THE MINERALOGICAL COLLECTIONS IN THE U. S. NATIONAL MUSEUM.

BY

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A mineral collection in a public museum should present all of the definite varieties of minerals occurring ready formed in nature, their associations with other minerals, their occurrences, and finally their chemical, morphological, and other physical features. It must meet the needs of the chemist, the crystallographer, the physicist, the geologist, the petrographer, the student, and the observer who may desire to obtain concise and specific information in any and all branches of mineralogy, and finally it should be a university extension of the broadest kind where one may secure a knowledge of minerals from the cases with as little reference to the library as possible.

With these ends in view the mineralogical collections of the National Museum are divided into three general series—the exhibition series, the study series, and the duplicate series. The first of these, the exhibition series, is primarily intended for the public and the student. It is divided into two parts—the systematic series and the comparative series.

THE SYSTEMATIC SERIES.

The systematic series treats of the properties of minerals in their relations to the several kinds of minerals, and the description and systematic arrangement of the several species. Here will be found the several representatives of the mineral kingdom, selected to illustrate occurrence, association, color, and typical development. Here too are to be found the rough and cut specimens of gems and ornamental stones, the collection of meteoric bodies, and the "special locality" collections illustrating certain regions in the United States where a mineral or a series of minerals occur under noteworthy or special conditions.

GENERAL ARRANGEMENT.

The systematic series is divided into two general classes—native elements and compounds of the elements. The compounds of the elements are further divided and grouped under certain heads according to, and which take their names from, their more negative constituents as follows: Compounds of the halogens, fluorides, chlorides, bromides, and iodides. Compounds of sulphur, selenium, and tellurium; also arsenic and antimony, including sulphides, selenides, and tellurides; arsenides, antimonides, sulpharsenides, and sulphantimonides; also sulphosalts. Oxygen compounds, including oxides and the oxygen salts, borates, aluminates, ferrites, chromites, manganites, uranates, carbonates, silicates, titanates, columbates, tantalates, nitrates, vanadates, phosphates, arsenates, antimonates, sulphates, chromates, tellurates, molybdates, and tungstates. Compounds of organic origin, including salts of organic acids and hydrocarbon compounds.

Each of these classes is further separated into groups, the minerals included in any one group being such as are related in the minor details of chemical composition and physical properties. Each of these groups is preceded by a general group label giving the class to which it belongs, the group name, the minerals composing that group together with their chemical composition, system of crystallization, and a short description of the occurrence, association, and characteristic form of each member of the group. The following label will serve to give a clearer idea of this arrangement:

TUNGSTATES.

Wolframite Group.

Wolframite,	$(Fe,Mn)WO_4$	Monoclinic.
Hübnerite,	$MnWO_4$	Monoclinic.

Wolframite.—Chiefly ferrous tungstate, with some manganese. It occurs in irregular lamellar, coarse divergent columnar, and granular masses, and in crystals, commonly tabular. Color and streak nearly black. Wolframite is often associated with tin ores, and with quartz carrying bismuth, scheelite, pyrite, galena, sphalerite, etc.

Hübnerite.—Chiefly manganese tungstate, with some iron. It occurs in bladed forms and massive in quartz, and with alabandite, rhodonite, scheelite, fluorite, and apatite. Color brownish red, hair brown to nearly black. Streak yellowish brown.

Following the group label, arranged in order from left to right, are the several members of the group, selected to illustrate as completely as possible their occurrences, associations, and variety in form and color. Each specimen is mounted upon a block, in front of which is a small label giving the name of the species, the minerals associated with it in that particular specimen, if any, its locality, catalogue number, and from whom and how received.

The several groups are placed in regular order in the cases, and each case carries a case label giving the name of the class to which its contents are referred. In the upper left-hand corner of each case is a numeral followed by an arrow, which serves to indicate the sequence

in which the cases are to be studied, and also to facilitate reference to the text of a descriptive catalogue soon to be printed.

The arrangement of the "special collections" is essentially the same, except that in place of the group label there is a general descriptive label applying to the entire case, as follows:

ZINC MINERALS OF NEW JERSEY.

