand.) Model of fishing boat of the type used on the Sea of Galilee in the time of Christ. The model was made in Syria.

No. 23.—Model of punt, or scow, used for ferrying and general transportation purposes in the harbor of Curacoa, Dutch West Indies.

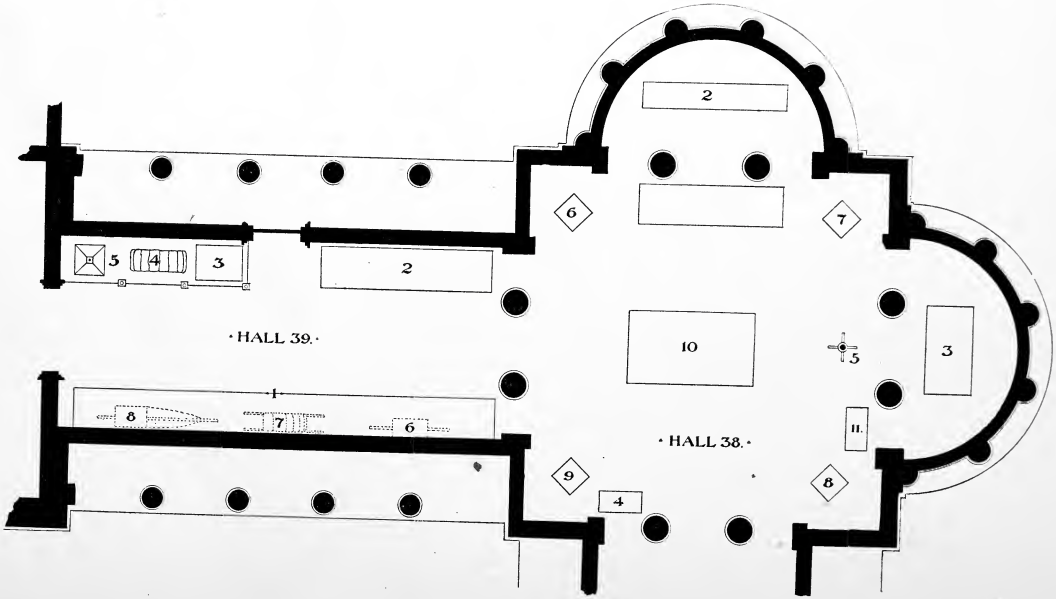
No. 24.—(Stand.) Model of fishing boat used near Curacoa, Dutch West Indies.

No. 25.—Venetian gondola for private use.

No. 26.—Daighsa (original). Locally called "Bumboat" by English sailors. Daighsas are used generally by Jewish merchants who peddle produce and fruits around Maltese harbors. Hence the inscription upon the seatback in the stern-sheets: "Heartily, wishing, all, sort, of, wealth, to, mankind, and, that, I, may, have, chance, to, live, honestly, with, same." Valetta, Malta.

No. 27.—Bragazza (original). A caravel-built two-masted fishing vessel of Venice, Italy. The sails are artistically painted, showing the survival of ancient Phœnician art influences among the Adriatic fishermen. On the foresail the inscription runs: "Peace to thee, St. Mark, my Evangelist."

On the North and South Walls are hung pictures from the West Coast of South America, from Africa, Asia, and the United States—illustrating many primitive and other craft, including types of the highest development of wooden-bottomed American sailing vessels. In bas-relief are shown hulls of whaling vessels, also lithographs of whaling vessels surrounded by icebergs in the Arctic seas.



PLAN OF HALLS 38 AND 39.

HALL 38.

Case 1.—Models of steam tow boats with large tow of coal from Pittsburgh to New Orleans. Secured through the Department of Mines and Mining, World's Columbian Exposition. The steamer represented is 200 feet long, 42 feet wide, with cylinder 24 inches in diameter and 12 foot stroke of piston, and has seven boilers. The barges are each 130 feet long, 25 feet wide and 7½ feet deep, each carrying almost 13,000 bushels of coal. The steamer and tow, when running, occupy a space of 700 feet long and 150 feet wide.

Model of a raft of logs in the Mississippi River, being towed by the stern-wheel steamboat "Juniata." The steamer is hitched to the raft bow on and by means of guy-ropes run to the nearest corners of the tow, the steamboat is made to direct the course of the raft. The model of the steamboat is of metal. The model of the raft is made of white pine branches cut in Northern Wisconsin. Both boat and raft are constructed on ¼ inch scale.

Case 2.—Models of river rafts and boats. The Jolly Boat—ferry boat of the Ganges. The Donga fishing and hunting boats. River trading boats from Malay Peninsula and China.

Case 3.—Ship barometer, log books, charts, chronometer, compasses and quadrants from old whaling vessels.

Case 4.—Wooden model of the "Santa Maria." A piece of wood from each exposition building (except concession stands) erected before May 1, 1893, in Jackson Park, is incorporated in this model, which is made to an exact scale.

No. 5.—Standard containing drawings, lithographs and prints of marine engines and experimental naval appliances. A letter to First Consul Napoleon of France from Robert Fulton, pertaining to plunging boats or masked batteries for use in the destruction of vessels in naval warfare, is shown here.

No. 6.—Statue of Robert Fulton.

No. 7.—Statue of John Ericsson.

No. 8.—Statue of Denis Papin.

No. 9.—Statue of man at the wheel, typical of marine transportation.

Case 10.—Experimental flying machine driven by compressed air. The machine was built by Lawrence Hargrave, of Stanwell Park, New South Wales, who has built eighteen experimental and successful flying machines, of which this is No. 14. An experimental test was made with this machine on March 31, 1892, and at a pressure of 250 pounds in the main tube, it flew 312 feet in nineteen seconds.

No. 11.—Models of double and single propellers for vessels; also, hull of tug boat.

On the Walls are hung a series of drawings, photographs and prints of the first propulsion by steam on water. Photographs of river, lake and ocean steamers. including relics of advertising posters in early days, form an interesting part of this exhibit.

HALL 39.

HUMAN BURTHEN BEARERS.

In the collection of Human Burthen Bearers are found life-size figures and models illustrating the primitive methods of transportation from widely diversified sections of the world, demonstrating the slow progress made in the manner of transporting goods and the wonderful endurance shown by the people of these countries.

Case 1.—Life-size figure representing street scenes in Constantinople, Turkey; street porters, transporting cases destined for the World's Columbian Exposition. Fire sergeant and original of fire extinguisher, chair carriers, and sedan chair of a wealthy Turkish lady. Water, milk, and bread peddlers.

Case 2.—Life-size figures of burthen bearers from South America. Indian carrying a Silla, or traveling chair, in which is seated an American on his way over the mountains to Bogota, the capital of Colombia. Two Indian Cargadores, male and female, transporting goods from Guayaquil to Quito, capital of Ecuador.

No. 3.—Sedan chair used by ladies of Bogota, Colombia, South America.

Case 3.—Negro woman, life-size, representing the common method of carrying goods on the head in early slavery days in the southern part of the United States, also thirteen models of Cargadores, showing the different methods of transportation which prevail in Latin America.

No. 4.—The palanquin used by Mrs. French-Sheldon as a carriage, a boudoir and a drawing room during her explorations in eastern Africa.

No. 6.—Phillipan, a primitive palanquin from Antananarivo, Madagascar.

No. 7.—A Mexilla, or palanquin, from St. Paul de Loanda Angola, Africa.

No. 8.—Traveling hammock from Funchal, Island of Madeira.

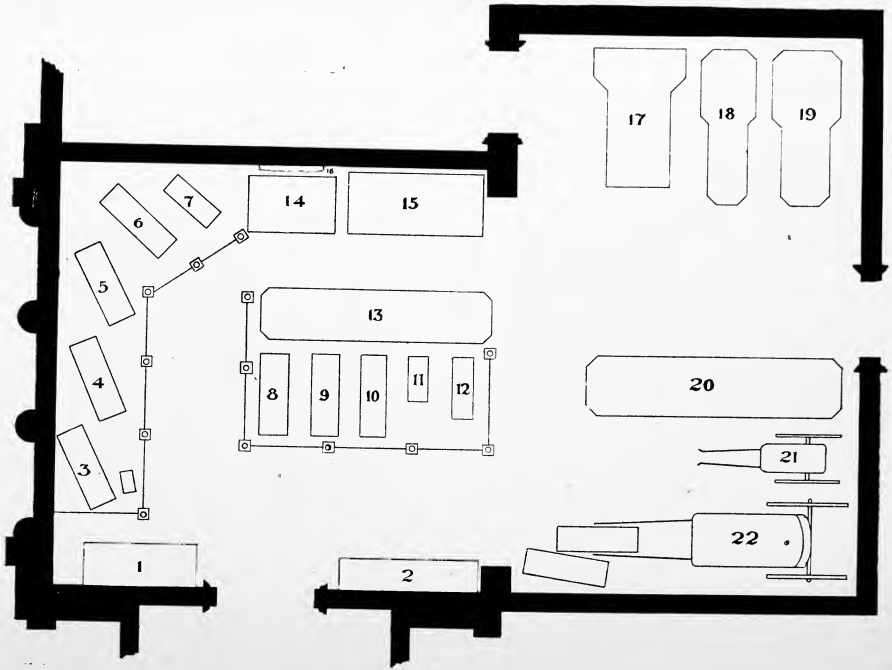
On the walls are shown photographs and lithographs of burthen bearers and their methods of transportation, from various parts of the world.

HALLS 40 AND 55.

PACK ANIMALS.

Burthen bearing by animals is illustrated by a full series of pack animals and saddles. The animals equipped for the journey stand on the west side of and in the center of hall, and the saddles in a case opposite. Among the most interesting are the Syrian pack saddles on the camel; the pack saddles with bales, accompanied by Arriero, or mule driver of Bogota; the Lechera, or woman milk peddler, of Ecuador; and the Vaquero, or cattle herder, of Colombia, South America.

Cases 1 and 2—Show different stages in the development of pack and riding saddles. There are specimens of the primitive American pack saddle, with Esterialtas or plantain saddle pads; the



PLAN OF HALLS 40 AND 55.

skeleton saddle of the Cheyenne Indian warriors; three very handsome saddles from Latin-America, including one heavily ornamented with solid silver; and Mexican saddles. With these are various Turkish saddles; the beautiful gold embroidered one was formerly used by the Sultan of Turkey. Specimens of Asiatic harness are also shown.

No. 3.—Mule with pack saddle,from Bolivia, South America, loaded with two bales destined for the World's Columbian Exposition and accompanied by an Arriero, or mule driver.

No. 4.—Lechera or woman milk peddler, Ecuador, South America.

No. 5.—Vaquero or cattle herder, from Colombia, South America, equipped with twisted rawhide lariat and rope tether, and mounted on a mule.

Case 6.—Camel with pack saddle, showing method of transporting of merchandise across the deserts of Asia and Africa.

No. 7.—Donkeys carrying street peddlers, a common scene on the streets of Constantinople, Turkey.

No. 8.—Donkey with Syrian bridle and pack saddle, from Jerusalem.

No. 9.—Donkey with baker's pack saddle, from Constantinople, Turkey.

No. 10.—Burro, with rush saddle from Peru, South America, the most important beast of burthen in all Latin-American countries.

No. 11.—Burrito (or young burro), from Peru, South America.)

No. 12.—Llama with blinds and panniers transporting portmanteaus over the mountains of Bolivia and Peru, South America.

No. 13.—Palanquin for passengers, transported by mules. A common mode of conveyance in the Orient.

On the walls are hung specimens of pack saddles, including a series of photographs of animal palanquins from Persia, and pack animals from various parts of the world.

HALLS 54, 40 AND 55.

LAND VEHICLES.

In the collection of land vehicles are installed vehicles from widely separated portions of the earth. The most interesting are the sledges of sub-tropical Madeira, where snow never falls; the Scythian racing chariot, interesting in that it differs typically from the Assyrian chariot in the number of spokes; the rolling hogshead, a relic of early colonial days in the south; and the Mexican carreta, a cart with spokeless wheels. These illustrate the introduction of the wheeled vehicles into civilization. The Sicilian pleasure cart is adorned with religious decorations. The Turkish holiday wagon is in use both in European and Asiatic Turkey. The Cuban volante is hitched tandem, the leading horse being almost in front and a little to the left of the shaft horse. Here are also an interesting series of models of bullock carts and other native vehicles from India and Burmah; carts, wagons and carriages from Ceylon; carts and wagons drawn by man; elephant trappings, and vehicles illustrating native land transportation in the Malay Peninsula, Java and Siam. Models of some American carts and horses are also shown.

No. 14.—Carro de Monte, or mountain sled from Funchal, Island of Madeira, made of willow and mahogany wood and finished in red cloth.

No. 15.—Carro de Boss, mountain sled with canopy, from Funchal, Island of Madeira, made of mahogany wood. Intended for four persons.

No. 16.—Corca, or freight sled, drawn by bullocks, from the Island of Madeira. Snow never falls at Madeira, but sleds are used as the steep, hilly streets of Funchal prevent the use of wheeled vehicles. The Carro de Monte, Carro de Boss, and Corca are the ordinary means of transportation in Madeira.

No. 17.—Replica of ancient Scythian racing chariot. This is an exact copy of the original found in an Egyptian tomb and now in the Museum of Archæology at Florence, Italy.

No. 18.—Sicilian holiday cart harness from Palermo, Island of Sicily, decorated with antique religious figures; used also in Naples and Southern Italy.

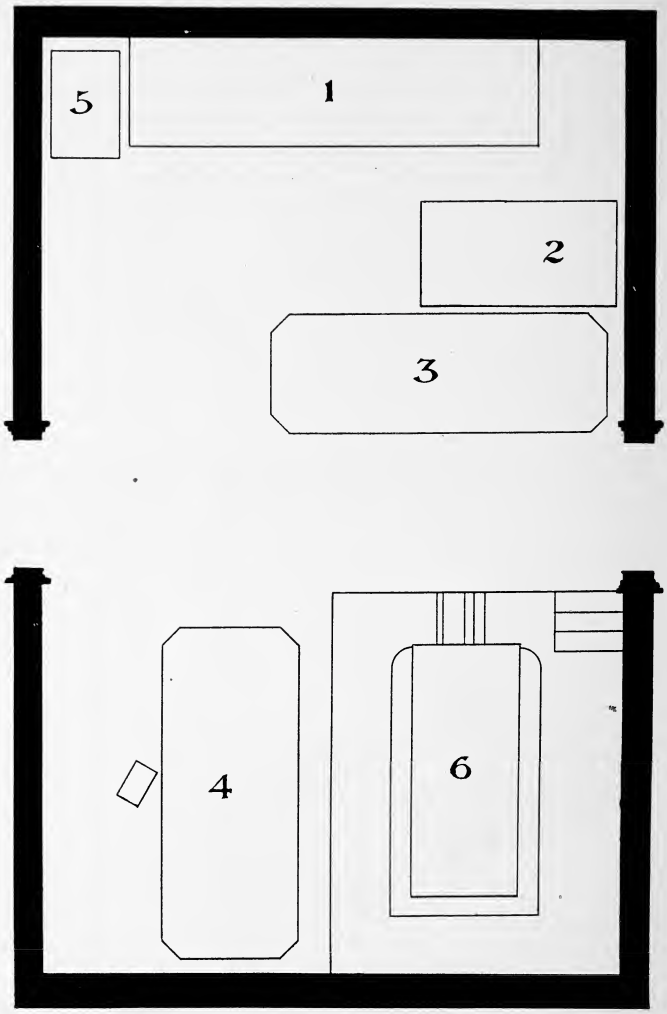
No. 19.—Red River cart and harnessed ox, the only method of transporting merchandise northwest of St. Paul, Minn., previous to 1871. In early days oxen only were used, but now ponies have displaced them.

No. 20.—Araba Codja, a country holiday carriage from Constantinople, Turkey, drawn by oxen. Their gaudy harness and hangings and bells make this a most picturesque and interesting specimen. The wagon contains no seats. The passengers sit cross-legged upon cushions placed at each side of the vehicle.

No. 21.—Norwegian cariole from Norway, originally exhibited at the Centennial Exposition, Philadelphia.

No. 22.—Volante, a carriage in common use in Cuba, drawn by two horses. A postilion rides the leader, and the passengers drive the shaft horse, using line and bit as customary with single horse vehicles.

On the Walls are photographs, lithographs and paintings illustrating the types of vehicles from all parts of the world. The interesting series of royal vehicles includes royal coaches and sleigh of the King of Bavaria; royal coaches of the sixteenth and seventeenth centuries; coaches of the Lord Mayor of London and Dublin, and of Pope Paul the 5th. Royal coaches from Japan, Russia and Portugal. The Shah of Persia's pleasure carriage, coach and his racing horses; also a series of Latin American vehicles, including many from India, China and Burmah. A series of ancient Assyrian and Egyptian vehicles, types in use hundreds of years before the Christian era.



PLAN OF HALL 54.

HALL 54.

Case 1.—Models of vehicles from various parts of the world. Ceylon carts for freighting; Hindoo and Burmese wagons drawn by bullocks and horses, including a variety of Turkish wagons, and modern American horse and cart.

No. 2.—Ghurry cart, drawn by man, from Surat, India, largely used for transporting goods within the cities.

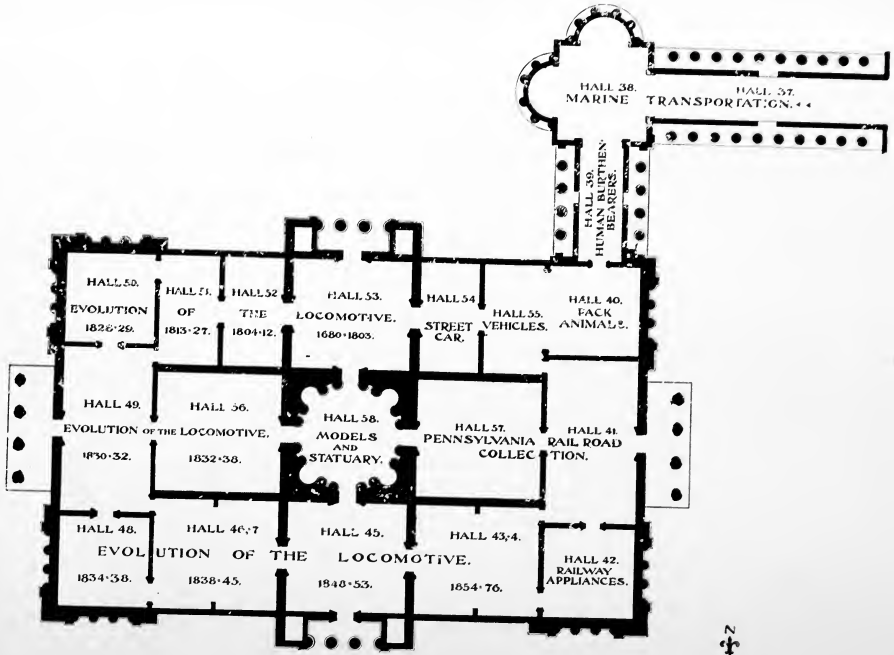
No. 3.—Rolling hogshead, with yoke of oxen and negro driver, illustrating the method in Virginia in colonial days of transporting tobacco from the plantation to the markets of Jamestown and Richmond, Virginia.