Ores of zinc in workable quantities are found in New Jersey, at Franklin and vicinity, Sussex County. The region is unique in that the deposit consists almost entirely of a mixture of the oxides and anhydrous silicates of zinc. The ore deposits are in beds or veins that are conformable with the stratification of the rocks in which they are embedded; they pitch to the northeast, they dip to the southeast, and they lie in a fold. The zinc minerals occur in the gangue rock associated with a variety of limestone carrying manganese, and with a manganese garnet. The run of the mine is usually a mixture of franklinite, willemite, and zincite.

Franklinite is iron black in color, having a metallic luster, a hardness varying from 5.5 to 6.5, and a specific gravity of 5. It is slightly magnetic, crystallizes in regular octahedrons, and is also massive, granular to compact. It has the chemical composition $ZnFe_2O_4$.

Willemite varies in color from apple green, flesh red, to manganese brown. Its hardness is 5.5, specific gravity 4. It is rarely crystallized, occurring usually in disseminated grains or masses. It has the chemical composition Zn_2SiO_4.

Zincite is of a dark red color, occurring usually foliated massive, or in coarse particles or grains, sometimes having a granular structure. Its hardness is about 4, and it varies in specific gravity from 5.3 to 5.7. It has the chemical composition ZnO.

THE COMPARATIVE SERIES.

The comparative series treats of the several characteristics or properties of any one mineral species as applied to all other mineral species. This series is intended primarily for the student of mineralogy. Here the properties of minerals are illustrated and defined. In each case the label containing a definition of the property under consideration precedes a series of specimens, and, wherever they can be used advantageously, a series of models illustrating that property. One example, that of "composition", will serve to illustrate the methods used in this series:

COMPOSITION.

All minerals are composed of either an element alone or two or more elements in combination. Elements are said to combine when on bringing them together a new substance is produced, differing from and possessing properties which, as a rule, are not the mean of those of its constituents. For example, the gases hydrogen and oxygen under the proper conditions combine to form water—a liquid. These combinations are represented symbolically by the juxtaposition of the symbols of the combining elements. Thus a molecule of water, composed of two atoms of hydrogen and one of oxygen, is represented by the symbol H_2O. The multiplication of a group of atoms is denoted by placing the proper numeral to the left of the group of symbols or by inclosing them in brackets and placing a small numeral at the right; thus $3H_2O$ or $(H_2O)_3$ denotes three molecules of water. The combination of groups is expressed by placing their symbols in juxtaposition with a dot between them; thus $Fe_2O_3.H_2O$ denotes a compound of oxide of iron with water. Sometimes a comma or the sign -|- is used in place of the dot. Further, the letter R is used to denote a varying group of equivalent elements; thus RCb_2O_8 is a compound in which there is a varying amount of the equivalent or isomorphic elements of the rare earths.

Following this label is a series of six typical elements with some of their native combinations. Each specimen is mounted on a block as in the systematic series, in front of which is a small label giving the name, composition, locality, etc., of the individual.

THE STUDY SERIES.

This series contains all that material which appeals exclusively to the specialist. It is the source of the material from which new exhibition series are built, or old ones strengthened. In it is placed all that material which has been the source of investigations, or which it is thought may be made the subject of research. It contains all those specimens which serve to illustrate the occurrence and associations of a mineral in any one locality that are not needed for the exhibition series, or which are not unnecessary duplications of material already on hand.

Each specimen in this series is numbered, labeled, and placed in a paper tray. The several specimens are then arranged geographically by species: the species arranged in groups, as in the systematic series, and placed in drawers. Each drawer contains but one species, and a label giving the contents of that drawer is pasted in the upper left-hand corner of its front.