No. 4.—Carreta ox-cart wheels without spokes, made by the Indians of the Pueblo of Acoma, New Mexico, with oxen yoked according to the Mexican method.

No. 5.—Passenger wheelbarrow, Amoy, China, used to transport travelers from point to point within the city. The passenger places one foot across the front cross-bar, allowing the other to swing free, and resting the arm on top of wheel shield.

No. 6.—Represents a section of Clay street, San Francisco, California, in 1872. On this street was placed and operated the first cable railroad in the world. A section of the cable road, including yokes and rails, and the first grip-car run for public use on any cable street railway, are here shown. On the stands are specimens of the original yokes and the first original grip which was made for Mr. A. S. Hallidie, the inventor of the cable railway, 1872. A small model of the grip, together with models of cars, are also here. At the end of the stand are two yokes used on the cable railway of Germany.

On the walls are a series of photographs of land vehicles, also a large drawing of Stephenson's first street car, together with photograph of street car lines in other countries.

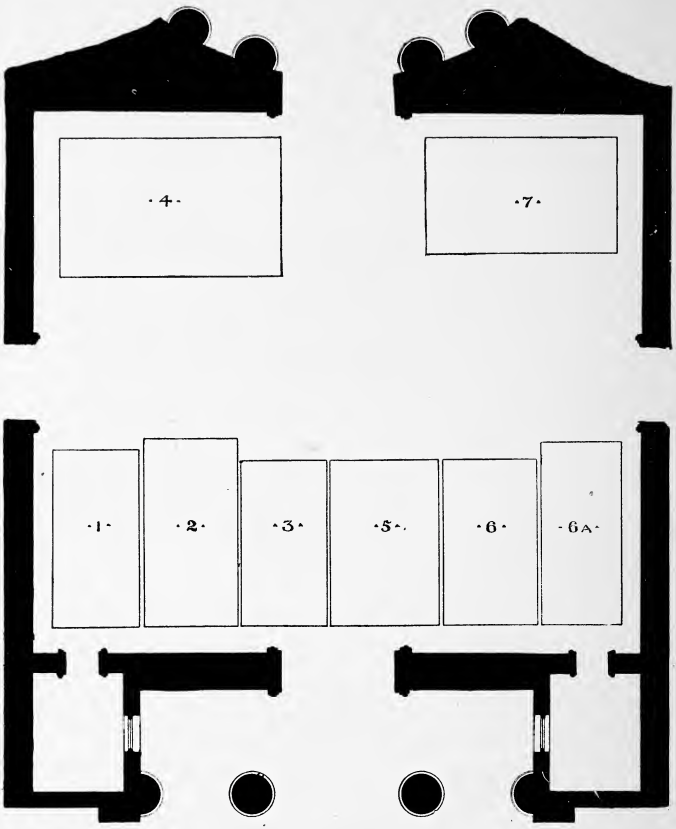


PLAN OF DIVISION OF TRANSPORTATION.

TRANSPORTATION BY STEAM.

This division of transportation, occupying the East Pavilion, is designed to illustrate, largely through full-sized reproductions and originals, the evolution and development of Permanent Way, Structures, Motive Power, Equipment and Appliances. The nucleus of this representation is in the extensive collection made by the Baltimore & Ohio Railroad Company for the Columbian Exposition, and purchased by the Field Columbian Museum. This collection embraces thirty-eight full-sized working reproductions, covering the period from the initial idea of steam propulsion on land, 1680, to the first "Camel' engine of 1848, and nine original locomotives, including examples of the practice followed from 1832 to 1876. In addition there are nearly eighteen hundred uniformly mounted and framed examples in original wash-drawings, detail plans, photographs, prints, and lithographs, illustrating the evolution and development of the railway in every land where the locomotive whistle has been heard.

The interesting collection made by the Pennsylvania Railroad Company for the Exposition is also in the Museum, and it tells in a graphic and instructive manner the story of the progress of this great railroad corporation by series of models and originals. The Baldwin Locomotive Works contributed the full-sized working reproduction of the "Old Ironsides," the first of the Baldwin engines, and the Rogers Locomotive Works the full-sized working reproduction of the "Sandusky," the first Rogers engine. The Philadelphia & Reading Company contributed the "Rocket," the original No. One on that road; the Illinois Central Company the "Mississippi," the original first locomotive in the Gulf States: the Chicago & North-Western Company the "Pioneer," the original first locomotive west of Chicago, and the Mount Washington Railway the original engine, the "Peppersauce," the first mountain-climbing locomotive in the world. The World's Exposition, through the Chief of the Department of Transportation, pre-



PLAN OF HALL 53.

sented to the Museum the "Samson" and the "Albion," the original first and second locomotives in Nova Scotia, together with the original first passenger car in that country and the two original first cars drawn on rails by a locomotive in the world, those from the Merthyr Tydvil tram road in South Wales.

In each instance the engines—the originals and reproductions —stand upon either the original or an exact counterpart of the track of their period.

It is suggested that visitors inspect the Halls in the order in which they are described, as in this manner evolution and development may be followed chronologically. On each original engine, as well as upon each reproduction, will be found cards affording much historical information.

HALL 53.

No. 1.—Full size working reproduction of the "Newton," England, 1680; the first idea of propulsion by steam on land in history.

No. 2.—Full size working reproduction from the measurements and detailed drawings made from the original in the Conservatoire des Arts et Metries, Paris, of the "Cugnot," France, 1769; the first actual propulsion by steam on land in the world.

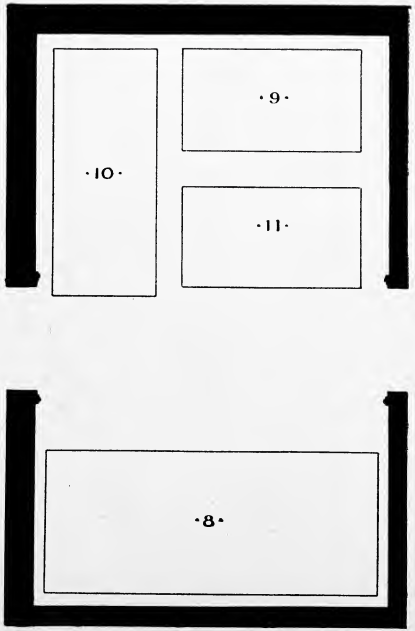
No. 3.—Full size working reproduction of the "Murdoch," England, 1784; first propulsion by steam on land in Great Britain."

No. 4.—Full size working reproduction of the "Read," America, 1790; the first idea of steam propulsion on land on the American continent.

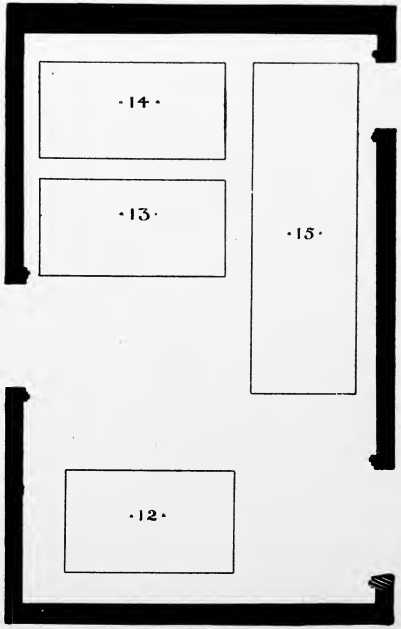
No. 5.—Full size working reproduction of the "Trevithick," England, 1800; the first effort of the father of the locomotive.

No. 6.—Full size working reproduction of the "Trevithick," England, 1804; the first locomotive on rails in the world.

Nos. 6A and B.—In connection with this are two of the first five cars drawn by a locomotive in the world, they having been attached to the "Trevithick" of 1804, on the "Mythyr Tydvil" tram road in South Wales. These are the original cars in their original form, standing upon the original rails, which in turn are upon the original stones laid on the South Wales tram road in 1800.



PLAN OF HALL 51.



PLAN OF HALL 52.

No. 7.—Full size working reproduction of the "Trevithick," 1808, the first locomotive on rails in England.

Upon the Walls, series of original large wash-drawings, indicative of the early stages of the evolution of the locomotive. Also, series of original drawings by Theodore Cooper, showing the evolution and development of the railroad bridge of the world. Also, series of bromides of scenes on railroads in foreign countries.

HALL 52.

No. 8.—Full size working reproduction of the "Evans," America, 1804; the first actual propulsion by steam on land on the American continent, and the first practical propulsion by steam on land in the world.

No. 9.—Full size working reproduction of the "Blenkensop," England, 1812; the first locomotive for actual commercial purposes in the world, it running on a rack road.

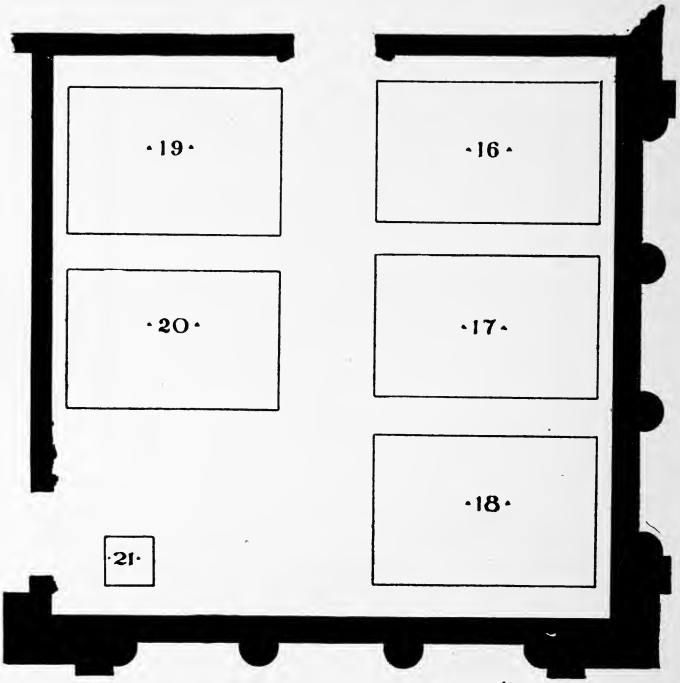
No. 10.—Full size working reproduction of the "Brunton," England, 1813; the horse-leg locomotive.

No. 11.—Full size working reproduction of the "Hedley" model, England, 1813, with which the first practical demonstration of the adhesion of smooth wheels to smooth rails was made.

On the Walls, continuation of the Theodore Cooper series of the evolution and development of the railroad bridge; also a continuation of the large wash-drawings showing the evolution of the locomotive. Likewise, a further series of bromides of railroad views in foreign countries.

HALL 51.

No. 12.—Full size working reproduction of the "Puffing Billy," England, 1813, built by Hedley immediately after demonstrating the adhesion of smooth wheels, this locomotive being thus constructed. The "Puffing Billy" is from the measurements and drawings made by the authorities of the South Kensington Museum in London, the original engine, the oldest in the world, being preserved in that institution.



PLAN OF HALL 50.

No. 13.—Full size working reproduction of the "Blucher," England, 1814; George Stephenson's first locomotive.

No. 14.—Full size working reproduction of the "Howard," America, 1828; the first locomotive patented in America.

No. 15.—Full size working reproduction of the "Seguin," France, 1827-28; the first locomotive in France, and the first locomotive in the world with a multi-tubular boiler.

Upon the Walls, concluding series of the Theodore Cooper drawings of the evolution and development of the railroad bridge. Also, series of large wash-drawings showing the evolution of the locomotive steam carriage period, and series of views illustrative of railroad operation in foreign countries.

HALL 50.

No. 16.—Full size working reproduction of the "Rocket," England, 1829; George Stephenson's successful locomotive in the Rainhill trial, the first locomotive contest in the world, the reproduction being from the original drawings.

No. 17.—Full size working reproduction of Timothy Hackworth's "Sans Pariel," England, 1829; the first locomotive constructed with steam blast, and also a competitor in the Rainhill trial, the reproduction being from the measurements and detail drawings furnished by the South Kensington Museum. The original engine is in that institution.

No. 18.—Full size working reproduction of Ericsson's "Novelty," England, 1829; the first tank locomotive, and also a competitor in the Rainhill trial.

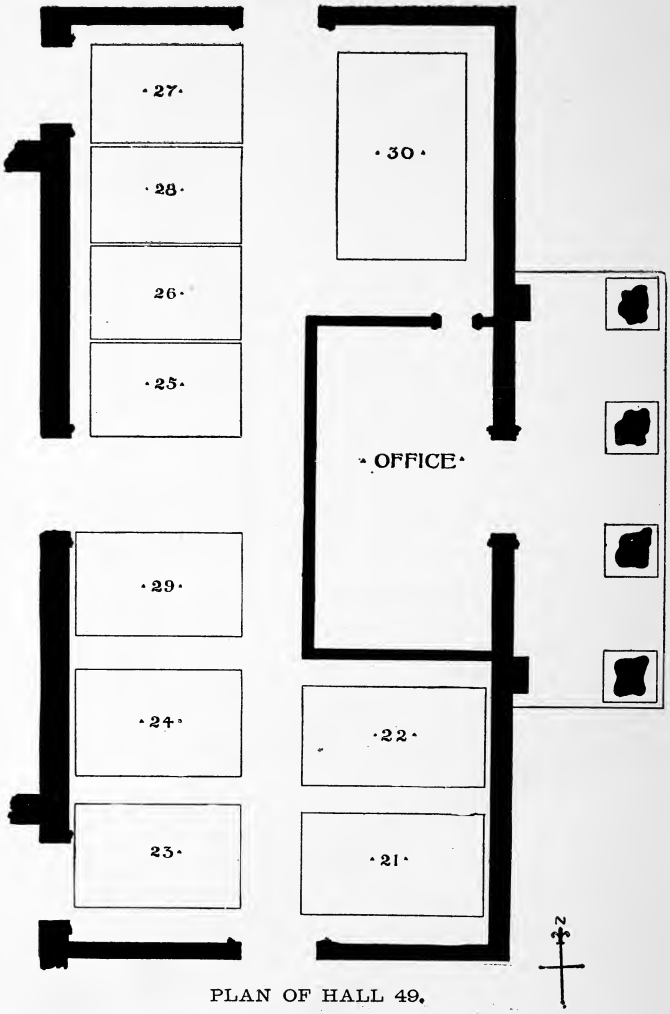
These three reproductions stand upon the stones, rails and chairs of the original track upon which the trial took place.

No. 19.—Full size working reproduction of the "Stourbridge Lion," England, 1829; the first locomotive seen in America, having been imported the year named.

No. 20.—Full size working reproduction of Peter Cooper's "Tom Thumb," America, 1829-30; the first locomotive built on the American continent.

No. 21.—Statue of George Stephenson.

Upon the Walls.—Continuation of the wash-drawings, showing the evolution of the locomotive of the world. Also continuation of the series of bromides, illustrating scenes on railroads in foreign countries, and a series of photographs showing modern bridges and railway appliances.



PLAN OF HALL 49.

HALL 49.

No. 21.—Full size working reproduction of the "Best Friend," America, 1830; the first locomotive built on the American continent for actual service.

No. 22.—Full size working reproduction of the "Mercury," England, 1830; George Stephenson's highest type of development, and the father of the standard English engine.

No. 23.—Full size working reproduction of the original "York," America, 1831; Phineas Davis' first locomotive.

No. 24.—Full size working reproduction of the "Johnson," America, 1831; the first locomotive with a double firebox.

No. 25.—Full size working reproduction of the "James," America, 1831; the first suggestion of the link motion.

No. 26.—Full size working reproduction of the "Costell," America, 1831; first locomotive with oscillating cylinders.

No. 27.—Full size working reproduction of the "Child," America, 1831; first rotary locomotive.

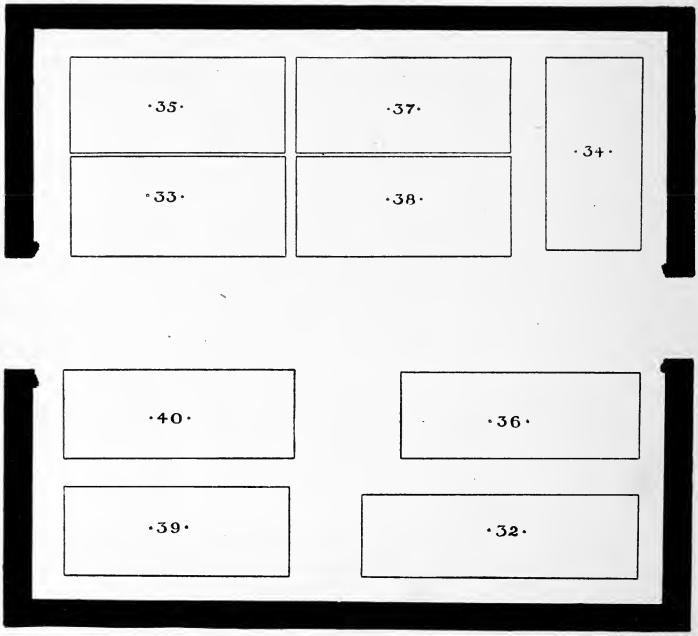
The five locomotives last mentioned were competitors in the Baltimore & Ohio locomotive competition or trial in 1831, the first event of this character on the American continent. The "York" was the winner.

No. 28.—Full size working reproduction of the "James," America, 1832; the first locomotive in the world with link motion.

No. 29.—Full size working reproduction of the remodeled "York," America, 1831; the first of the distinctively "Grasshopper" type.

No. 30.—Full size working reproduction of the "Old Ironsides," America, 1832; the first Baldwin locomotive.

On the Walls, photographs on canvas of Harper's Ferry, Buckhorn Wall, and Fairport; these photographic results being eight feet high and sixteen feet long. On the East, North and West walls of this room are a series of original drawings, lithographs, and photographs, illustrative of the development of the Baldwin locomotive from 1832 to 1893; on the walls in the Southern half of the room are a series of original drawings, lithographs and photographs, illustrating the progress as manufacturers of the Portland Locomotive Works, the New Jersey Locomotive Works and the Cooke Locomotive Works. Also series of maps showing the railroad occupation of the United States by decades from 1830 to 1890.



PLAN OF HALL 56.

HALL 56.

No. 32.—Full size working reproduction of the "South Carolina," America, 1832; the first double end locomotive in the world.

No. 33.—The "Atlantic," America, 1832; original engine, and the oldest locomotive in its original form on the American continent.

No. 34.—Full size working reproduction of the "Experiment," America, 1832; the first locomotive constructed in the world with the forward or "bogie" truck.

No. 35.—The "Traveller," America, 1833; original locomotive, and the first in the United States built expressly for freight purposes. This engine has a record of sixty years of actual service, a locomotive record without a parallel in history.

No. 36.—Full size working reproduction of the "Hercules," America, 1837; the first locomotive in the world with equalizing frame and levers.