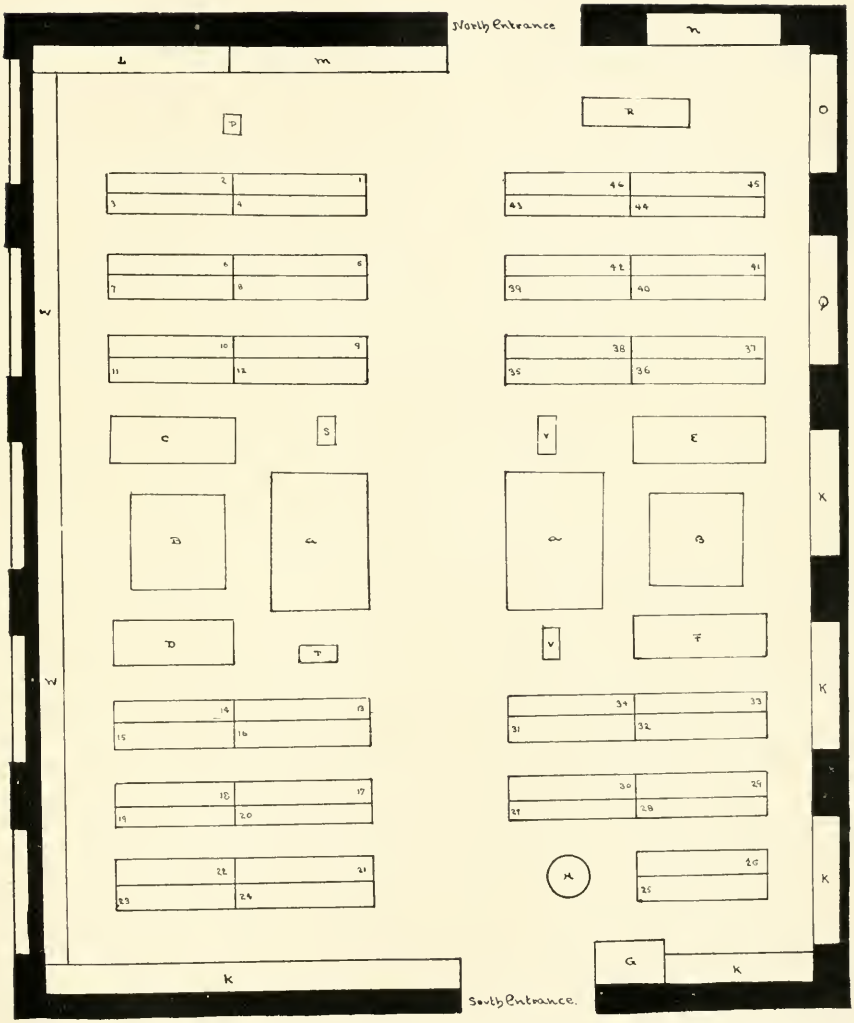
This series also includes all the original and type material belonging to the Department. These are brought together in a series of drawers reserved for that purpose, and all of the type or original specimens which are not needed to complete the exhibition series are here placed, together with a copy of the original papers, or at least a reference to them, and a bibliography in which the work has appeared. Those types used in the exhibition series are here indicated by a card giving its exact position in the cases.

THE DUPLICATE SERIES.

This series includes all that material not needed for the exhibition or study series; and from it all exchanges, gifts, etc., are made up.

INSTALLATION.

The species and varieties of minerals—that is, the systematic series—are arranged in forty-six slope front-floor cases. Beginning with the first on the right, entering the hall from the north, the contents of these cases are as follows: 1–2, native elements; 3–4, fluorides, chlorides, bromides, and iodides; 5–9, sulphides, selenides, tellurides, arsenides, antimonides, and sulphosalts; 9–16, oxides; 17, borates, aluminates, chromites, ferrites, manganites; 18–22, carbonates; 23–37, silicates; 38, titanates, columbates, and tantalates; 39, nitrates and vanadates; 40–42, phosphates and arsenates; 43–45, sulphates; 46, chromates, molybdates, tungstates, and uranates. The several special collections, which may be recognized by their case labels, are contained in the cases marked A, B, C, D, E, F, etc., in the plan (Plate 1). The wall case W on the west side of the hall contains the comparative series.



PLAN OF THE MINERAL HALL.