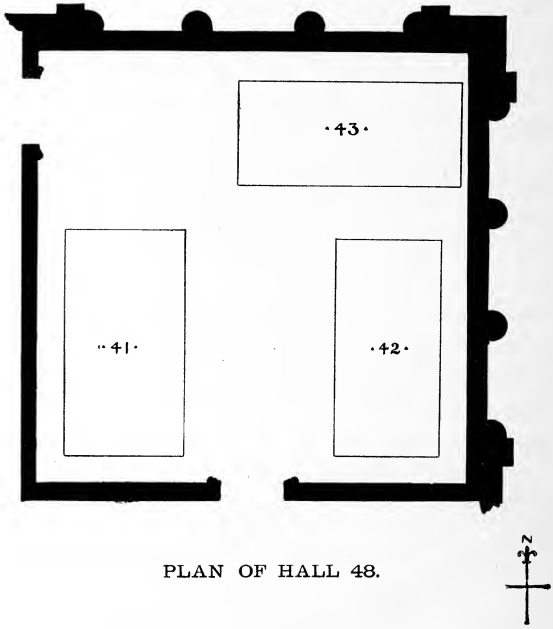
No. 37.—The "Thomas Jefferson," America, 1836; an original locomotive of the "Grasshopper" type, the first with cab for engineer and fireman, and the first Winans engine.

No. 38.—The "Mazeppa," America, 1837; original locomotive, and first of the "Crab" type.

No. 39.—Full size working reproduction of the "Campbell," America, 1836; the first or father of the American type of eight wheel passenger locomotive.

No. 40.—Full size working reproduction of the "La Fayette," America, 1837; the type of the first Norris locomotive with adhesion sufficient to surmount heavy grades.

On the Walls.—Photographs of the cities of Pittsburgh and Washington. A series of original wash-drawings, showing the development of the locomotives of the world and a series of bromides from direct photographs of English historical locomotives. Another series of drawings showing the evolution of locomotives and cars of the elevated railways. Also, a series of detail drawings of American and foreign locomotives.



PLAN OF HALL 48.

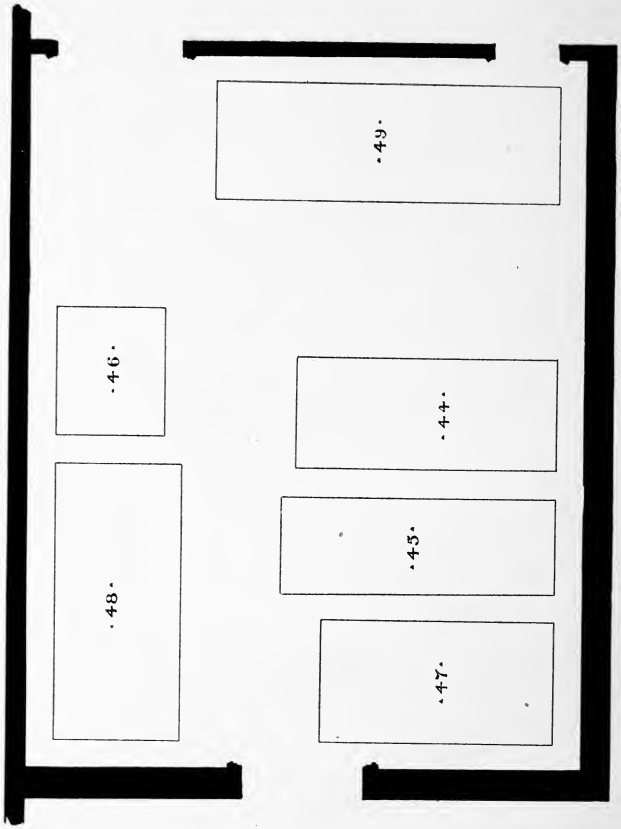
HALL 48.

No. 41.—Original locomotive, "Mississippi," built in England in 1834, imported to America in 1836, and the first locomotive in New Orleans, it standing upon a section of the original track.

No. 42.—Full size working reproduction of the "Sandusky," America, 1836; Rogers' first locomotive, and the first locomotive west of the Ohio River.

No. 43.—Original locomotive "Rocket," England, 1838; built by Braithwaite, London, and the first locomotive on the Philadelphia & Reading Railroad. , Old "Number One."

Upon the Walls.—Original drawings, specifications, lithographs, and photographs, showing the development of the Rogers' locomotive; also a series of large wash-drawings, showing the development of the locomotive of the world. Also, series of photographs of railway appliances.



PLAN OF HALLS 46 AND 47.

DOUBLE HALL 46 AND 47.

No. 44.—Original engine "Samson," England, 1838; built by Timothy Hackworth, and the first locomotive in Nova Scotia.

No. 45.—Original engine "Albion," England, 1839; built by Hackworth, and the second locomotive in Nova Scotia.

No. 46.—Original passenger car, England, 1831; sent with the "Samson" to Nova Scotia, the year named, and probably the oldest coach in its original form in existence.

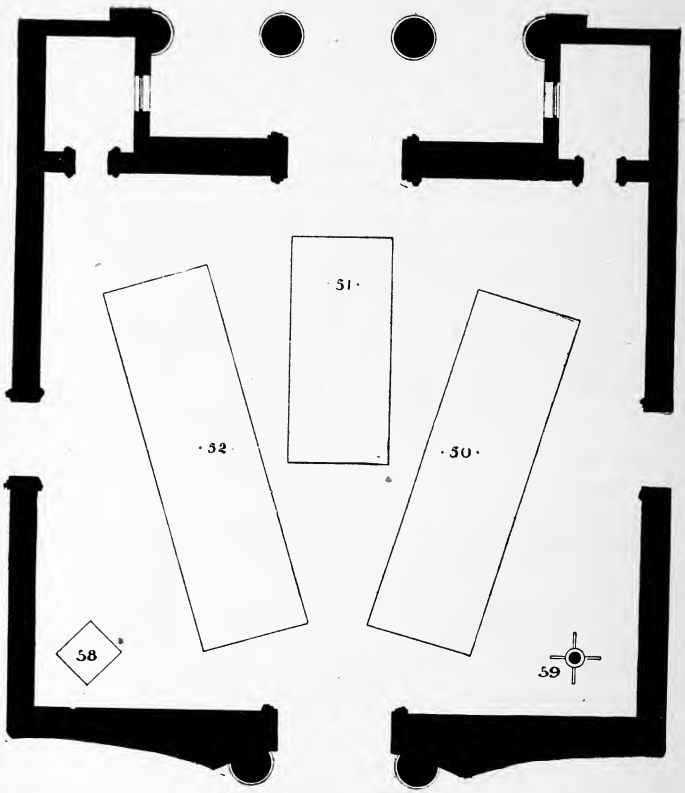
No. 47.—Full size working reproduction of the "Buffalo," America, 1844; the first locomotive in the world with 8 wheels coupled.

No. 48.—Full size working reproduction of the "Mount Clare," America, 1844; first locomotive built by the Baltimore & Ohio Railroad at its own shops, and the heaviest locomotive of its time.

No. 49.—Full size working reproduction of the "Camel," America, 1848; the first of the heavy freight locomotives in America.

49½. Collection of railroad wood cross-ties, from all parts of the world, includes such wood as mahogany, iron bark, yellow wood, and red wood, some of which have been in service twenty-seven years, and are still serviceable.

Upon the Walls, large wash-drawings, showing the development of the locomotives of the world. Also, series of bromides of railroad scenes in remote countries. Also, series illustrating the development of railroad appliances. Another series of wash-drawings, showing the development of permanent way. Also, relief map of the United States, showing the railroad lines and principal transportation lines of the sea coast and great lakes.



PLAN OF HALL 45.

HALL 45.

No. 50.—Original locomotive "Dragon," America, 1848; the first with rocking grate and the oldest Baldwin engine now existing.

No. 51.—Original locomotive "Pioneer," America, 1848; the first in Chicago.

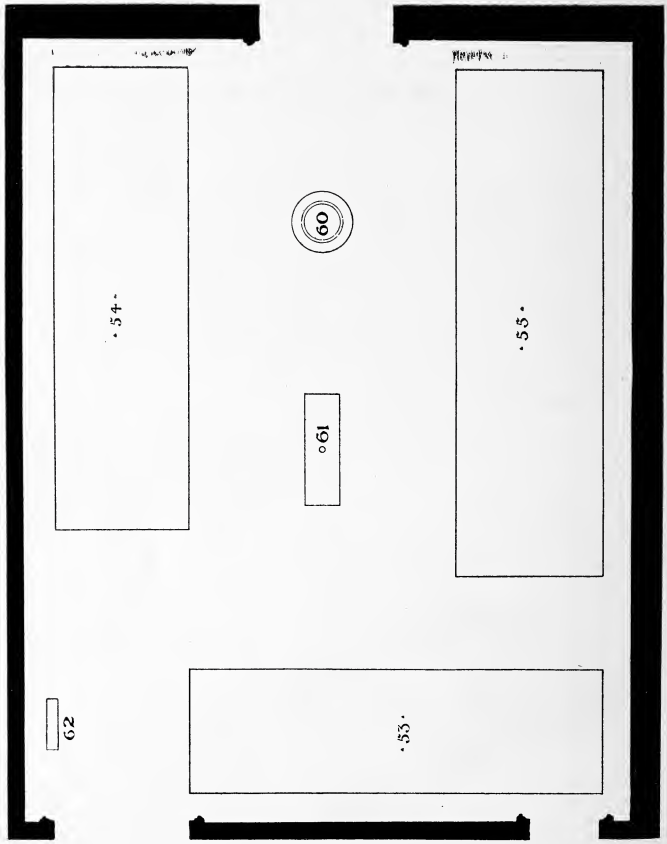
No. 52.—Original locomotive "Mason," America, 1860; one of the earliest of the distinctive American model passenger engines.

No. 58.—Iron picture stand, containing photographs of railway car and appliances, by German manufacturers.

No. 59.—Statue of James Watt.

Upon the Walls.—The Westinghouse series of large original drawings, showing the evolution and development of the railway brake of the world. Another series shows the development of the Pullman sleeping car, and the Wagner sleeping car.

Series of original wash-drawings illustrating the evolution and development of permanent way, and photographs showing interior and exterior views of the royal trains of the world.



PLAN OF HALLS 43 AND 44.

HALLS 43 AND 44.

No. 53.—Original ten-wheel "Camel," locomotive, America, 1852; the first of this type of heavy engines.

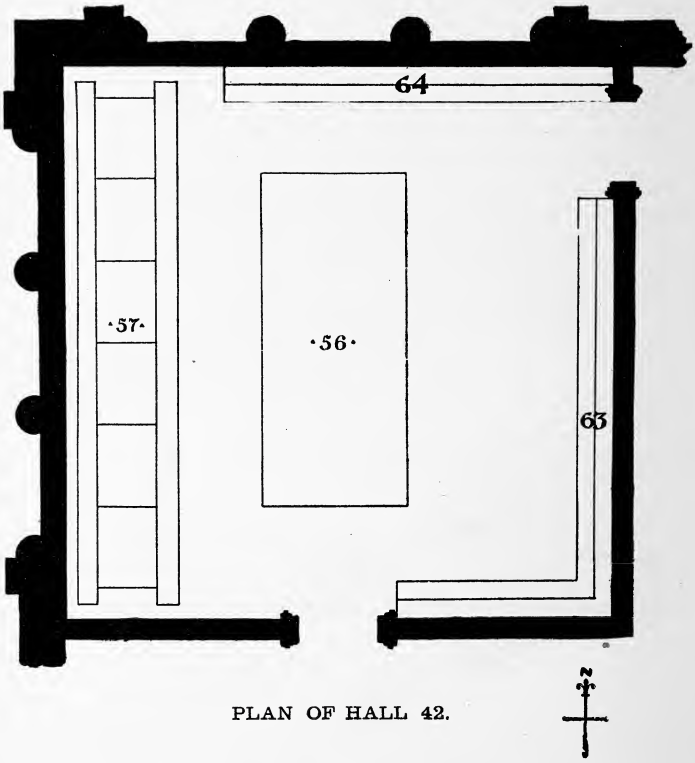
No. 54.—Original locomotive, "Perkins," America, 1862; the first of the special type for climbing the heavy grade of the Allegheny Mountains.

No. 55.—Original locomotive No. "600," America, 1876; the first passenger mogul. This engine took an award at the Centennial Exposition, Philadelphia.

No. 60.—Original first chilled steel locomotive tires made in the world.

No. 61.—Collection of modern railway appliances and permanent way from different parts of Europe and America.

On the Walls.—Series of large original wash-drawings, showing the modern compound locomotives of the world. Series of original drawings and lithographs of historical engines, cars and appliances. Series illustrating development of the leading foreign manufactures of locomotives, cars and appliances. Series furnished by the German government, indicating the development of German motive power and equipment. The "West" series complete, consisting of fourteen plates, showing, in detail, the evolution and development of the English locomotive.



PLAN OF HALL 42.

HALL 42.

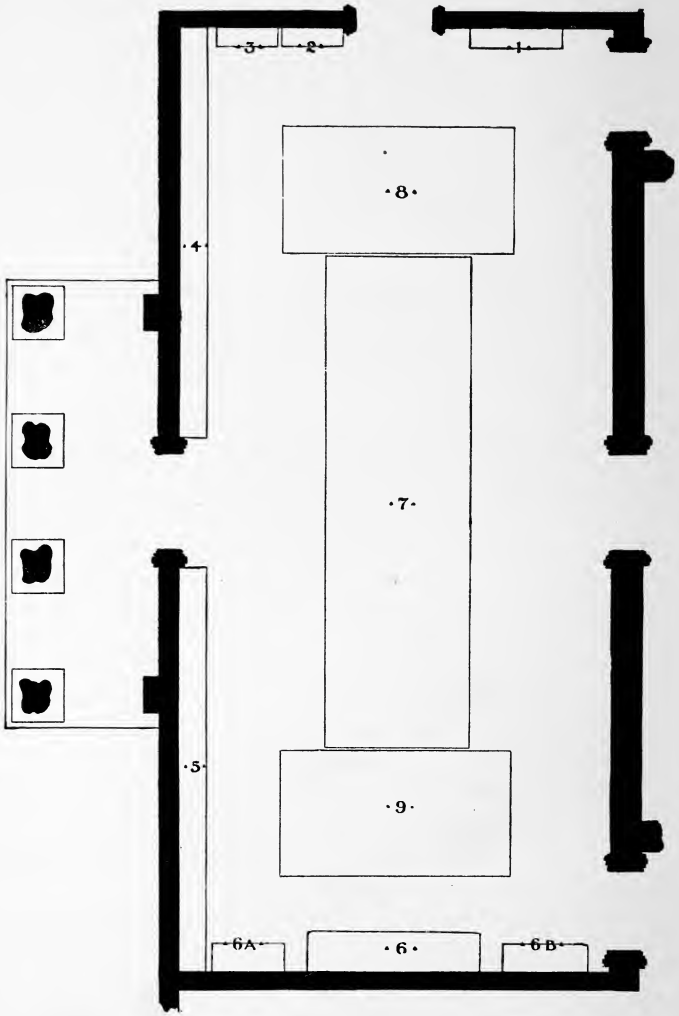
No. 56.—Original locomotive "Peppersauce," America, 1864; the first mountain-climbing locomotive in the world, standing on a section of the original track.

No. 57.—The original first iron railroad bridge ever erected on the American continent, it being substituted in 1839 for the wooden trestle-work on a crossing near Laurel, on the Baltimore & Ohio line between Baltimore and Washington.

No. 63.—On platform. Collection of modern railway appliances, permanent way, from Europe and America.

No. 64.—On shelves. Original cast iron tram rails, from Merthyr Tydfil Tram Road, South Wales, 1800. Cast iron edge rails, with frog, England, 1810. Loughborough edge rails, England, 1820. Old English plate rails, 1822. Original rails and chairs of Liverpool & Manchester Railway, England, on which the first locomotive competition in the world took place, 1829.

On the Walls.—Series of large, original wash-drawings, showing modern compound locomotives of the world. Series of original drawings, showing the development of American railway passenger and freight cars, by the Harlan & Hollingsworth Co. Series of photographs of drawing-room, sleeping and dining cars. Series of photographs and lithographs of railways throughout the world.



PLAN OF HALL 41.

HALL 41.

Cases 1, 2, and 3.—Containing samples of material tested by department of chemical and physical tests of the Pennsylvania Railroad Company.

Case 4.—Relics of early railroad days—lanterns, headlights, pieces of track, etc., etc.

Case 5.—Models showing early train signal and early block signals, together with rails, section of track system, switches, and frogs.

No. 6.—The original Saxby and Farmer interlocking switch. This is the earliest successful switch ever used in America.

Stand 6A.—Relics of early rail joints, car springs, etc., etc.

Stand 6B.—Relics of early track appliances, etc., etc.

No. 7.—Original Camden & Amboy car, 1836, standing on the original block stone and the original rail of that period.

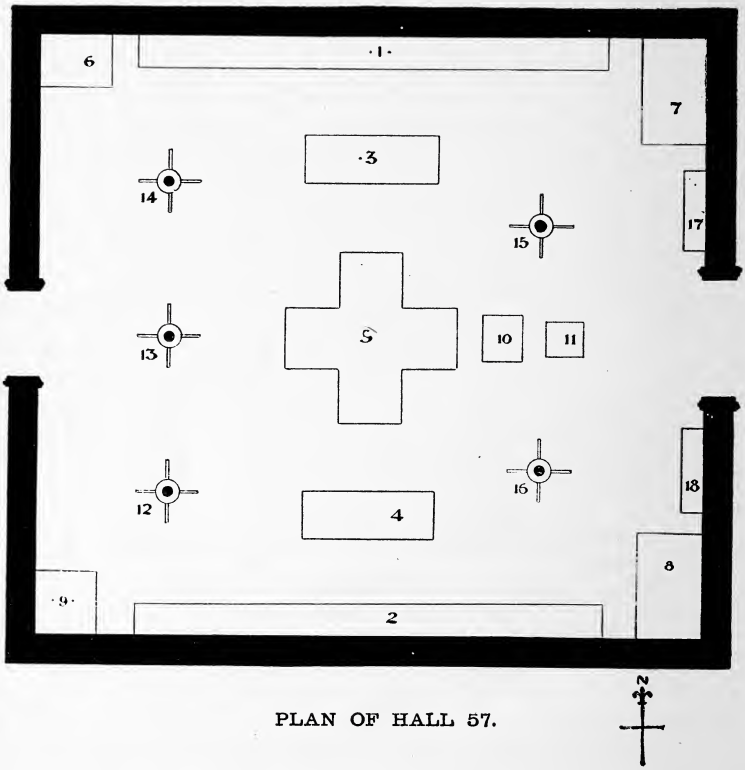
No. 8.—An original section of early wooden stringer and strap-rail construction, together with one of the original driving wheels of the "John Bull" locomotive, 1831, and wooden switch lever, with signal and cross, 1835; also a pair of cast iron wheels on axle, passenger equipment, 1846, and specimens of early railroad track.

No. 9A.—Section of original "T"-rail track, laid on original stone block and ties, Old Portage Railway.

Nos. 9B and 9C.—Two pair Camden & Amboy wooden passenger car wheels, 1848.

No. 9D.—Freight car wheel, with split-hub keyed to the axle. On the east side of the car are old rails, etc. On the west side are models of early railroad appliances.

No. 9 E.—Collections of small sections of original rails from Amboy Div. Pennsylvania R. R. showing the development of the rail from 1831 to 1893.



PLAN OF HALL 57.

HALL 57.

Case 1.—Models of the original "John Bull" and train, 1831. Model of the locomotive "John Stevens," 1825. Model of the locomotive "George Washington," the first locomotive to climb a heavy grade, built by Wm. Norris & Co., 1838. Model of the locomotive "Herald," the first on the Baltimore & Susquehanna Railroad, 1831. Model of the locomotive "Lancaster" and train, built by Baldwin, 1834. Model of passenger car "Victory," 1834. Model of ambulance car used during the war, 1862. Models of passenger and baggage cars Camden & Amboy Railroad, 1850. Model of car on Portage Railroad, 1835. Model of old car used between Rahway and Newark, 1833. Model of passenger car on Portage Railroad, 1834. Series of models showing the sectional canal boats transported on railroad trucks, 1839-1850. Model of machinery of Plane No. 7, Old Portage Railroad, 1835. Model of "Conestoga" wagon. Model of old stage coach, 1825.

Case 2.—Early publications and documents. Models of cars on J., M. & I. Road. Models showing modern freight cars for coal. Model of Madison plane, and rack-rail locomotive used on it, 1850. Models showing modern rail, steam lighters, methods of unloading iron ore from vessels to rail, etc., etc. Statistical model showing the Pennsylvania Railroad system. Original of largest check ever drawn in an American railroad transaction.

Case 3.—Model showing the transfer of entire freight trains, New York Harbor.

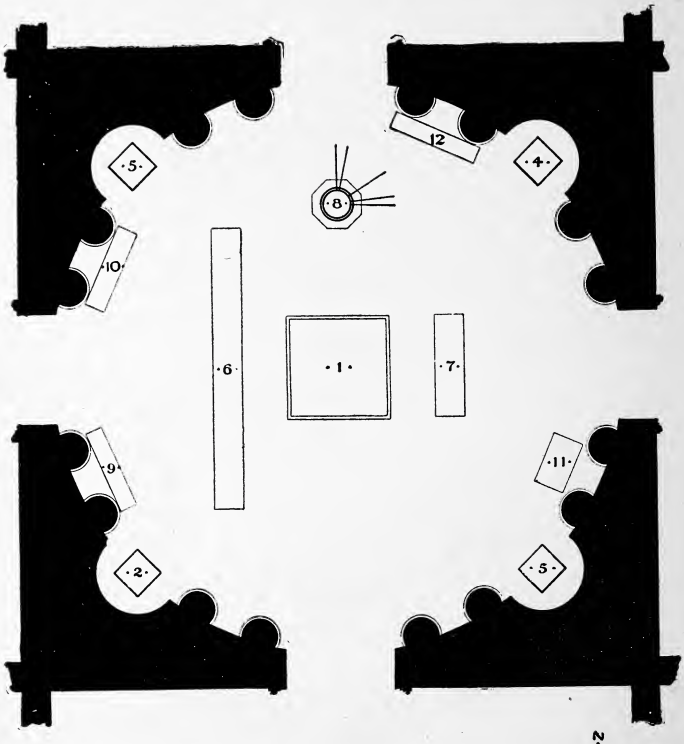
Case 4.—Large model of the ferry-boat "Washington," running between Jersey City and New York.

No. 5.—Large model showing the rail crossings of the Alleghenies in the territory on which was located the Old Portage Road of 1832-1852, the New Portage Road of 1853, and the modern system of 1892.

Case 6.—Model of standard safety underground tunnel for passengers

Case 7.—Relief map of Philadelphia terminals.

Case 8.—Relief map of Jersey City terminals.



PLAN OF HALL 58.

No. 9.—Model of monument erected at Bordentown to commemorate first movement of steam in New Jersey.

Case 10.—Large globe model showing traffic of the Pennsylvania Railroad system.

No. 11.—Statue of J. Edgar Thompson, former president of the Pennsylvania Railroad.

Nos. 12, 13, 14, 15, 16.—Standards holding frames containing photographs of locomotives of the different types used on the Pennsylvania Railroad from its inception; also a series of maps showing the development of the Pennsylvania Railroad by decades. A series of views of the disastrous floods at Johnstown, Pa., and the great riot at Pittsburgh, Pa., 1877, including a series of views covering the whole line of the Pennsylvania Railroad system. On the west wall, models of seals of corporations and chart of organization and badges of employes of the Pennsylvania Railroad Company. On the north wall is a large chart illustrating all trains in motion on the whole of the Pennsylvania Railroad system, at 6 o'clock, P. M. Columbus time, each day.

EAST DOME.

No. 1.—Beneath the center of the dome a group of statuary, typical of the railroads.

No. 2.—Statue of Thomas A. Scott, a former president of the Pennsylvania Railroad Company.

No. 3.—Statue of Cornelius Vanderbilt.

No. 4.—Statue of John W. Garrett, a former president of the Baltimore & Ohio Railroad.

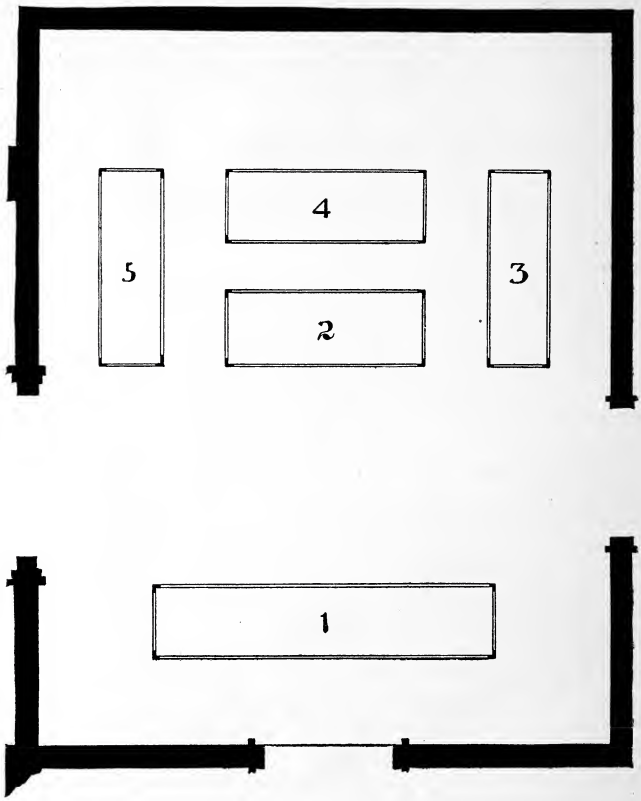
No. 5.—Statue of an old-time brakeman.

No. 6.—Large working model of the Consolidated Car Heating Company's system of heating cars.

No. 7.—Model of pontoon railway bridge across the Mississippi River at Prairie du Chien, Wisconsin.

No. 8.—Picture standard, containing views of Prussian railways and stations.

Nos. 9, 10, 11 and 12.—Models of early railway bridges planned and constructed by Benjamin H. Latrobe.



PLAN OF HALL 1.

DEPARTMENT OF MONOGRAPHIC COLLECTIONS.

The collections in this Department are isolated for purposes of convenience. At present it comprises two divisions viz., Musical Instruments and Printing and Graphic Arts.

HALL 1.

MUSICAL INSTRUMENTS.

The collection in this Hall consists of musical instruments from Java and India, also a series of reproductions of antique instruments.

Case 1.—Contains several sarons of various sizes. The saron is a musical instrument used to a great extent in a Javanese orchestra. It consists of a number of bronze bars of about two inches wide and six inches long, of graduated thickness, placed side by side across an elaborately carved and painted base and which are loosely held in position by means of metal pins. The saron is played upon by a small wooden mallet.

The bonang.—A set of seven kettle-shaped gongs of various tones, resting on rattan strips fastened to a carved and painted low stand and which is also a Javanese musical instrument. The player sits cross-legged upon the ground and plays the bonang by means of a padded stick.

The soeling, a bamboo whistle, which is the only wind instrument used in a Javanese orchestra.

There are also in this case, drums from Java and India.

Case 2.—Is devoted to Javanese musical instruments, these being four single gong bonangs; two very large deep sounding gongs suspended from a rack, which are played by a stick having at one end a large ball of rubber; and a rehab, a two-stringed violin played by the leader of a Javanese orchestra, with a bow of loose stretched horse-hair.

Case 3.—An eighteen bronze-barred saron of a very wide register. A seventeen wooden-barred saron. Two gendangs—a small drum, forming a part of a Javanese orchestra. The bânya, dholaka, tabla, midranga or drums of East India.

Case 4.—An interesting collection of twenty wind and stringed musical instruments from India, consisting of the mahat vina, which is constructed of two gourds, connecting a horizontal rod of bamboo, upon which are stretched seven wires of various thickness, these being tuned by an ordinary key similar to the guitar or banjo key, but somewhat larger; the mayuri which has eighteen fine wire strings; the kachapi vina is another stringed instrument; likewise the ektara, which has but one string. Other very peculiar instruments in this case are the chikara, the sanyogi and the surangi, each of which have two sets of strings, one of catgut strung over a bridge, and directly above a set of brass wires which run through holes in the bridge.

The wind instruments are chiefly the rana sringa, the puni and the benu.

Case 5.—Reproductions of antique forms of musical instruments, such as the Elizabethian lute; the rebec, an Arabian stringed instrument; the crwth which is a Welsh instrument said to be the oldest known stringed instrument; guitar (Antonius Stradivarius); the quinterna, an antique form of an Italian guitar, the xylophone, and a harp of Irish form. This collection was presented by Lyon & Healy.

ALCOVE 117.

Case 47.—Piano made about 1820 by John Tallman and arranged in six octaves.

Case 48.—An Italian musical instrument known as a calderarpa, which is a combination of the piano key-board with the string arrangement of a harp.

Case 49.—First full-cast iron plate frame piano. Invented in 1832 by Meyer of Philadelphia.

PRINTING AND GRAPHIC ARTS.

The purpose of these collections is to show the history, the evolution and the practical processes of the arts employed in printing and illustration. The subjects are treated from the modern point of view, that is to say, as technical processes of the useful and fine arts of today. Their origin as practical arts dates back to the fourteenth century, previous to which time they are purely of archeologic interest. The historical specimens, therefore, begin for the most part at the mediaeval period, when these arts commenced to be factors in civilization.

ALCOVE 118.

TYPOGRAPHY.

This alcove is devoted to collections illustrating the development of typography, printing presses, and accessories of printing.

South Wall.—A series of pictures of the early printers, Gutenberg, Coster, Aldus, Caxton and others. Also samples of fine printing, contributed by the Imperial German Printing Office, Berlin.

Case 50.—Old Ramage printing press. This is like the press preserved in the Smithsonian Institution, used by Benjamin Franklin. It is the original pattern of the Washington hand press of today, and was used by the Confederate States Government in Columbia, South Carolina, during the war, to print Confederate money. It has been in actual use for the past fifty years for printing a newspaper. The bed takes two pages of a five-column paper, but requires two impressions to print it. The frame is of wood and an iron impression screw is used instead of a lever. Contributed by Barnhart Bros. & Spindler, Chicago.

Case 51.—Comparative collection of writings and books of various nations; ancient and modern.

Cases 52 to 54.—Collection of old and modern books illustrating the work of the renowned printers of the 15th century and affording a comparison with the product of the modern publisher. Above Case 52 is a frame of wood type of many artistic patterns, contributed by the Hamilton Manufacturing Company.

ALCOVE 119.

GRAPHIC ARTS.

This alcove contains the nucleus of the Graphic Arts collections. The specimens are arranged under these heads.

A. Relief processes: Wood engraving.

B. Intaglio processes: Graver work, dry point, etching, mezzotint, stipple, etc.

C. Planographic processes: Lithography, autography, etc.

D. Substitute process. Combinations of the above methods.

E. Photo-mechanical processes. All of the applications of photography to printing.

South Wall.—Wood cuts, line engravings, etchings, etc.

Case 55.—Tools and appliances used by the artist and artisan in the production of the first four classes of processes mentioned above. Specimens illustrative of wood engraving contributed by Harper Bros., New York; exhibit of the steel engraving processes by Western Bank Note Co. of Chicago; and of lithographing by P. F. Pettibone & Co. and employees, Chicago; etching plates and tools loaned by Dr. C. F. Millspaugh. Set of wood blocks and of tools used by the Japanese in making color prints.

No. 57.—Frames containing a set of progressive proofs illustrating the printing of a chromo-lithograph. Further illustrations of this process are being prepared by Prang & Co., Boston.

West Wall.—Collection of prints illustrating the history and development of photography. Prepared by the Section of Photography of the Museum.

Case 56.—Specimens exhibiting the technique of the photo-mechanical methods; halftone, zinc etching, collotype, etc. Contributed by the Chicago Photogravure Co. and the Binner Engraving Co., Chicago.

North Wall.—Results from photo-mechanical processes.

ALCOVE 120.

BOOKBINDING.

A collection illustrating the bookbinders' art by P. Ringer & Co., Chicago.

LIBRARY DEPARTMENT.

HALLS 28, 29 AND 34.

The Library Department comprises the Library (Hall 29); the Reading Room (Hall 28), and the Lecture Hall (Hall 34) and is in charge of the Recorder and Librarian, who also keeps the records of specimens entering or leaving the Museum. The Library is designed for reference purposes only. It contains many valuable scientific and technical works which may be consulted by the general public. It is primarily for Curators and for those desiring to pursue special study or investigation on subjects treated in the Museum. A prominent feature of this Department is the lectures upon various scientific topics of interest and importance given in the Lecture Hall.

HALLS 28 AND 29.

LIBRARY AND READING ROOM.

The collection of books and pamphlets on the shelves numbers over 11,000. It includes:

The Kunz collection of works on minerals, gems, and semi-precious stones, and containing many rare tomes on these subjects, in Latin, dating back to the 15th and 16th Centuries.

The Baltimore and Ohio collection, treating of the origin and early development of railways and their equipment.

The special library of the Department of Ethnology of the Exposition, formed by contributions to that Department from the

authors themselves. A wide range of subjects is covered, and the Library is probably one of the best of its kind in this comparatively new science.

The Skiff collection, containing many valuable books of reference on minerals, mining and metallurgy. (This collection has been placed in the Departmental Library of the Department of Geology, West Annex.)

The special library of the Department of Mines, Mining and Metallurgy of the World's Columbian Exposition, gathered for exhibition in the Mining Building by the Chief of that Department. Includes sets of periodicals bearing on these subjects, and complete sets of geological publications issued by the Government.

The collection of Russian works on forestry, presented by the Imperial Russian Commission to the World's Columbian Exposition.

The ornithological library purchased of C. B. Cory and containing the proceedings and transactions of the leading ornithological and zoological societies and the rare and standard reference books of the working ornithologist.

Upon the cases are the busts of the eminent scientists and naturalists: Geoffry St. Hilaire, Galileo, Esculapius, Columbus, Cuvier, Agassiz, Humboldt, Huxley, Buffon, Hippocrates, Darwin and Linneus.

Departmental Libraries have been established in several departments of the Museum for working use by Curators.

The Rules give information as to the privileges of the General Library:

LIBRARY RULES:

1. The Library will be open every day during the hours the Museum is open to the public.

2. The Library is entirely a library of reference. The books are to be used in the reading rooms and not taken from them under any circumstances, excepting by the Curators and Assistants for use in Departmental Libraries.

3. Books may be obtained by filling out the application slip and presenting it at the desk. Before leaving the room the borrower will return the book or periodical to the desk.

4. Current periodicals may be consulted only in the Reading Room and are not to be taken from the room.

5. Any book or periodical drawn from the General Library for Departmental Libraries, and required for immediate reference, will be sent for upon application to the Librarian, and temporarily returned to the General Library.

6. A set of encyclopedias, dictionaries and other general works of reference will be permanently retained in the General Library.

In the Reading Room will be found the reading tables, which are supplied with current magazines and periodicals pertaining more particularly to scientific, technical and kindred subjects.

HALL 34.

LECTURE HALL.

This is reserved for all public meetings, lectures, etc., held in the Museum. Courses of lectures on scientific and technical subjects are here given on Saturday afternoons of March and April, and October and November by specialists acquainted with the results of the latest research. The lectures are usually illustrated with stereopticon views.

Five lecture courses have thus far been given. The following lectures were delivered in the last course:

FIFTH LECTURE COURSE.

March 7—"The History of Coins."
Mr. Sigmund Krausz, Chicago.

" 14—"Mining in the Middle Ages."
Mr. H. W. Nichols,
Curator of Economic Geology, Field Columbian Museum.

" 21—"How Plants Travel."
Dr. C. F. Millspaugh,
Curator of Botany, Field Columbian Museum.

March 28—"The Oldest Known Bird."
Dr. O. P. Hay,
Assistant Curator of Ichthyology Field Columbian Museum.

April 4—"Masterpieces of American Art."
Prof. W. H. Holmes,
Curator of Anthropology, Field Columbian Museum

" 11—"The Evolution of Transportation."
Mr. Willard A. Smith,
Hon. Curator Dep't Industrial Arts, Field Columbian Museum.

" 18—"The Illustration of Books."
Mr. Edward L. Burchard,
Librarian, Field Columbian Museum.

" 25—"Caricature."
Prof. John H. Finley,
President, Knox College.

The semi-circular mural paintings on the sides of the room possess an intrinsic and historical value. The one on the north wall—a scene in Homeric Greece—is by Mr. F. D. Millet; the other illustrates a typical industry, that of pottery, and is by L. K. Earle. These paintings adorned the ceiling of the corner pavilions to the Manufactures Building, and were contributed by the Exposition to the Museum. On the west wall is a large equestrian picture of General Winfield Scott, while opposite it is one of General John A. Logan—the former loaned by Robt. McMurdy, the latter by the Chicago Veteran Club. In the corners of the Hall are placed a heroic bust of Washington, presented by Susse Freres of Paris; a life-size statue of Edwin M. Stanton, Secretary of War in the Lincoln Cabinet; and the stooping figure of a fawn—a fragment of a fountain—by R. P. Bringhurst of St. Louis.

THE OFFICES OF THE MUSEUM.

THE EXECUTIVE COMMITTEE—Southwest corner of South Court.
THE DIRECTOR—Southeast corner of South Court.
THE DEPARTMENT CURATORS:
ANTHROPOLOGY—Northeast corner of North Court.
PHYSICAL ANTHROPOLOGY—First Gallery of East Court.
BOTANY—Second Gallery of North Court.
GEOLOGY—Southwest corner of West Annex.
ZOOLOGY—Second Gallery of South Court.
ORNITHOLOGY—Second Gallery of South Court.
INDUSTRIAL ARTS—East Annex.
THE RECORDER AND LIBRARIAN—Northwest corner of North Court.
THE SUPERINTENDENT OF THE BUILDING—Southwest corner of South Court.
THE ACCOUNTANT—Southeast corner of South Court.